GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Industrial Automatics Systems, PG_00051511		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2021	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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	4.0
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 Własa	
	Teachers	dr inż. Mirosław Własa	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	15.0	0.0	0.0	60

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	60	5.0	35.0	100

Subject objectives

The aim of this course is to present industrial automation systems. The main content is the design, integration and visualization of industrial process control systems, constructed on the basis of CAD/CAM class design software and SCADA class visualisation software. Review of types of electronic and power-electronic devices used in industry. Selection of the converter to the drive system. Selection of control and control equipment. Power supply and redundancy of industrial automation systems. Machine safety.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_K05	He knows the principles of health and safety and the principles of safe machine design.	[SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice
K6_W10	The student is able to design an industrial automation system	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
K6_U09	The student uses data sheets and technical and operating documentation of automation equipment, as well as documentation of electrical equipment and apparatus realizes the design of the automation system	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
K6_K01	The student, working in a group develops a report on the basis of based on the available literature and laboratory research carried out and presents it in the credit classes	[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills

Subject contents	The subject matter of the course includes design, integration and visualization of industrial process control systems, constructed on the basis of CAD/CAD class design software and SCADA class visualisation software. Types of industrial objects with PLCs and converters. Selection of the converter to the drive system. Selection of control and control equipment. Setting of protection in frequency inverters. Power supply and redundancy of industrial automation systems. Setting of frequency converter parameters. Machine safety - safety categories and stopping categories. Ways of creating projects and drawing electrical diagrams. Programming of frequency inverters cooperating with PLC controllers, operator panels in industrial automation systems Hardware requirements for control and automatic regulation systems. Structures of industrial automation systems and industrial network solutions. OPC and DDE servers.
Prerequisites and co-requisites	The subject is a continuation and supplement of the subject "Industrial Information Networks" and "Automation of Electric Drive".

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Raport	50.0%	50.0%
Project	50.0%	50.0%

Recommended reading

Basic literature	1. Dokumentacja do programu SEE Electrical Expert - CAD Elektryczny http://www.ige-xao.pl 2. Co warto wiedzieć o napięciowych przemiennikach częstotliwości J. Szmajdziński Wydawnictwo Politechniki Rzeszowskiej 2001 3. Jakuszewski R.: Programowanie systemów SCADA. WPK J. Skalmierskiego, Gliwice 2002 4. Legierski T..: Programowanie sterowników PLC. WPK J. Skalmierskiego, Gliwice 1998
Supplementary literature	1. L. Ptaszyński: Przetwornice częstotliwości Wyd. ENVIROTECH, Poznań 1996 2. P. Drozdowski: Wprowadzenie do napędów elektrycznych Wyd. Politechnika Krakowska, Kraków 1998 3. Niestępski S., Parol M. i In.: Instalacje Elektryczne Budowa, Projektowanie i Eksploatacja Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001 4. Wiatr J.: Poradnik Projektanta Elektryka Dom Wydawniczy Medium Warszawa 2006.
eResources addresses	Uzupełniające Adresy na platformie eNauczanie: SYSTEMY AUTOMATYKI PRZEMYSŁOWEJ [2023/24] - Moodle ID: 28502 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28502

Example issues/ example questions/ tasks being completed	1. design and construction of a laboratory station with Siemens S7-300 programmable logic controllers (Matalb facility model, PLC control) (station 10) 2 Laboratory station for temperature and pressure control with visualisation on a PC. (VIPA Speed7- stand 8) 3. Design and construction of a belt conveyor drive model (Mitsubishi st. 9). 4. assembly and start-up of the passenger lift model (Schneider PLC M340 st. 10) 5. visualisation and control of the food centrifuge drive system model.(St. 3, Altivar inverter, Modbus RTU) 6. induction-motor cargo and passenger elevator drive.(st. 7 FCM 300 inverter, PLC - Moeller XC-200) 7. Pumping station model.(St. 3, ABB inverter, Siemens S1200 controller) 8. 3 axis milling plotter control.(St. 1. B&R servo drives and stepper motors and PLC) 9. paper rewinder model with Danfoss FC302 converters and Moeller XC-200 controller. (stand 7) 10. laboratory stand to control room ventilation as a function of temperature. (VIPA Speed7 - stand 10) 11. Ethernet network in H11W Laboratory, webcam. 12. SEW Eurodrive - frequency inverter gearmotor (stand 5) 13. Beckhoff stepper motor laboratory stand (stand 2). 14. laboratory stand for temperature and humidity control with visualisation on a PC. (SIMEX - stand 8).
Work placement	The opportunity to visit the Distributed Generation Laboratory.