GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Control in industrial objects, PG_00038081		
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	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	4	Language of instruction	Polish
Semester of study	7	ECTS credits	4.0
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 hab. inż. Marcin Śliwiński	
	Teachers	dr inż. Jacek Zawalich dr inż. Adam Kielak dr inż. Emilian Piesik	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	0.0	0.0	45

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	45	2.0	53.0	100

Subject objectives

The aim of the course is to present selected industrial objects and the control systems correlation with the industrial technology used in them. With a focus on process automation systems, sequential automation systems; Control and automation systems for nuclear power plant and refinery.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W11	The student is able to assess the threat from the outside for the operation of a distributed control and protection system.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
K6_U07	Students will be able to perform a simple model of the process installation part in the simulation software.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
K6_K04	The student has basic knowledge about the use of functional safety methodology.	[SK2] Assessment of progress of work [SK4] Assessment of communication skills, including language correctness

Subject contents	**Lecture** The scope covers discussing the structure of a modern enterprise on selected examples of industrial objects: object-oriented measurement systems and actuators; basic process control systems and distributed control systems (BPCS; DCS) and alarm or supervisory control and data acquisition systems; safety instrumented systems SIS; safety related systems SRS; emergency shutdown systems ESD; and production management systems with enterprise management elements (SAP ERP; MES). Cooperation of individual systems within the layered control system, from the basic control systems layer (and safety systems) through the master control systems to the management and production planning layer. Classification of objects and automation systems in technical facilities in relation to applied technologies. Functional, technical and organizational characteristics of installation and systems. Marine automation systems, sequential control, power system, wind farms, petrochemical installations and nuclear power plants. Visualization of the interaction between the controlled object and the control unit. An overview of the magnitudes characterized of a controlled object taking into account the technological aspects of the considered objects. **Laboratory** Computer control, monitoring (SCADA) and protection automation systems used in typical industrial installations. Examples of sequential control systems. Actuators and measuring subsystems in BPCS, DCS, SIS and ESD systems used in industrial installations. Introduction to the modeling of technological processes in typical industrial plants using Flownex SE software.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Assessment of activity on laboratory exercises and home-written reports	60.0%	30.0%
Writing test part 1	60.0%	35.0%
Writing test part 2	60.0%	35.0%

Recommended reading

Basic literature	1. K.T. Kosmowski red.: Podstawy bezpieczeństwa funkcjonalnego. Wydawnictwo Politechniki Gdańskiej 2. J. Stokłosa, T. Bilski, T. Paszkowski: Bezpieczeństwo danych w systemach informatycznych. 3. R. Andersen: Inżynieria zabezpieczeń. WNT Warszawa 4. M. Karbowski: Podstawy kryptografii. Helion. 4. Z. Bubnicki: Teoria i algorytmy sterowania. PWN, Warszawa 2005.
Supplementary literature	1. Hoyland A., Rausand M.: System Reliability Theory. Models and Statistical Methods. New York: John Wiley & Sons, Inc. 1994.
eResources addresses	Adresy na platformie eNauczanie: STEROWANIE W OBIEKTACH PRZEMYSŁOWYCH [2023/24] - Moodle ID: 33684 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33684

Example issues/ example questions/ tasks being completed	1. What is the difference between SIS and BPCS ? 2. Why in the process industry installation are used layer of protection system ?
Work placement	Not applicable