GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Control in industrial objects, PG_00058309		
Field of study	Automation, Robotics and Control Systems		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2027/2028
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		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	15.0	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 facilities and the interrelation of the control systems with the industrial technology used in them. With a focus on automation systems process automation systems, sequential automation systems; control and protection automation systems in nuclear power plant and refinery.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U07] can build and analyze models of systems and systems in the field related to control systems and automation	Students can perform a simple one model of a fragment of the installation process in software simulation.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K6_K04] can react in abnormal and emergency situations, threats to health and life when using automation and robotics components and systems	The student has basic knowledge of the application of the methodology of functional safety.	[SK2] Assessment of progress of work [SK4] Assessment of communication skills, including language correctness
[K6_U09] is able to use artificial intelligence methods and understands the advantages and limitations of using this type of tools in engineering	The student has advanced knowledge about the use of methods artificial intelligence.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K6_W11] knows the hazards arising from devices, installations, systems and technical systems, basic principles of occupational health and safety, taking into account the role of control and security systems in controlling automation and robotics facilities	The student is able to assess threats from the outside on functioning distributed control and safety systems.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents	Lecture. The scope includes a discussion of the structure of a modern enterprise using selected examples industrial facilities: object measurement systems and actuators; control systems processes (BPCS; DCS) and their supervision from the central control room (alarm system; SCADA); systems protection automation (SIS; SRS; ESD) and production management systems with elements business management (SAP; ERP; MES). Cooperation of individual systems within structure of a layered control system, from the direct control (and protection) layer through superior control systems to the management and production planning layer. Classification facilities and automation systems in facilities in relation to the technologies used. Characteristics functional, technical and organizational systems of facilities. Ship automation system, control sequential, energy system and power system, wind farms, installations petrochemical and nuclear power plants. Illustration of interactions between the controlled object and control unit. Discussion of the quantities characterizing the controlled object, taking into account aspects technological processes occurring in the facilities under consideration. Design. Computer control, monitoring (SCADA) and security automation systems used in typical industrial facilities. Examples of sequential control systems. Executive and measurement subsystems in BPCS, DCS, SIS and ESD systems used in facilities industrial. Introduction to modeling of typical technological processes industrial facilities using Flownex SE software.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Pass-fail test part 1	60.0%	35.0%
Pass-fail test part 2	60.0%	35.0%
Evaluation for the project	60.0%	30.0%

Recommended reading

Basic literature	1. K.T. Kosmowski red.: Podstawy bezpieczeństwa funkcjonalnego. Wydawnictwo Politechniki Gdańskiej, 2020. 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. 5. 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:

Example issues/ example questions/ tasks being completed	1. State the differences between the SIS system and BPCS? 2. Why are layered safety systems used in process installations?
Work placement	Not applicable