COURSE DESCRIPTION CARD - SYLLABUS

Course name
Automation in safety assurance

Course

Field of study
Safety Engineering

Year/Semester
2/3

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:
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Prerequisites

A student beginning classes in the course of Automation in Safety Assurance should have basic knowledge in mathematics, physics and computer science. Student should also have the ability to obtain information from indicated sources and be ready to start cooperation within the team.

Course objective

The aim of the course is to provide students with basic concepts and concepts for solutions in the field of automation, computer control and process monitoring and visualization systems. To develop students' problem-solving skills in designing automation systems to ensure safety of operators, machines and technological processes.

Course-related learning outcomes

Knowledge

student has the structured, underpinned by theoretical knowledge of the methods measuring environmental factors [P6S_WG_02],

student knows the basic methods of design and analysis of automatic control systems used in industrial processes [P6S_WG_06],

student knows the methods of design control, monitoring and visualization systems using to minimize security risks, devices, structures, systems and technical systems [P6S_WG_02].

Skills

students can to select sensors and transducers to specific of automation systems [P5S_UO_01],

students can to design automatic control systems used in industrial processes to meet specific requirements and performing specific functions [P5S_UO_01],

student can to evaluate the economic aspect of the solution in the selection of the control parameters and the design of the monitoring and visualization systems of security threats people, machines, equipment and processes [P5S_UW_06].

Social competences

student understands the need for permanent training and sharing understandable information with the immediate environment for professional activities [P6S_KK_01, P6S_KK_02],

student understands the non-technical, including of the environmental consequences their actions and the impact on the environment, and demonstrates a willingness to teamwork [P6S_KR_02].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified by the colloquium realized during the last lecture. The colloquium consists of 10 questions (5 test and 5 open), differently scored. The credit threshold - 50% of points. The credit issues on the basis of which the questions are prepared will be made available to students on the lecturer's website.

In the scope of laboratory courses - obtaining a final pass is conditioned by passing all laboratory exercises together with the realization of the final task requiring the use of the acquired skills of designing an automation system.

Programme content

Lecture: signals, sensors and signal converters used in automation. Object-modeling technique, mathematical models of systems. Linearization, Laplace transform, transfer function. Basic elements of control and time – frequency analysis (characteristics in frequency and time domain). Automatic control systems, the basic control algorithms, tuning of classical controllers, quality control, stability of automatic control systems. Security for industrial automation and control systems. Safety of control process, risk assessment and categories of security of monitoring control systems.

Laboratory: Modeling of control object, modeling of actuator in Matlab Simulink and Scilab. Time - frequency analysis for selected of automation systems. Modeling and simulation for automatic control. Implementation of the selected control algorithms. Implementation of the monitoring and visualization system of the industrial process in the security context.

Teaching methods

Lecture - multimedia presentation.

Laboratory - instructions placed on the lecturer's website.

Bibliography

Basic

Urbaniak A., Podstawy automatyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2007

Mazurek J., Vogt H., Żydanowicz W., Podstawy automatyki, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2006

Additional

Brzózka J., Regulatory i układy automatyki, Wydawnictwo Mikom, Warszawa 2004

Rosołowski E., Automatyczne sterowanie i regulacja. Procesy ciągłe i dyskretne, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2020

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	35	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests) [1]	40	1,5

[1] delete or add other activities as appropriate