



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Automation

Course

Field of study

Management and production engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/5

Profile of study

practical

Course offered in

english

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo 3, 60-965 Poznań

Prerequisites

Mathematics in the field of set theory, Boolean algebra. Ability to operate on sets and logical functions.

Fundamentals of electrical engineering and electronics. Management basics.

Course objective

Acquainting with the basics of automation and industrial automation.

Course-related learning outcomes

Knowledge

Knows what automation does, knows the basic concepts and systems of automation. Knows what an open and closed system is and knows what automation tasks are - [K_W12]



Knows what are binary functions, combinational and sequential circuits - [K_W12]

Knows what it is, how it works and how to program an industrial PLC controller - [K_W12]

Knows what basic elements are used in automation: sensors, measuring devices, drives, etc. - [K_W12]

Knows the structure of complex automation systems and generally knows what computer production control is - [K_W12]

Skills

Is able to implement a given combinational and sequential binary function - [K_U15]

Can write and run a simple binary control program for the device - [K_U15]

Is able to select the basic elements of automation - [K_U15]

can propose the automation structure of the device and the production line - [K_U15]

Social competences

Understands the need for lifelong learning - [K_K01]

Is aware of the role of automation in the modern economy and its importance for the management and control of production - [K_K04]

Can define priorities for the implementation of the task of automation - [K_K02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

EXAM: Passed on the basis of an examination consisting of 5 general questions (for a correct answer to each question - 1 point. Grading scale: less than 2.6 points - 2, 2.6 ÷ 3.0 - 3.0, 3.1 ÷ 3.5 points - 3.5, 3.6 ÷ 4.0 points - 4.0, 4.1 ÷ 4.5 points - 4.5, 4.6 ÷ 5.0 points - 5.0 very good)

Laboratory: Credit based on the correct implementation of exercises and reports on each laboratory exercise according to the instructions of the laboratory teacher. Before the exercises, short entrance tests, and after the exercises, a written final test. In order to pass the laboratories, all exercises must be passed (positive grade from the answers and the report).

Programme content

1. Basic concepts. Signals. Open and closed automation systems. Basics of description of automation elements. Block diagrams. Regulators.
2. Basics of Boolean algebra. Functions of 2nd variables. Implementation of two-state systems. Sequential systems. Basic digital elements.
3. Construction and operation of PLC controllers
4. Fundamentals of PLC application and programming



- 5. Basic elements of automation: measuring and driving
- 6. Automated devices and industrial automation systems
- 7. Production control and management systems. SCADA, MES, ERP systems Systemy sterowania i zarządzania produkcją. Systemy SCADA, MES, ERP.

Teaching methods

Lectures and multimedia presentation illustrated with examples given on the board.

Bibliography

Basic

- 1. Modern Control Engineering (5th Edition) by Katsuhiko Ogata.
- 2. Introduction to PLCs: A beginner's guide to Programmable Logic Controllers, 2012 by E. Pérez Adrover

Additional

Handbook of SCADA/Control Systems Security, Robert Radvanovsky, Jacob Brodsky

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	30	1,0

¹ delete or add other activities as appropriate