

Programming methods for programmable logic controllers - course description

General information	
Course name	Programming methods for programmable logic controllers
Course ID	11.9-WE-AutD-PMfPLC-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Automatic Control and Robotics / Computer Control Systems
Education profile	academic
Level of studies	Second-cycle Erasmus programme
Beginning semester	winter term 2022/2023

Course information	
Semester	2
ECTS credits to win	2
Course type	optional
Teaching language	english
Author of syllabus	<ul style="list-style-type: none">dr inż. Małgorzata Mazurkiewicz

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	15	1	-	-	Credit with grade
Laboratory	15	1	-	-	Credit with grade

Aim of the course

- To provide knowledge on design and programming of contemporary industrial control systems of PLC class.
- To develop skills in configuration and programming of SIMATIC S7 1200 controllers.
- To develop skills in visualization of simple industrial processes.

Prerequisites

Scope

Introduction to formal specification and verification of programs for logical control.

Design of program in Ladder Diagram language with use of decision tables.

New generation PLC controllers: S7 series. Network configuration, system structure. Programming with new engineering tools.

PLC programming according to IEC standard. Process visualisation. Human Machine Interface in control system.

Implementation of control algorithms. Program concurrency. Diagnostics of control algorithm.

Algorithm specification in Function Block Diagram and Ladder Diagram. Modular and linear program structure.

Program testing and verification.

Teaching methods

Lecture, laboratory exercises.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Can solve tasks related to realization of control system based on PLC controllers.		<ul style="list-style-type: none">• a quiz• an ongoing monitoring during classes• carrying out laboratory reports	<ul style="list-style-type: none">• Laboratory
Can characterize digital control systems specification methods.		<ul style="list-style-type: none">• a test with score scale	<ul style="list-style-type: none">• Lecture
Possesses skills to visualize simple production processes.		<ul style="list-style-type: none">• an ongoing monitoring during classes• carrying out laboratory reports	<ul style="list-style-type: none">• Laboratory
Knows and can practically apply PLC drivers programming languages.		<ul style="list-style-type: none">• a quiz• an ongoing monitoring during classes• carrying out laboratory reports	<ul style="list-style-type: none">• Laboratory

Assignment conditions

- Lecture – the passing condition is to obtain a positive mark from the test.

- Laboratory – the passing condition is to obtain positive marks from laboratory exercises to be planned during the semester.

Recommended reading

L. A. Bryan, E. A. Bryan: Programmable controllers. Theory and Implementation, Amber Technical Pub, 2003.

K. Collins: PLC Programming for Industrial Automation, Exposure Publishing, 2006.

H. Berger: Automating with SIMATIC S7-1200: Configuring, Programming and Testing with STEP 7 Basic, 2013

Further reading

Notes

Modified by dr hab. inż. Wojciech Paszke, prof. UZ (last modification: 11-04-2022 09:05)

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