



COURSE DESCRIPTION CARD - SYLLABUS

Course name

PLC Controllers [S1Eltech2>PO2-StPLC]

Course

Field of study

Electrical Engineering

Year/Semester

3/5

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

30

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

3,00

Coordinators

dr inż. Krzysztof Budnik

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Lecturers

Prerequisites

Students beginning this course should have a basic understanding of electrical engineering, digital and analog electronics, automation and control, and programming. They should also demonstrate the ability to self-educate and be willing to collaborate within a team.

Course objective

Familiarization with the operating principles, operation, and broadly defined programming of PLC controllers. Acquisition of skills in designing automation systems for industrial needs.

Course-related learning outcomes

Knowledge:

Has basic knowledge of the use of PLCs for control in industrial automation systems.

Skills:

Can correctly identify an object requiring an automatic control system. Can select appropriate devices: a PLC, measuring, control, and actuator components (analog and digital). Can utilize the tools necessary for software implementation of a desired control algorithm using a PLC.

Social competences:

Recognizes the importance of knowledge in solving cognitive and practical problems and understands that in technology, knowledge and skills quickly become obsolete and therefore require constant updating.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

- Assessment of knowledge and skills demonstrated in a problem-based written exam, passing score: 50% of points.

Laboratory:

- Testing and rewarding knowledge necessary to complete the current laboratory exercises,
- A project during the final class involving independent completion of a given task, conducted in groups of 2-3 students,
- Pass score: 50% of points.

Programme content

Basic information in the field of industrial automation, control theory, including the structure and operation of PLC controllers.

Course topics

Lecture:

Introduction to control concepts. Classification, architecture, structure, and operating principles of PLCs. Characteristics of basic PLC expansion modules. Programming languages (LAD, STL, FBD). Programming basics, arithmetic and logical data operations, basic function blocks. Examples of system configurations using a PLC.

Laboratory:

- Familiarization with dedicated laboratory kits containing a PLC,
- Discussion of programming tools,
- Project creation, hardware configuration, writing a basic program in a selected programming language, program operation testing, and project archiving,
- Using basic logical operations, timers, comparators, and flip-flops to control I/O DI, DO, AI, AO,
- Control project for a selected industrial process.

Teaching methods

Lecture:

Multimedia presentation, illustrated with examples provided on the board.

Laboratory:

Multimedia presentation, illustrated with examples provided on the board, and completion of tasks assigned by the instructor - practical exercises.

Bibliography

Basic:

1. Kasprzyk J., Programowanie sterowników przemysłowych., WNT, Warszawa, 2006.
2. Gilewski T, Szkoła programisty PLC : sterowniki przemysłowe, Wydawnictwo Helion, Gliwice, cop. 2017, ISBN: 978-83-283-3082-5.
3. SIMATIC, Programming with STEP7, Manual, Wydanie 5/2010, Siemens A.G.
4. Ladder Logic (LAD) for S7-300 and S7-400 Programming, Reference Manual, 6ES7810-4CA10-8BW1, 05.2010, Siemens A.G.

Additional:

1. Simatic S7 Programowalny sterownik S7-1200, Podręcznik systemu, Wydanie 4/2009, Siemens A. G.
2. J. Kwaśniewski. Programowalny sterownik SIMATIC S7-300 w praktyce inżynierskiej, Wydawnictwo BTC, Legionowo 2009.
3. J. Kwaśniewski, Sterowniki PLC w praktyce inżynierskiej, Wydawnictwo BTC, Legionowo 2008.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	47	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	28	1,00