



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Control Engineering and computing science in industry [S1Eltech1>B-AilwP]

Course

Field of study

Electrical Engineering

Year/Semester

3/6

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

30

Laboratory classes

30

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

3,00

Coordinators

dr inż. Jerzy Frąckowiak

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Lecturers

Prerequisites

Knowledge of Boolean algebra, minimization of logic functions, basics of microcontrollers and programming.

Course objective

Synthesis of selected industrial control systems, development of algorithms and control programs for PLC controllers, their activation and testing.

Course-related learning outcomes

Knowledge:

Architecture, instruction list, timers, counters, S7-1200 PLC interrupts, selected PLC programming languages.

Skills:

Is able to formulate a control algorithm for combinational systems and the SFC method, uses programming languages and appropriate IT tools used in electrical engineering.

Social competences:

Is aware of the importance of own work and compliance with professional ethics, is ready to comply with the principles of team work and take responsibility for jointly performed tasks.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture - 90 minutes final test.

Laboratory - development of the control algorithm; writing, launching and presenting the control program of an example control system.

Programme content

PLC programmable controller, selected interrupts, cooperation with the operator panel.

SFC control algorithm, LAD and STL programming languages

Selection of sensors and measurement transducers.

Discrete PID controller, selection of controller settings.

Course topics

Lecture:

Construction and architecture of the Siemens PLC S7-1200 controller.

Discussion of selected interrupts. programming languages, TIA Portal environment.

Presentation of SFC control algorithms for example control systems. Based on control algorithms, program implementation in LAD and STL languages. Launching and testing control programs.

Presentation of selected transducers/sensors used in the control system, discussion of their principles of operation, properties and parameters.

Communication between the PLC controller and the operator panel, presentation of selected control system parameters on the operator panel

Discussion of the discrete control algorithm of the positional and incremental PID controller, control algorithm implemented in the MATLAB environment, selection of controller settings.

Lab:

Program implementation of the presented control algorithms on a PLC controller; testing and tracking program execution.

Independent development of the control algorithm for the assigned control system, its implementation on the controller with the possibility of using the operator panel. Testing, tracking execution and presenting the operation of the control system.

Teaching methods

Lecture: multimedia presentation illustrated with examples given on a blackboard.

Laboratory exercises: multimedia presentation, presentation illustrated with examples given on a blackboard, and performance of tasks given by the teacher - practical exercises.

Bibliography

Basic

Seta Z. , Wprowadzenie do zagadnień sterowania, Wydawnictwo Mikom, Warszawa 2002.

Kamiński K., Programowanie w Step 7 Microwin, GRYF, Warszawa 2006.

Dokumentacja sterownika S7-1200 firmy Siemens.

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	85	3,00
Classes requiring direct contact with the teacher	75	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,00