# COURSE DESCRIPTION CARD - SYLLABUS

Course name
Programming of industrial controllers [S1Mech2>PSP1]

## Course

Field of study
Mechatronics

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

## Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

## Number of credit points

2,00

## Coordinators

dr inż. Dariusz Sędziak
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## Lecturers

## Prerequisites

The student learned the basics of electronics, the basics of automation, elements of mechatronics, drives and sensors, automation and supervision of machines. Initially learned about sensors.

## Course objective

Learning about the structure, operation, design and programming of industrial device controllers

## Course-related learning outcomes

Knowledge:
Extended knowledge of the structure of PLC controllers and knowledge of the principles of connecting I/O elements to these controllers. Knowledge of languages and methods of programming and configuring PLC controllers and drives of production devices and systems.

Skills:
The student understands the need for lifelong learning; is able to inspire and organize the learning process of others. Is aware of the role of automation in the modern economy and its significance for society and the environment. Is able to define priorities for the implementation of a specific task.

Social competences:
The student understands the need for lifelong learning; is able to inspire and organize the learning process of others. Is aware of the role of automation in the modern economy and its significance for society and the environment. Is able to define priorities for the implementation of a specific task.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Passing based on a written work consisting of 4-5 general questions from the subject (< 50% - ndst, 50-60%: dst 60-70%-dst+, 70-80: db, 80-90: db+, > 90% - bdb)
Laboratory: Passing based on an oral or written answer from the content related to the exercise performed and an assessment of the reports from each exercise. Passing the laboratory takes place after meeting both criteria

## Programme content

Discussion of selected issues in programming industrial controllers on various hardware platforms, drive control, and an introduction to machine safety functions.

## Course topics

Construction and configuration of PLC controllers from different manufacturers, methods of I/O connection and implemented functionalities. Discussion of PLC programming environments from different manufacturers. Selection of a PLC controller for the tasks performed and functions of the control system. Discussion of the functions of word operations, data conversion, comparison, etc. Division of programs, functions and procedures on the PLC platform, function libraries, application examples.

## Teaching methods

Lecture: multimedia presentation illustrated with examples
Laboratory: Topics implemented in groups at teaching stations

## Bibliography

Basic:
1. Kwaśniewski J., Sterowniki PLC w praktyce inżynierskiej, Wydawnictwo BTC, Legionowo 2008.
2. Flaga S., Programowanie sterowników PLC w języku drabinkowym, Wydawnictwo BTC, Legionowo 2010.
3. Pierwsze kroki z Simatic S7-1200, Wydawnictwo Siemens
4. J. Hawrylak, Języki programowania sterowników PLC: LAD, FBD, SCL, STL. Ćwiczenia dla początkujących, Wydawnictwo Helion
5. K. Korpysz, P. Obstawski, R. Sałat, Wstęp do programowania sterowników PLC, Wydawnictwa Komunikacji i Łączności WKŁ

Additional:
1. Terminal HMI serii NQ - Instrukcja obsługi, Omron
2. Materiały dodatkowe, udostępniane przez producentów sprzętu

## Breakdown of average student's workload

| | Hours | ECTS |
|---|---|---|
| Total workload | 50 | 2,00 |
| Classes requiring direct contact with the teacher | 30 | 1,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 20 | 1,00 |