COURSE DESCRIPTION CARD - SYLLABUS

Course name
Automation in mechatronics [S1Mech2>AwM]

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
30

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

dr inż. Dariusz Sędziak
dariusz.sedziak@put.poznan.pl

Lecturers

Prerequisites

The student learned the basics of electronics, basics of automation, and elements of mechatronics.

Course objective

Familiarization with the construction, operation, design and programming of automation systems and supervision of machines and production processes

Course-related learning outcomes

Knowledge:
Has knowledge of the construction, basic operation and parameters of sensors and measuring and drive elements used in industrial automation. Knows the general construction and operation of PLC controllers and is able to program them using the LD method. Knowledge of signals and their transmission methods in automation. Has knowledge of connecting elements to PLC controllers. Construction and operation of automation systems and machine and process supervision.

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 exam consisting of 5-6 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 the field of automation components and systems, basic types of sensors used in industrial applications. Introduction to PLC controllers, construction, classification. Introduction to visualization.

Course topics

Structure of an automated system. Signals and information coding in automation. Signal transmission in industrial automation systems. Installation of automation systems. Basic parameters of sensors. Sensors for detecting objects and machine elements. Two-state sensors. Analog and digital sensors. Measurements of object position. Measurements of speed, acceleration, force, temperature, etc. Relays. Counters and timers. Identification systems in automation systems. Basics of vision systems. PLC controllers - structure, classification and operation. PLC programming languages. Basic functions and programming examples. Introduction to visualization and communication in automation systems.

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	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