COURSE DESCRIPTION CARD - SYLLABUS

Course name
Automation of the production processes in electromobility [S2Elmob1-SSP>APPwE1]

Course

Field of study
Electromobility

Year/Semester
1/2

Area of study (specialization)
Car Onboard Systems

Profile of study
general academic

Level of study
second-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. Arkadiusz Hulewicz
arkadiusz.hulewicz@put.poznan.pl

Lecturers

Prerequisites

A student starting this course should have basic knowledge of electrical engineering, metrology and computer science as well as electronics, including electronic analog, digital and microprocessor circuits. They should also have the ability to effectively self-educate in the field of PLC programming and be able to work in a laboratory group.

Course objective

Providing students with knowledge in the field of automation of production processes, focused mainly on electromobility. Transfer of thorough knowledge in the field of PLC programming and familiarization with interdisciplinary achievements in the field of their use for the needs of automation of production processes.

Course-related learning outcomes

Knowledge:
1. The student has extensive knowledge of programming techniques and the use of modern IT tools.
2. The student has extensive knowledge in the field of measurements of electrical quantities and selected non-electrical quantities, also with the use of remotely controlled systems.
3. The student has knowledge of methods and tools specific to project and production management,

with particular emphasis on the area of electromobility.

Skills:
1. The student is able to obtain information (in Polish and English) from various sources, make their interpretation, critical evaluation, analysis and synthesis, as well as draw conclusions.
2. The student is able to, when formulating and solving engineering tasks, take into account unpredictable conditions, given technical specification and non-technical criteria, ensuring savings of raw materials and energy.
3. The student is able to integrate knowledge from various sources and related disciplines when formulating and implementing engineering projects.

Social competences:
1. Student rozumie, że w obszarze techniki wiedza i umiejętności szybko się dewaluują co wymaga ciągłego ich uzupełniania.
2. Student ma świadomość znaczenia najnowszych osiągnięć naukowych i technicznych w rozwiązywaniu problemów badawczych i praktycznych oraz w razie potrzeby wspierania się opiniami ekspertów.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: The knowledge acquired during the lecture is verified during a 45-minute colloquium carried out during the last lecture. The test consists of 6-8 questions (open), scored differently. Passing threshold: 50% of points. The credit issues on the basis of which the questions are developed will be made available to students in the Moodle system.
Laboratory: The skills acquired during laboratory classes are verified during each class on the basis of software control systems using PLC and HMI and a final test in the last laboratory consisting in completing a given program task. Passing threshold: 50% of points.

Programme content

Lectures:
1. Structure of the measuring systems using PLC controllers and HMI panels. Programming languages and examples of measuring systems configurations with the use of a PLC controller.
Laboratory:
Construction and programming of control systems using PLC controllers and HMI panels.

Course topics

Lecture:
1. Construction of systems for automatic control of production processes in electromobility, using PLC controllers and HMI panels.
2. PLC programming languages: graphic and text.
3. Fundamentals of programming, data operations, signal processing, communication of controllers.
4. Examples of configuration of systems for automatic control of production processes in electromobility, using a PLC controller and an HMI panel.
Laboratory:
1. Construction of systems for automatic control of production processes in electromobility, using PLC controllers and HMI panels.
2. Programming systems for automatic control of production processes in electromobility using a PLC controller and HMI panels.

Teaching methods

Lecture: Multimedia presentations supplemented with examples given on the board. Theoretical issues are presented in close connection with practice.
Laboratory: Multimedia presentations supplemented with examples given on the board and the implementation of experiments individually or in teams, with the help and control of the teacher.

Bibliography

Basic:
1. A. Hulewicz, Z. Krawiecki, K. Dziarski: Distributed control system DCS using a PLC controller, ITM Web Conf., Computer Applications in Electrical Engineering, Volume 28, 2019, s. https://doi.org/10.1051/itmconf/20192801041.
2. A. Hulewicz, Z. Krawiecki, Sterownik PLC i panel operatorski w układzie automatyki inteligentnego budynku, , Poznan University of Technology Academic Journals, Electrical Engineering, No 92, Poznań 2017, s. 345-354.
3. T. Gilewski., Podstawy programowania sterowników SIMATIC S7 1200 w języku LAD, BTC, Warszawa 2017.
4. R. Sałat, K. Korpysz, P. Obstawski, Wstęp do programowania sterowników PLC, WKŁ, Warszawa 2010.
5. A. Król, J. Moczko-Król, S5/S7 Windows Programowanie i symulacja sterowników PLC firmy Siemens, Nakom, Poznań 2002.
6. J. Kasprzyk, Programowanie sterowników przemysłowych, WNT, Warszawa 2006.

Additional:
1. Hulewicz A., Krawiecki Z., Parzych J., Przykłady niekonwencjonalnych zastosowań sterowników PLC, Poznan University of Technology Academic Journals, Electrical Engineering, No 91, Poznań 2017, s. 81 - 92.
2. U. Tietze, Ch. Schenck, Układy półprzewodnikowe, WNT, Warszawa 2009.
3. J. Bogusz, Lokalne interfejsy szeregowe w systemach cyfrowych, Wyd. BTC, Warszawa 2004.

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	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)	25	1,00