COURSE DESCRIPTION CARD - SYLLABUS

Course name
Designing of measurement and control systems [S2Eltech1E>PUP-R]

Course

Field of study
Electrical Engineering

Year/Semester
1/2

Area of study (specialization)
Microprocessor Control Systems in Electrical Engineering

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

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

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Lecturers

Prerequisites

The student has a basic knowledge of electrical engineering and computer operation. He has the ability to effectively self-educate in a field related to the chosen field of study. He can operate a computer at a basic level. He is aware of the need to expand his competences. He understands the necessity to use computer programs at work.

Course objective

Getting to know the methods of designing measurement and control systems of electrical devices, based on the use of microcontrollers. Getting to know the methods of programming microcontrollers and presenting the results of his work.

Course-related learning outcomes

Knowledge:
The student has in-depth knowledge of the construction and operation of the power system, renewable energy sources and economic and legal issues related to the generation, distribution and processing of electricity. He has extensive knowledge of creating optimization and decision algorithms used in the

power industry. Has extended knowledge of computer-aided design in electrical engineering.

Skills:
The student is able to make a critical analysis of complex electrical systems using appropriate tools, modifying the methods of their analysis if necessary. He can formulate a design specification of a complex and unusual electrical device or system, taking into account legal aspects, including intellectual property protection, and other non-technical aspects. He can design and manufacture electrical systems and systems for various applications. He can propose improvements to the existing design solutions and models of electrical systems and devices.

Social competences:
The student 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 replenishment. Is aware of the need to develop professional achievements and observe the rules of professional ethics, fulfill social obligations, inspire and organize activities for the benefit of the social environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures
Assessment of knowledge and skills demonstrated on the final test - written or oral.
Laboratories
- continuous assessment in class (rewarding activity and quality of perception),
- evaluation of laboratory projects prepared individually by each student.

Programme content

Lectures: Basics of using microcontrollers to design control systems for electrical devices. Basics of the programming environment used during the laboratory exercises. Presentation of the results of design works with the use of programming tools.
Project: designing, building and programming systems based on microcontrollers.

Course topics

Lectures: Basics of the programming environment used during laboratory exercises.
Project: Design, construction and programming of microcontroller-based systems used to control the operation of electrical devices.

Teaching methods

Lectures
Lectures with a multimedia presentation, supplemented with examples given on the blackboard.
Laboratories
Laboratory exercises performed with the use of engineering programs.

Bibliography

Basic:
[1] Banzi M.,Wprowadzenie do Arduino, APN Promise, 2016
[2] Smythe Richard J., Arduino w nauce: gromadzenie, wyświetlanie i przetwarzanie danych z czujników, APN Promise, Warszawa, 2022
[3] Smythe R. J., Arduino w nauce. Gromadzenie, wyświetlanie i przetwarzanie danych z czujników, Promise, 2022

Additional:
[1]Klosow A., Gorgoń M., Stanowisko dydaktyczne z wykorzystaniem platformy Arduino: projekty w zakresie robotyki, Collegium Witelona Uczelnia Państwowa, Legnica, 2022
[2] Klosow A., Lasowy E., Stanowisko dydaktyczne z wykorzystaniem platformy Arduino: projekty w zakresie telemetrii, Collegium Witelona Uczelnia Państwowa, Legnica, 2022
[3] Moranda H., Gielniak J., Kownacki I., Assessment of Concentration of Mineral Oil in Synthetic Ester

Based on the Density of the Mixture and the Capacitance of the Capacitor Immersed in It, Energies, 14 (1839), 2021, 1-12

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