COURSE DESCRIPTION CARD - SYLLABUS

Course name
Microprocessor technique

Course

Field of study
Electromobility

Year/Semester
2/4

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	15	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Piotrowo 3A Street, 60965 Poznań

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of mathematics, electronics and computer science. The ability to understand and interpret the messages communicated and effective self-education in the field related to the selected field of study. Willingness to work individually and as part of a team.

Course objective

Getting to know the architecture and the basics of programming microprocessor systems and the principles of their cooperation with external devices at the basic level.

Course-related learning outcomes

Knowledge

1. Knows the structure and principle of operation of analog and digital electronic, optoelectronic and power electronics systems; has general knowledge of teletransmission, technology and microprocessor systems, as well as PLC controllers and SCADA systems.

2. Has a structured and theoretically underpinned general knowledge of computer science key issues for the electromobility area, including programming and the use of IT tools in modeling, simulation and design.

3. Knows and understands the fundamental dilemmas of modern civilization related to the mass use of electromobility; is aware of the latest development trends related to the field of study.

Skills

1. Is able use literature sources, integrate the obtained information, evaluate it and interpret it and draw conclusions in order to solve complex and unusual problems in the field of electromobility.

2. Is able test and diagnose simple systems and devices related to the area of electromobility and use them in accordance with the requirements and technical documentation.

3. Is able compare various technical solutions, evaluate them in terms of selected utility, economic, ecological, legal and ethical criteria.

4. On the basis of technical documentation, using appropriate methods, tools and materials, he is able to make and start up typical electrical and electronic systems and devices used in electromobility.

Social competences

1. Understands the importance of improving professional, personal and social competences; is aware that knowledge and skills in the field of electromobility are evolving rapidly.

2. Understands the importance of knowledge in solving problems in the field of electromobility; is aware of the necessity to use the knowledge of experts when solving engineering tasks beyond their own competences.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

Assessment of the knowledge and skills demonstrated in the written test-problem exam - based on the number of points obtained.

Laboratory

1. Continuous assessment, rewarding the increase in the ability to use the learned rules and methods.

2. Assessment of knowledge and skills related to the exercise, assessment of the exercise report.

3. Obtaining additional points for activity during classes, especially for:

- proposing to discuss additional aspects of the issue,

- effectiveness of applying the acquired knowledge while solving a given problem

- the ability to cooperate as part of a team practically carrying out a detailed task in the laboratory,

- remarks related to the improvement of teaching materials,

- continuous assessment, rewarding activity and substantive content of statements.

Programme content

Kinds of microprocessor systems in terms of the features of their architecture. Purpose and properties of the basic components of the microprocessor system.

Microprocessor and microcontroller.

Architecture and instruction list of INTEL MCS51 family of microcomputer systems. Design and commissioning tools for MCS51 family controllers.

Advanced microcontrollers derived from the MCS51 family.

Architecture, command list and commissioning tools of microcontrollers with ARM core - on the example of a selected family of systems.

Support for basic I / O blocks on the structure of microcontroller systems.

The essence of digital analog signal processing. Types and division of digital signal processors (DSP). Architecture of signal processors based on the Analog Devices Inc. family of floating point processors ADSP-21000 family. Design and commissioning tools for DSP.

Teaching methods

1. The lecture with multimedia presentation (diagrams, formulas, definitions, etc.) supplemented with the content given on the blackboard. Introducing a new topic, preceded by a reminder of content related to other items.

2. The laboratory exercises: a multimedia presentation, a presentation illustrated with examples given on the blackboard and the implementation of tasks given by the teacher - practical exercises.

Bibliography

Basic

1. P. Misiurewicz, M. Grzybek, TTL semiconductor logic circuits (in polish), WNT, W-wa, 1982.

2. T. Starecki, 8051 microcontrollers in practice (in polish), BTC, W-wa, 2002.

3. P. Hadam, Design of microprocessor systems (in polish), Wydawnictwo BTC, W-wa, 2004.

4. J. Doliński, AVR microcontrollers in practice (in polish), Wyd. BTC, W-wa 2003.

5. R. G. Lyons, Introduction to digital signal processing (in polish), Issue II, WKŁ, W-wa, 2010.

6. A. Dąbrowski, Signal processing using the signal processors (in polish), Publishing House of Poznań University of Technology, Poznań, 2000.

Additional

1. T.P. Zieliński, Digital signal processing. From theory to applications. (in polish), Issue II, WKŁ, W-wa, 2014.

2. Technical documentation of selected microprocessor systems, their application notes, and educational materials - available on the websites of theirs manufacturers.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	50	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation of a report on the laboratory exercise, preparation for exam) [1]	25	1,0

[1] delete or add other activities as appropriate