COURSE DESCRIPTION CARD - SYLLABUS

Course name
PO6: Electronics of electric vehicles in practice - Electronic systems of electrical vehicles

Course

Field of study
Electromobility

Year/Semester
3/6

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
elective

Number of hours

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

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:
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Prerequisites

Basic knowledge of electrical engineering and electronics. Basic knowledge of electronic analog and digital circuits. Knowledge in scope of construction of electric vehicles. Ability to effectively self-study in the field related to the design and construction of electronic circuits. Awarness of the need to expand their competences and is ready to cooperate as part of a team.

Course objective

Presentation of the basics of designing, manufacturing, commissioning and testing of electronic circuits using in electric vehicles.

Course-related learning outcomes

Knowledge

1. Knows the structure and principles of operation of analog and digital electronic and optoelectronic devices in electric vehicles.

2. Understands the processes taking place in life cycle of electronic devices in electric vehicles.

Skills

1. Can design a simple electronic systems and devices used in electrical and hybrid vehicles and also in its systems of powering and charging.

2. Can create and run typical electronic circuits and devices used in electromobility.

3. Can test and diagnose simple electronic circuits and devices used in electromobility

Social competences

1. Understanding the need and knows the possibilities of lifelong learning (second and third cycle and post-graduate studies).

2. Ability to think and act in an entrepreneurial manner in the field of electrical engineering.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures

Evaluation of the knowledge with a written test related to the content of lectures (test, computational and problem questions). Passing threshold of test equals 50%.

The grade from laboratory as well as attendance and activities during the lectures are taken into account.

Laboratory

Rewarding of knowledge necessary to implement the problems posed in the area of laboratory tasks. Current assessment of skill related with realised task. Evaluation of the as-built design. Assessment of knowledge demonstrated on the written test in the scope of laboratory content (test questions and calculating tasks).

Programme content

Lectures

The major electronic systems of electric vehicles. Requirements for electronic devices in electric vehicles. Systems with low enegy consumption. Application and realisation of devices with galvanic separation. The standards of data transmission in vehicles - CAN and LIN controlers. Electronic circuits power supply - DC/DC and DC/AC converters. The interfaces of sensors and executive devices (controlers of DC and Stepper Motors). Selected measurement devices in vehicles. On-board diagnostic

systems - the standard of OBD II. Connectors, wires, housings, cooling, shielding of electronic circuits in electronic vehicles. Techniques of assembling electronic circuits and making of PCB.

Laboratory

Knowledge of the principle of safety during laboratory classes. Design and implementation of a simple electronic circuit intented for use in electric vehicles. Diagnostics and testing of the completed electronic circuit. Preparation of as-built documentation for the completed circuit.

Teaching methods

Lecture

Lectures are performed using multimedia presentations illustrated with simulation examples and necessary mathematical calculations on the blackboard. Theoretical questions are presented in the exact reference to the practice.

Laboratory

Project development and making simple electronic circuit using method of soldering elements on printed circuit board (PCB). Individual use of laboratory equipment during diagnostics and testing of manufactured electronic circuits. Acquiring measurement results for as-built documentation.

Bibliography

Basic

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Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	20	0,5

[1] delete or add other activities as appropriate