



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electrical engineering and electronics in the automotive industry [S1MiBP1>EiEwPS]

Course

Field of study	Year/Semester
Mechanical and Automotive Engineering	3/6
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	Polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other
15	30	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

The student has a basic knowledge of the basics of electrical engineering and electronics. The student is able to integrate the obtained information, interpret it, draw conclusions; can connect simple electrical and electronic circuits. The student is aware of the importance of the technical efficiency of the vehicle and understands the technical aspects and consequences of the failure for road safety.

Course objective

Getting to know the theoretical and practical problems related to the construction, functioning and diagnosis of electrical and electronic systems of motor vehicles and familiarization with modern diagnostic equipment.

Course-related learning outcomes

Knowledge:

1. Has knowledge in the field of physics, including the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics, necessary to understand specialist lectures in the field of the theory of construction materials and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems .
2. Has basic knowledge of the standardized rules of recording structures and engineering graphics.

3. Has extended basic knowledge necessary to understand specialist subjects and specialist knowledge about the construction, construction methods, manufacturing and operation of a selected group of working, transport, thermal and flow machines covered by the diploma path.

Skills:

1. Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.
2. Can properly use modern equipment for measuring major physical quantities, used in machine research and production control.
3. Can draw a diagram and a simple machine element by hand in accordance with the rules of technical drawing.

Social competences:

1. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on its own.
2. Is ready to fulfill social obligations and co-organize activities for the benefit of the social environment.
3. Is ready to fulfill professional roles responsibly, including:
 - observing the rules of professional ethics and requiring this from others, - caring for the achievements and traditions of the profession.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture based on credit and the laboratory on the basis of the results of the current control of the preparation and evaluation of reports.

Programme content

The module program covers the following topics:

- electrical diagrams and etheric installations,
- energy production and storage,
- lighting systems,
- CAN communication bus,
- vehicle communication systems, OBD, diagnostic testers,
- sensors: pressure, position, speed and acceleration.

Course topics

The lectures and laboratory exercises cover the following topics:

- Basic information on the construction and drawing of electrical wiring diagrams in vehicles on a selected example.
- Design and operation of power systems, including operation and characteristics of alternators.
- Construction and operation of vehicle energy storage systems, including familiarization with the most commonly used battery solutions.
- Construction, operation and testing of lighting components, including control and start-up systems.
- Construction and operation of starting systems, starters and start-stop systems.
- Solutions of ignition systems and their components in motor vehicles
- Reading schematics of electronic circuits using modern software.
- Basic engine control systems.
- Application and testing of communication buses on the example of the CAN bus.
- External communication systems with vehicle controllers via the diagnostic socket.
- Identification of the location of components in the vehicle based on information from the software.
- Construction and operation of pressure / position / speed / acceleration sensors.
- Testing of selected engine components containing electronic systems.
- Testing of selected mechatronic systems of the vehicle with the use of diagnostic testers.

Teaching methods

1. Lecture with a multimedia presentation - a combination of an information and problem lecture;
2. Laboratory - building systems and testing their operation - experimental method.

Bibliography

Basic

1. Dyga G., Trawiński G.: Diagnostyka układów elektrycznych i elektronicznych pojazdów samochodowych, WiSP, Warszawa 2014r.
2. Fundowicz P., Radzimierski M., Wieczorek M.: Podstawy elektrotechniki i elektroniki pojazdów samochodowych, WiSP, Warszawa 2015r.
3. Ocioszyński J., Zespoły elektryczne i elektroniczne w samochodach, WNT, Warszawa 1999r.

Additional

1. Serwis motoryzacyjny; miesięcznik dla naprawiających i badających pojazdy, PISKP, Warszawa 2018r.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00