COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electrical and electronic systems in industry and vehicles

Course

Field of study

Electrical Engineering

Area of study (specialization)

Electric and Computer Systems in Industry and Vehicles

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

10

Laboratory classes

10

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Faculty of Control, Robotics and Electrical Engineering

ul. Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

The student starting this subject should have a basic knowledge of electrical engineering, electronics, microprocessor technology and electrical machines. They should also be able to interpret electrical diagrams, connect electrical circuits and cooperate in a team.

Course objective

Providing students with knowledge of theoretical and practical aspects related to the functioning and diagnosis of electrical and electronic systems used in industry and automotive vehicles.

Course-related learning outcomes

Knowledge

1. Has in-depth knowledge of physical phenomena and principles of mechanics necessary to understand the functioning and diagnosis of automotive accessories and industrial equipment.

2. Has knowledge about the use and application of modern solutions in electrical and electronic systems in industry and vehicles.

Skills

1. Is able to analyze and critically evaluate electrical and electronic devices and components used in industry and vehicles on the basis of technical documentation and available literature.

2. Is able to assemble, run and diagnose basic devices and systems functioning in motor vehicles, independently carry out the necessary tests and prepare documentation of the results of completed experiments.

Social competences

1. Understands that knowledge and skills in issues related to electrical and electronic systems in industry and motor vehicles require continuous self-education.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

- assess the knowledge and skills demonstrated during the problem credit, realized in the form of written and oral.

Laboratory:

- assessment of knowledge and skills related to the implementation of laboratory exercises,

- evaluation of the reports of laboratory tests,

- evaluation of the completed technical report (paper) on modern electrical and electronic systems used in industry and in vehicles.

Programme content

Lecture: Construction and functional properties of compression-ignition internal combustion engines (in-line pumps, axial and radial distributors, pump injectors, UPS injection systems and Common Rail system). Electronic systems for additional vehicle equipment: active and passive safety systems, navigation, comfort improvement systems, etc. Functional properties, parameters, technical solutions and methods for diagnosing individual systems and their components. Transducers of non-electric quantities into electrical quantities used in automotive systems (sensors: acceleration, linear and angular position, rotational speed, engine load, force, vibration, gyro angle sensors, etc.). Exhaust after-treatment systems for compression-ignition engines.

Laboratory: Tests of advanced ignition-injection systems, control systems of common-rail diesel engines, ABS and ASR systems. Computer diagnostics of car alternators.

Teaching methods

Lecture: multimedia presentation (drawings, photos, animations) supplemented with examples given on the board, initiating discussions during the lecture.

Laboratory tutorials: demonstrations, implementation of practical exercises as planned and additional tasks doubled by the teacher.

Bibliography

Basic

1. Herner A., Riehl H. J.: Elektrotechnika i elektronika w pojazdach samochodowych, WKiŁ, Warszawa 2014.

2. Kowalczyk J., Niedbała T.: Diagnostyka systemów Commom Rail w silnikach o zapłonie samoczynnym, Inter-Team 2014.

3. Zbierski K.: Układy wtryskowe Common Rail. Łódź, 2014.

4. Praca zbiorowa: Układy bezpieczeństwa i komfortu jazdy. Informator techniczny BOSCH, WKiŁ, 2016.

5. Frei M. Samochodowe magistrale danych w praktyce warsztatowej: budowa, diagnostyka, obsługa, WKiŁ, 2010.

6. Jajczyk J., Matwiejczyk K.: CAN bus diagnostics, Computer Applications in Electrical Engineering, 2014, vol. 12, pp. 376-385.

7. Filipiak M., Jajczyk J.: Badanie systemu ESP w warunkach drogowych, Poznan University of Technology Academic Journals, Electrical Engineering, 75, 2013, pp. 199-206.

Additional

1. Praca zbiorowa: Zasobnikowe układy wtryskowe Common Rail, WKiŁ, 2009.

2. Gajek A., Juda Z.: Czujniki, WKiŁ, Warszawa 2011

3. Denton T.: Automobile electrical and electronic systems, Arnold, London 2000.

4. Filipiak M., Jajczyk J.: Diagnostyka radarowego systemu ACC, Poznan University of Technology Academic Journals, Electrical Engineering, 88, 2016, pp. 227-237.

Breakdown of average student's workload

	Hours	ECTS
Total workload	64	2,0
Classes requiring direct contact with the teacher	26	1,0
Student's own work (literature studies, preparation for tutorials, preparation for test, preparation for exam) [1]	38	1,0

[1] delete or add other activities as appropriate