COURSE DESCRIPTION CARD - SYLLABUS

Course name

Safety and comfort systems in vehicles

Course

Field of study

Electromobility

Year/Semester

4/7

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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Wydział Automatyki, Robotyki i Elektrotechniki

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Responsible for the course/lecturer:

Prerequisites

The student starting this course should have basic knowledge of electrical engineering, electronics, microprocessor technology and electrical machines. He should be able to connect physical phenomena with the principles of operation of technical devices. He should also be able to interpret electrical diagrams, connect electric circuits and cooperate in a team.

Course objective

Provide students with knowledge about theoretical and practical aspects related to the functioning and diagnosis of safety and comfort systems in vehicles.

Course-related learning outcomes

Knowledge

1. has knowledge of the properties of electrical components and systems used in vehicles

2. has knowledge of safety and comfort systems in vehicles

Skills

1. can test and diagnose electronic safety and comfort systems in vehicles

2. can make a critical analysis and evaluation of the functioning of safety and comfort systems

Social competences

1. understands that knowledge and skills in the field of electronic vehicle systems are evolving rapidly

2. understands the need to provide the public with information about electronic systems in vehicles

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: the knowledge acquired during the lecture is verified during the written test or on the Moodle platform, which consists of 15-25 questions (test and open) with different scores. Passing threshold: 50% of points. The issues on the basis of which the questions are developed will be sent to students by e-mail using the university's e-mail system.

Laboratory: the skills acquired in the laboratory exercises are verified on the basis of reports made by students at home after the exercises (at least two) and an oral response.

Programme content

Lecture:

Construction and functional properties of passive safety systems (belt tensioners, gas cushions) and active (ABS, BAS, ASR, ESP) Construction and operation of electronic systems improving the comfort and safety of driving (automatic lights, cornering lights, rain sensor, lane keeping systems, adaptive cruise control systems, navigation and GPS vehicle positioning systems). Functional properties, parameters, technical solutions and methods of diagnosing individual systems and their components. Converters of non-electrical quantities into electrical quantities used in automotive safety and driving comfort systems (sensors: acceleration, linear and angular position, force, gyro angular displacement sensors, rain and light sensors, etc.). Data exchange technologies in electronic safety and comfort systems in vehicles (LIN, CAN, MOST, FlexRay buses).

Lab:

The implemented issues are related to the diagnosis and testing of traction control systems (ABS, ASR, EDB), positioning and monitoring systems (GPS), comfort systems and data buses, sensors used in safety and comfort systems.

Teaching methods

Lecture:

Multimedia presentation (drawings, photos, animations) supplemented with examples given on the blackboard, initiating discussions during the lecture.

Laboratory:

Demonstrations, implementation of practical exercises as planned and additional tasks doubled by the teacher. Working in teams.

Bibliography

Basic

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

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

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

4. Filipiak M., Jajczyk J.: Diagnostyka systemu elektronicznej stabilizacji toru jazdy, Poznan University of Technology Academic Journals, Electrical Engineering, Issue 75, ISSN 1897-0737, Published by Poznan University of Technology (2013). pp. 207-214.

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

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

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.: Badania radarowego systemu ACC w warunkach drogowych, Poznan University of Technology Academic Journals, Electrical Engineering, Issue 86, ISSN 1897-0737, Published by Poznan University of Technology (2016), Perfekt Druk, pp. 267-276.

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

6. Jajczyk J., Lorkiewicz W.: Stanowisko testowe systemu multipleksowego autobusów miejskich, Poznan University of Technology Academic Journals, Electrical Engineering, Issue 95, ISSN 1897-0737, Published by Poznan University of Technology (2018), Perfekt Druk, s. 321-332.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation for exam, reports preparation) [1]	30	1,0

[1] delete or add other activities as appropriate