# COURSE DESCRIPTION CARD - SYLLABUS

Course name
Assistance, safety and comfort systems [S2Elmob1-SSP>SABiK]

## Course

Field of study
Electromobility

Year/Semester
2/3

Area of study (specialization)
Car Onboard Systems

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

## Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

## Number of credit points

2,00

## Coordinators

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## Lecturers

## Prerequisites

A student starting this course should have basic knowledge of electrical engineering, electronics, sensor science and microprocessor technology. They should also be able to interpret electrical diagrams, connect electrical circuits and work in a team.

## Course objective

Providing students with knowledge about the theoretical and practical aspects related to the functioning and diagnosis of on-board systems that support the driver and increase safety and comfort in motor vehicles.

## Course-related learning outcomes

Knowledge:
1. Has in-depth knowledge of the operation of advanced electronic systems in motor vehicles.
2. Has extensive knowledge of communication and data exchange between components of electronic vehicle systems.
3. Has knowledge of current trends in automotive technology.

Skills:
1. Can obtain information on current solutions used in automotive technology.
2. Can analyze the operation of car systems, perform the necessary measurements, critically evaluate the results and formulate conclusions.

Social competences:
1. Is aware of the need to constantly improve knowledge and skills in the field of assistance systems in motor 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 eKursy platform, which consists of 25-35 questions (test and open) with different 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 or on the eKursy platform.
Laboratory: skills acquired during laboratory exercises are verified on the basis of at least two reports made by students at home after the exercises (max. 80% of points) and test results (max. 20% of points).
Grading scale for the lecture and laboratory in accordance with the document "Good practices for academic teachers" adopted by the Academic Senate of the Poznań University of Technology: ( <0;50%): 2.0 unsatisfactory, <50%;60%): 3.0 satisfactory <60%;70% ): 3.5 fair plus, <70%;80%): 4.0 good, <80%;90%): 4.5 good plus, <90%;100%>: 5.0 very good.

## Programme content

Driver assistance systems. Construction, principle of operation and mutual correlations of active and passive safety and comfort systems.

## Course topics

Lecture: Architecture, principle of operation, operation, calibration and diagnostics of driver assistance systems (e.g. parking assistant, active cruise control, traffic jam assistant, lane keeping assistant, driver fatigue recognition system, traffic sign recognition, high beam assistant). Active safety systems (ABS, ASR, ESP) and passive safety systems (including belt tensioners, airbags). Construction and principle of operation of air conditioning (components of the air conditioning system, refrigerant circuit, components of the air supply system, heat pump).
Laboratory: The issues implemented as part of laboratory classes concern: testing and diagnostics of assistance systems in motor vehicles, the use of diagnoscopes (VAS, VCDS, KTS) and oscilloscopes (Pico), testing systems supporting acceleration, driving and braking, airbag systems and belt tensioners, data transmission in systems supporting the driver and increasing safety and comfort.

## Teaching methods

Lecture: multimedia presentation (including: drawings, photos, animations, videos) supplemented with examples given on the board and extensive comments. Analysis of selected issues with the participation of students.
Laboratory: demonstrations, implementation of practical exercises according to the plan and additional tasks given by the teacher. Working in teams.

## Bibliography

Basic:
Podstawowa:
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. Boruta G., Piętak A., Mechatronika samochodu: układy bezpieczeństwa czynnego i biernego, Wydawnictwo Uniwersytetu Warmińsko-Mazurskiego, 2012..
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.

Additional:
1. Gajek A., Juda Z.: Czujniki, WKiŁ, Warszawa 2011
2. Denton T.: Automobile electrical and electronic systems, Arnold, London 2000.
3. 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.
4. Filipiak M., Jajczyk J.: Badanie systemu ESP w warunkach drogowych, Poznan University of Technology Academic Journals, Electrical Engineering, 75, 2013, pp. 199-206.

## Breakdown of average student's workload

| | Hours | ECTS |
|---|---|---|
| Total workload | 59 | 2,00 |
| Classes requiring direct contact with the teacher | 32 | 1,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 27 | 1,00 |