



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electric cars [N2MiBP1-PS>SE]

### Course

Field of study

Mechanical and Automotive Engineering

Year/Semester

1/2

Area of study (specialization)

Motor Vehicles

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

### Number of hours

Lecture

9

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

1,00

### Coordinators

dr inż. Jerzy Kupiec

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### Lecturers

### Prerequisites

The student has a basic knowledge of the construction, operation and operation of motor vehicles and basic electrical systems and components, such as engines, batteries. The student is able to analyze and synthesize information, draw conclusions, formulate and justify opinions. The student is aware of the importance of electric cars in technical, economic and ecological terms.

### Course objective

Introduction to the issues related to electric vehicles, both in technical, ecological and legal aspects.

### Course-related learning outcomes

Knowledge:

He has in-depth knowledge of the construction, principles of operation and classification of machines from a selected group.

He knows the main development trends in the field of mechanical engineering.

Is aware of the civilization effects of technology.

Skills:

He can estimate the potential threats to the environment and people from the designed working machine and vehicle from a selected group.

Can communicate on specialist topics with a diverse audience.

Can interact with other people as part of teamwork and take a leading role in teams.

Social competences:

He is ready to critically assess his knowledge and received content.

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.

It is ready to fulfill social obligations, inspire and organize activities for the benefit of the social environment.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

Assessment based on a written or oral test.

## Programme content

The scope of the lecture includes the following topics:

- history of electric cars,
- construction of a typical electric car,
- charging systems,
- energy consumption of the vehicle,
- legal requirements for EV vehicles,
- technical tests.

## Course topics

1. The history of electric cars

- systematization of events related to electric vehicles and their creators in chronological order,
- advantages and disadvantages of electric vehicles.

2. Electric vehicle construction on selected examples

- review of the engines construction, control systems, battery assemblies, bodies and an indication of their development trends.

3. Systems and charging stations for electric vehicles

- review of solutions and technical parameters related to vehicle charging (internal and external chargers),
- infrastructure development and its status as of today (charging stations in Poland and other countries).

4. Energy consumption by electric vehicle equipment

- construction and operation of basic vehicle systems in the aspect of energy consumption: braking systems, power steering systems, cooling and heating of the passenger compartment and lighting in electric vehicles.

5. Legal requirements for an electric vehicle

- on the basis of information from UN / ECE Regulations 100 and 101, the most important requirements for an electric vehicle related to the safety of its operation and use have been indicated.

6. Technical examination of an electric vehicle

- current and new test procedures specific to the EV vehicle, based on vehicle technical conditions and draft regulation on the scope and method of technical testing.

7. Electric vehicles market in Poland and in the world

- selling vehicles and reviewing their prices, user discounts applied by various countries, EV market development forecasts for the future.

## Teaching methods

1. Lecture with a multimedia presentation - a combination of an information and problem lecture;

## Bibliography

Basic

1. Merkisz J., Pielecha I.: Układy elektryczne pojazdów hybrydowych, Wydawnictwo Politechniki

Poznańskie, Poznań 2015r.

2. Nikowitz M.: Advanced Hybrid and Electric Vehicles, Springer, Switzerland 2016.

3. Regulamin 100 i 101 EKG ONZ.

Additional

### Breakdown of average student's workload

	Hours	ECTS
Total workload	15	1,00
Classes requiring direct contact with the teacher	9	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	6	0,50