



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electric cars

### Course

Field of study

Year/Semester

Construction and operation of means of transport

1/2

Area of study (specialization)

Profile of study

Motor vehicles

general academic

Level of study

Course offered in

Second-cycle studies

polish

Form of study

Requirements

part-time

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

9

0

0

Tutorials

Projects/seminars

0

0

### Number of credit points

1

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

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### 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

1. Knows how an electric car is built and knows the basic terminology.
2. He knows the requirements of the infrastructure ensuring the use of EVs.
3. Knows the basic legal acts regulating the requirements for EV vehicles.

#### Skills

1. Can recognize the components of an electric vehicle and discuss their principle of operation.
2. Can define the legal requirements and the scope of technical tests for EV vehicles.

#### Social competences

1. Understands the need for lifelong learning due to the rapid technological progress in EV cars.
2. Is aware of the importance of electric cars for transport tasks and the natural environment.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment based on a written test.

### Programme content

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 Poznańskiej, 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	26	1,0
Classes requiring direct contact with the teacher	9	0,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	17	0,5

<sup>1</sup> delete or add other activities as appropriate