



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Materials science [S1Elmob1>IM]

### Course

Field of study

Electromobility

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-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

3,00

### Coordinators

dr inż. Maciej Tuliński

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### Lecturers

### Prerequisites

Basic knowledge of physics and chemistry. Logical thinking, exploring of various sources of knowledge. Understanding of necessity of learning and acquisition of new knowledge.

### Course objective

The aim of the course is to provide students with a general overview of the basic knowledge about the classification of materials, their structure, properties and applications.

### Course-related learning outcomes

Knowledge:

Has a basic knowledge of materials science covering types of materials used in engineering

Skills:

Based on technical documentation and using appropriate methods, tools and materials he/she is able to produce standard electrical and electronic devices used in electromobility.

Social competences:

He/she is aware of the need to use the knowledge of experts when solving engineering tasks that go beyond his competence

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lectures:

Credit given in writing at the end of semester, covering issues discussed in lectures (in order to receive a passing grade an minimum of half of a possible points must be earned).

Laboratory classes:

Credit given on the basis of oral or written tests in every individual laboratory class as well as on the basis of written reports of laboratory classes as required by the teacher. Final credit is given by all positive results of tests and reports.

### Programme content

The program includes basic issues related to matter, its structure and properties. Groups of engineering materials, their basic properties and applications (automotive industry included) will be presented.

### Course topics

Lectures:

Introduction to material science. The main groups of materials: metallic materials, polymers, ceramics and composites. Basic properties of materials: mechanical, electrical and magnetic. The relationship between the structure of the material and its properties and application. Selected failure mechanisms of materials: cracking, fatigue, creep. Properties and examples of application of selected materials used in the automotive industry. The selected aspects of the selection of materials.

Laboratory classes (5 exercises chosen by the teacher):

- 1) Steels in delivery condition.
- 2) Heat treated steels.
- 3) Structure and properties of steel after thermo-chemical treatment.
- 4) Tool steels.
- 5) Cast iron alloys.
- 6) Copper and its alloys.
- 7) Light alloys.
- 8) Surface layers with special properties.
- 9) Composite materials.
- 10) Causes of premature wear of machine parts and tools.

### Teaching methods

Lectures:

Multimedia presentation illustrated with examples given on a blackboard

Laboratory classes:

Exercises are performed individually with the help and supervision of the lecturer.

### Bibliography

Basic

Blicharski M., Wstęp do inżynierii materiałowej, WNT, Warszawa, 2017

Ashby M.F., Jones D.R.H., Materiały inżynierskie tom. 1 i 2, WNT, 2004.

Dobrzański L., Materiały inżynierskie i projektowanie materiałowe. Podstawy nauki o materiałach i metaloznawstwo, WNT, Warszawa, 2006

Additional

Leda H., Współczesne materiały konstrukcyjne i narzędziowe, Wydawnictwo Politechniki Poznańskiej, Poznań, 1996

Leda H., Wybrane metalowe materiały konstrukcyjne ogólnego przeznaczenia, Wydawnictwo Politechniki Poznańskiej, Poznań, 1997

Leda H., Strukturalne aspekty własności mechanicznych wybranych materiałów, Wydawnictwo Politechniki Poznańskiej, Poznań, 1998

Blicharski M., Inżynieria powierzchni, WNT, Warszawa, 2013

Dobrzański L., Zasady doboru materiałów inżynierskich, Wydawnictwo Politechniki Śląskiej, Gliwice, 2001

Leda H., Kompozyty polimerowe z włóknami ciągłymi, Wydawnictwo Politechniki Poznańskiej, Poznań, 2000

### Breakdown of average student's workload

	Hours	ECTS
Total workload	80	3,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	50	2,00