



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Metal construction materials in automotive industry [S1MiTPM1>MMKwPM]

Course

Field of study

Materials and technologies for automotive industry

Year/Semester

2/3

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

30

Laboratory classes

30

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

6,00

Coordinators

dr inż. Kamil Kowalski

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Lecturers

Prerequisites

Basic knowledge about material science, plastic treatment, casting and heat treatment. Necessary skills: logical thinking, an image association with a description. Understanding the need to learn and acquire knowledge, regularity in study.

Course objective

Acquainting students with the knowledge of methods for meeting the requirements for the properties of materials used for products in the automotive industry with high durability and reliability, working in different conditions.

Course-related learning outcomes

Knowledge:

1. The student has basic requirements of materials used in the automotive industry.
2. The student should know basic characteristic of engineered materials specifically for metallic materials for automotive parts.

Skills:

1. Student can select material and its heat treatment for its reliable use.
2. Student can determine the cause of damage to machine parts.

Social competences:

1. The student is aware of problem caused by the failure of parts.
2. A student can cooperate in the team.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: oral or written exam

Laboratory: Passing based on oral answers in the field of the content of each laboratory exercise according to indications conducting laboratory exercises. To get the laboratories, all exercises must be passed (positive assessment from the answers and reports).

Programme content

Construction materials in the automotive industry:

- classification;
- influence of producing methods on the structure and properties of materials;
- application of construction materials.

Course topics

Lecture:

1. Basic properties of materials for the automotive industry.
2. Iron steels in the automotive industry.
3. Directions for the development of materials based on Fe.
4. The use of aluminum alloys in the automotive industry.
5. Magnesium alloys.
6. Ti alloys.
7. Superalloys.
8. Copper alloys.
9. Bearing materials.
10. Other construction materials

Laboratory :

1. Steels for car body.
2. Construction steels.
3. Materials for rolling and sliding bearings.
4. Materials for gears.
5. Materials used in turbochargers.
6. Materials for engines I (engine blocks, heads).
7. Materials for engines II.
8. Materials on clutches and steering elements.
9. Springs.
10. Magnesium alloys for the automotive industry.

Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on the board.
2. Laboratory exercises: Practical use of selected microscopic research techniques, discussion and development of results in the form of a report, formulation of conclusions regarding issues raised during class.

Bibliography

Basic:

1. M. Blicharski, Stal, PWN, Warszawa 2017.
2. S.J. Skrzypek, K. Przybyłowicz, Inżynieria metali i technologie materiałowe, PWN, Warszawa, 2019.
3. A. Kawalec, K.E. Oczoś, Kształtowanie metali lekkich, PWN, Warszawa, 2012.

Additional:

1. Dobrzański L.A. Metaloznawstwo i podstawy inżynierii materiałowej , WNT Warszawa 1998.
2. Blicharski M. Wstęp do inżynierii materiałowej. WNT Warszawa 1998.

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,00
Classes requiring direct contact with the teacher	62	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	88	3,00