COURSE DESCRIPTION CARD - SYLLABUS

Course name
Modern engineering materials and rules of their selection

Course

Field of study
MechanicalEngineering
Area of study (specialization)
-
Level of study
Second-cycle studies
Form of study
full-time
Year/Semester
I/1
Profile of study
general academic
Course offered in
polish
Requirements
compulsory

Number of hours

Lecture
30
Laboratory classes
0
Other (e.g. online)
0
Tutorials
0
Projects/seminars
15

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
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Wydział Inżynierii Materiałowej i Fizyki Technicznej

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Responsible for the course/lecturer:

Prerequisites

Basic knowledge of materials science and other areas of the field of study. Structured theoretical knowledge in the field of study. Knowledge of engineering materials and manufacturing technologies. Logical thinking skills, using information obtained from the library and the Internet. Understanding the need to learn and acquiring knowledge, systematic learning.

Course objective

Learning about the properties of materials and the most important methods of their selection

Course-related learning outcomes

Knowledge

1. The student should be able to characterize the basic groups of materials.

2. The student should know modern materials with specific properties.

3. The student should know the requirements for the selection of materials.

Skills

1. The student is able to evaluate the properties and optimal application of materials

2. The student is able to choose the right material for specific machine parts.

3. Student is able to determine the cause of damage to machine parts.

4. The student is able to assess the costs of the materials used.

Social competences

1. The student is able to pass his knowledge to others during the presentation

2. The student is aware of the impact of the selection of materials on the economy

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Written or oral examination

Project: evaluation of the presentation and active participation during the presentation of other students

Programme content

Lecture:

Classification of steel, the influence of alloy additives on the properties of alloys. Identification of functions and requirements for materials. Ceramic materials. Plastics. Composites. Surface layers. The most commonly used optimization criteria: technological, mechanical properties, operational properties, durability and reliability, ecological performance. Costs related to meeting these requirements. Use of knowledge of heat and thermo-chemical treatment in the selection of steel, type of technology and its parameters Taking into account the factors causing the destruction of machine elements and tools. Examples of material expertise with indication of correct and improper solutions.

Project:

Presentation of the optimization of properties and application of materials for a specific product by each student in the form of a multimedia presentation during classes.

Teaching methods

Lecture illustrated with a multimedia presentation containing the discussed program content

Project: student's independent work, project consultations, discussion

Bibliography

Basic

1. M. F. Ashby, Materials Selection in Mechanical Design, Elsevier, 2016

2. M. F. Ashby, D. R. H. Jones, Engineering Materials 1 and 2, Elsevier, 2006

Additional

1. L. A. Dobrzański, Zasady doboru materiałów inżynierskich, Wyd. Politechniki Śląskiej, 2000

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	45	2,0

[1] delete or add other activities as appropriate