



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Engineering Materials in Application

Course

Field of study

Management and Production Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

DSc. Eng. Karol BULA

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo 3 st., 60-965 Poznań

Prerequisites

The student should have basic knowledge of materials science and manufacturing techniques.

Course objective

Student should obtain knowledge about mechanical, physical and chemical aspects of materials properties in their application in practice.

Course-related learning outcomes

Knowledge

Student have basic knowledge of materials science, including types of materials used in technology, roles in selection of engineering materials in machine construction - comparison of their structure, properties and applications, basics of material design.



Skills

Student know how to assess the selection of structural material properties, mainly in terms of its use.

Student know how to carry out basic tests of materials used in mechanical engineering (tests of strength properties, hardness and impact strength), is able to interpret test results and formulate conclusions regarding the use of specific construction materials.

Social competences

Student understands issues related to environmental issues and restrictions related to natural resources.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

Written colloquium at the end of the semester, contains open questions (credit in case of obtaining at least 50,1% correct answers).

Laboratory classes

Passing on the basis of written tests and oral answers of all performed laboratory meetings. All laboratory exercises must be passed with positive note.

Programme content

Lecture

Selective description of engineering materials. Comprehensive analysis of material properties and the material application (metals, plastics, elastomeric materials, wood, ceramic materials, composites). The discussion concerning the influence of processing conditions and the structure on the base properties of the materials. Analysis of some important mechanical properties (described in static and dynamic conditions), thermal and usable properties of the materials in machine building. Criteria of materials selection for certain application. Description of materials selection procedure for making constructional elements (case study).

Laboratory classes: application of typical methods for testing materials properties based on plastics and rubber concerning performing of: static tensile test, hardness test, impact test, methods of materials identification, specific gravity testing and flammability of polymeric materials).

Teaching methods

Lecture: multimedia presentation illustrated with examples given on a board.



Laboratory classes: performing experimental procedure of testing of materials properties, solving tasks, discussion, teamwork.

Bibliography

Basic

1. Ashby M.F., Jones D.R.H., Materiały inżynierskie, Tom 1. Właściwości i zastosowanie. Wydawnictwa Naukowo-Techniczne, Warszawa 1997.
2. Ashby M.F., Jones D.R.H., Materiały inżynierskie, Tom 2. Kształotowanie struktury i właściwości, dobór materiałów. Wydawnictwa Naukowo-Techniczne, Warszawa 1998.
3. Dobrzański L.A., Podstawy nauki o metalach i metaloznawstwo: materiały inżynierskie z podstawami projektowania materiałowego. Wydawnictwa Naukowo-Techniczne, Warszawa 2002.
4. Dobrzański L.A., Wprowadzenie do nauki o materiałach. Wyd. Polit. Śląskiej, Gliwice 2007.
5. Garbarski J., Części maszyn z tworzyw sztucznych, Oficyna Wyd. PW, Warszawa 2016.
6. Oczóś K.E., Kształtowanie ceramicznych materiałów technicznych, Oficyna Wyd. Politechniki Rzeszowskiej, Rzeszów 1996.

Additional

1. Ashby M.F., Dobór materiałów w projektowaniu inżynierskim. Wydawnictwa Naukowo-Techniczne, Warszawa 1998.
2. Łączyński B., Nietalowe elementy maszyn, Wydawnictwa Naukowo-Techniczne, Warszawa 1988.
3. Dobrzański L.A., Zasady doboru materiałów inżynierskich z kartami charakterystyk. Wyd. Polit. Śląskiej, Gliwice 2001.
4. Dobrzański L.A., Metalowe materiały inżynierskie. Wydawnictwa Naukowo-Techniczne, Warszawa 2004.
5. Dobrzański L.A., Podstawy nauki o materiałach. Wyd. Polit. Śląskiej, Gliwice 2013.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	50	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	25	1,0

¹ delete or add other activities as appropriate