COURSE DESCRIPTION CARD - SYLLABUS

Course name
Application of engineering materials [S1ZiIP2>ZMK]

Course

Field of study
Management and Production Engineering

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
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

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 7 to 12 of open questions o (credit in case of obtaining at least 50 % correct answers).
Assignment of grades to percentage ranges of results: <90-100> very good; <80-90) good plus; <70-80) good; <60-70) satisfactory plus; <50-60) satisfactory; <0-50) unsatisfactory.
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

1. Engineering materials - classification, general characteristics.
2. Technological and functional properties of engineering materials.
3. General and specific criteria for selection of materials.
4. Selected methods of materials testing.

Course topics

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 onfluence 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. Data bases of materials properties.
Criteria of materialsselection for certain application. Description of materials selection procedure for making construction 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 identyfication, specific gravity testing and flammability of plymeric 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 inzynierskie, Tom 1. Właściwości i zastosowanie. Wydawnictwa Naukowo-Techniczne, Warszawa 1997.
2. Ashby M.F., Jones D.R.H., Materiały inzynierskie, 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. Oczoś 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., Niemetalowe 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	50	2,00
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)	20	1,00