COURSE DESCRIPTION CARD - SYLLABUS

Course name

Materials science

Course

Field of study

Mechatronics

Year/Semester

1/1

Area of study (specialization)

-

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

dr inż. Katarzyna Niespodziana

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Faculty of Materials Engineering and Technical Physics

ul. Piotrowo 3, 60-965 Poznań, CMBiN pokój 329

Responsible for the course/lecturer:

Prerequisites

The student should have basic knowledge of physics and chemistry. He should be able to think logically, using information obtained from the library and the Internet.

Course objective

The aim of the course is to provide students with basic knowledge of materials science, within the scope defined by the curriculum content appropriate for the field of study.

Develop students' ability to solve simple problems related to different groups of materials, distinguishing between materials and analysis of the results of microscopic observation on the basis of acquired knowledge.

Course-related learning outcomes

Knowledge

Basic knowledge of the structure of matter and its components, construction crystallographic solids.

Knowledge of basic engineering materials: steel and foundry alloys iron, non-ferrous metals and their alloys, sintered and ceramic materials, glass and composites.

Knowledge of methods of forming properties and microstructure of metals and alloys (plastic working, heat treatment, heat treatment, coatings).

Skills

Student can apply appropriate manufacturing technology to shape the structure and properties of engineering materials.

Using understanding of the identified sources of knowledge (list of basic literature) and gaining knowledge from other sources.

Social competences

Student understands the need for lifelong learning, can inspire and organize the learning process of others.

Student is aware of the role of engineering materials in the contemporary economy and their importance to society and the environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

Passing on the basis of the didactic test consisting of 20 test questions with different scores. Passing threshold of 51%.

Laboratory classes

Credit based on the correct performance of ten laboratory classes. As part of each class, a report should be prepared according to the instructions of the laboratory teacher. During each class, there is an oral or written verification of knowledge about a given exercise. For credit laboratories all exercises must be passed (positive grade from the answers and the report).

Programme content

Lecture:

Classification of engineering materials, crystallography of solids. The defects in crystal structure and their effect on properties. Phase equilibrium systems, solid solutions, intermetallic phases. Iron-cementite phase balance. Crystallization of metals and alloys. Shaping the structure and properties of

engineering materials by means of plastic, thermal and thermo-chemical processing. The coatings. Iron and carbon alloys: steels, cast iron and cast steel. Non-ferrous metals and their alloys (copper, aluminum, titanium, nickel). Ceramic materials (engineering ceramics, porous, glass). Composite materials.

Laboratory classes:

Delivery condition for steel. Heat treated structural steels. Structure and properties of steel after thermo-chemical treatment. Tool steels. Cast iron and cast steel. Copper and its alloys. Light alloys. Surface layers with special properties. Composite materials. Reasons for premature wear of machine parts and tools. Iron-cementite balance system.

Teaching methods

Lecture: multimedia presentation

Laboratory classes: metallographic microscopes, cards with tasks and problems to be solved

Bibliography

Basic

Dobrzański L.: Podstawy nauki o materiałach i metaloznawstwo, WNT 2002

Barbacki A.: Materiały w budowie maszyn. Przewodnik do ćwiczeń laboratoryjnych, WPP 2005

Dobrzański L.: Metaloznawstwo z podstawami nauki o materiałach, WNT 1998

Blicharski M.: Wstęp do inżynierii materiałowejWNT 2003

Przybyłowicz K. „Metaloznawstwo” WNT 1996

Additional

Przybyłowicz K.: Materiałoznawstwo w pytaniach i odpowiedziach, WNT 2000

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	55	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