



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Materials Science with elements of chemistry

Course

Field of study

Mechanical engineering

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

1 / 2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

8

Laboratory classes

10

Other (e.g. online)

-

Tutorials

-

Projects/seminars

-

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

PhD Eng. Aneta Bartkowska

Responsible for the course/lecturer:

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Faculty of Materials Science and Technical

Physics

Jana Pawla II 24, 61-138 Poznan

Prerequisites

Knowledge: basics of chemistry, physics and mathematics;

Skills: the ability to think logically, associating the picture with the description;

Social competencies: understanding the need to learn and acquire new knowledge, regularity in science

Course objective

Knowledge of the relationship between chemical composition, physical properties and structure of the material in connection with heat, thermochemical and plastic treatments.



Course-related learning outcomes

Knowledge

1. Student can on based of microstructural observations determine the structure and properties of materials
2. Student should know a materials propewrties
3. Student can determine the cause of damage of machine parts

Skills

1. Student can based onmicrostructural observations determine the structure and properties of materials
2. Student can identify the material and its previous heat treatment based on microstructure observation

Social competences

1. Student is able to work in a group
2. Student is aware of the importance of material properties in the economy

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Forming rating:

- a) in the field of laboratory classes based on oral responses from each exercise,
- b) in the field of lectures based on exam conducted during in the exam session.

Summary rating:

- a) in the laboratory classes, the average of grades obtained from the exercises,
- b) in the field of lectures - exam in a written form.

Programme content

Lectures:

Ceramics - types, microstructure, properties, purpose. Plastics - types, microstructure, properties, purpose. Composites - types of construction and properties. Meaning, types and properties of surface layers.

Laboratory classes:

1. Steels in able of delivery



2. Heat-treated constructional steels
3. Structure and properties of steel after thermochemical treatment
4. Tool steels
5. Cast iron and cast steel
6. Copper and copper alloys
7. Light alloys
8. Surface layers
9. Processes of wear materials
10. Composites

Teaching methods

Lecture: multimedia presentation, examples of samples after various processes, discussion

Laboratory: practical exercises, discussion

Bibliography

Basic

1. Dobrzański L. A.: Podstawy nauki o materiałach i metaloznawstwo, WNT, Warszawa, 2002
2. Przybyłowicz K.: Metaloznawstwo. WNT, Warszawa, 1999
3. Blicharski M.: Wstęp do inżynierii materiałowej. WNT, Warszawa, 1998
4. Barbacki A.: Materiały w budowie maszyn. Praca zbiorowa, Wydawnictwo Politechniki Poznańskiej, Poznań, 2006
5. Ashby M.F., Jones D.R.H.: Materiały inżynierskie t. 1 i 2, WNT, Warszawa, 1995, 1996

Additional

1. Burakowski T., Wierzchoń T.: Inżynieria powierzchni metali. WNT, Warszawa, 1995
2. Leda H.: Współczesne materiały konstrukcyjne i narzędziowe. Wydawnictwo Politechniki Poznańskiej, Poznań, 1998.
3. Młynarczak A., Jakubowski J.: Obróbka powierzchniowa i powłoki ochronne. Wydawnictwo Politechniki Poznańskiej, Poznań, 1998.



Breakdown of average student's workload

	Hours	ECTS
Total workload	36	3,0
Classes requiring direct contact with the teacher	18	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	18	1,5

¹ delete or add other activities as appropriate