COURSE DESCRIPTION CARD - SYLLABUS

Course name
Materials Science

Course

Field of study
Education in Technology and Informatics

Year/Semester
1/2

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	Laboratory classes	Other (e.g. online)
20	15	
Tutorials	Projects/seminars	

Number of credit points

3

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 physics and mathematics (program basis for high school level). Ability to solve basic problems of physics on the basis of existing knowledge, the ability to obtain information from identified sources. Understanding the need to broaden the competence, willingness to work together as a team.

Course objective

1. Provide students with basic knowledge of materials, to the extent specified by the content of the program relevant to the field of study.

2. Development of students' ability to solve simple problems related to the choice of materials, distinguishing between materials and analysis of the results of microscopic observations based on the gained knowledge.

3. Development of students' teamwork skills.

Course-related learning outcomes

Knowledge

A student who has completed the course is able to:

1. explain the purpose and meaning of the technology of materials and their further processing [K1_W11]

2. connect the microstructure of the material with its physico-chemical and mechanical properties etc., and on this basis to suggest the potential use [K1_W10]

Skills

A student who has completed the course is able to:

1. benefit from the indicated sources of knowledge (basic bibliography) and gain knowledge from other sources [K1_U01]

2. formulate simple conclusions on the basis of the calculations and results of measurements and conducted observations [K1_U19]

3. choose materials with suitable physicochemical and structural properties for engineering applications [K1_U20]

4. choose the appropriate production technologies in order to shape the products, their structure and properties [K1_U21]

Social competences

A student who has completed the course is able to:

1. actively engage in solving the questions, independently develop and expand skills [K1_K03]

2. work together as a team, to discharge the duties assigned to the division of labor in a team, demonstrate responsibility for own work and the responsibility for the results of the team's work [K1_K01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

W01-W02 Assessment of lectures: a written test exam. The exam can be applied after completion of laboratories.

Assessment based on a written test of knowledge:

3 50.1% -70.0%

4 70.1% -90.0%

5 from 90.1%

U02 Assessment of laboratory: based on reports on exercises, oral and written answer

3 - the student is able to distinguish the observed materials and correctly describe their microstructure

4 - the student is able to distinguish the observed materials and correctly describe their microstructure, associate microstructure with properties, describe the effect of material processing

5- the student is able to distinguish the observed materials and correctly describe their microstructure, associate microstructure with properties, describe the effect of material processing, propose modification of the chemical composition and/or treatment of the material in order to improve its properties; the student is familiar with modern technological processes of producing materials

Programme content

1. Matter and its components.

2. Rules for selection of engineering materials.

3. Basis of material design. Sources of information on engineering materials, their properties and applications.

4. The strengthening of metals and alloys and shapeing their structure and properties with technological methods (crystallization, plastic deformation, recrystallization, thermo-forming, phase transformations during heat treatment, diffusion, coatings and surface layers).

5. Working conditions and mechanisms of wear and decohesion (mechanical properties, fracture toughness, fatigue, creep, corrosion, tribological wear).

6. Steels, ferrous casting, non-ferrous metals and their alloys.

7. Sintered materials and ceramic, glass and glass ceramics.

8. Polymeric materials and composites.

9. Modern functional and special materials.

10. Methods of testing materials.

Teaching methods

Lecture: presentation illustrated with examples given on the board, problem solving.

Laboratory exercises: conducting experiments, solving tasks, discussion, team work.

Bibliography

Basic

1. L. A. Dobrzański, Wprowadzenie do nauki o materiałach, Wydawnictwo Politechniki Śląskiej, Gliwice 2007

2. M. Blicharski, Wstęp do inżynierii materiałowej, Wydawnictwo Naukowo-Techniczne 2009

Additional

1. M. Jurczyk, Nanomateriały, Wydawnictwo Politechniki Poznańskiej, Poznań 2001

2. Ch. Kittel, Fizyka ciała stałego, PWN Warszawa 1996

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