COURSE DESCRIPTION CARD - SYLLABUS

Course name
Materials Science [S1ETI2>MTRZ]

Course

Field of study
Education in Technology and Informatics

Year/Semester
2/4

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
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

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 has knowledge of current issues in materials engineering, functional materials and nanotechnology

Skills:

A student who has completed the course:
1. is able to obtain information from literature, databases and other sources, integrate it, interpret it and draw conclusions, formulate and justify opinions, as well as prepare and give an oral presentation and documented study on issues related to the field of education in Polish and English
2. can use the acquired mathematical knowledge to describe processes, create models and other activities in the field of materials engineering, mechanics, machine design, electrical engineering, electronics and computer science
3. is able to select materials with appropriate physicochemical and structural properties for engineering applications, select appropriate manufacturing technologies to design products, their structure and properties, recognizing social, economic, ecological and legal aspects

Social competences:
A student who has completed the course:
1. understands the need for continuous education (e.g. by participating in courses and postgraduate studies) in order to improve professional and social competences and the need to think and act in an entrepreneurial and innovative way
2. is able to work on a given task independently and cooperate in a team, assuming various roles, demonstrates professionalism and responsibility for decisions made

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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%
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

The program contains basic issues related to matter, its structure and properties. Groups of engineering materials, their basic functions and applications are presented.

Course topics

1. Materials science - introduction, development and goals of materials engineering
2. Matter and its components.
3. Crystal structure - description, testing methods.
4. Properties of materials, testing methods.
5. Material groups and principles of selecting engineering materials.
6. Steels and other iron alloys.
7. Heat and thermo-chemical treatment.
8. Non-ferrous metals and their alloys.
9. Sintered and ceramic materials, glasses and glass ceramics.
10. Polymer and composite materials.
11. Modern functional and special materials.

Teaching methods

Lecture: presentation illustrated with examples given on the board, problem solving.
Laboratory exercises: conducting experiments, microscopic observations, 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	100	4,00
Classes requiring direct contact with the teacher	47	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	53	2,00