



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Materials science - properties and application of materials

Course

Field of study

Engineering Management

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

12

Laboratory classes

12

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

Ph.D., Eng., Grzegorz Adamek

Mail to: grzegorz.adamek@put.poznan.pl

Faculty of Materials Engineering and Technical
Physics

ul. Jana Pawła II 24, 61-139 Poznań

Responsible for the course/lecturer:

Ph.D., Eng., Mikołaj Popławski

Mail to: mikolaj.poplawski@put.poznan.pl

Faculty of Materials Engineering and Technical
Physics

ul. Jana Pawła II 24, 61-139 Poznań

Prerequisites

Basic knowledge of chemistry and physics. Ability to solve basic problems of science 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

Provide students with basic knowledge of materials science and technology, to the extent specified by the content of the program relevant to the field of study. Development of students' ability to solve simple problems related to the choice of nanomaterials and analysis of the results of studies based on the gained knowledge.



Course-related learning outcomes

Knowledge

The student names and describes the classification of engineering materials and their physicochemical properties [P6S_WG_14].

The student defines concepts related to the structure of materials, such as crystalline structure and defects in crystalline structure [P6S_WG_17].

The student describes key engineering materials, including metals, polymers, ceramics, and composites, as well as their properties and applications [P6S_WG_17].

Skills

The student explains and interprets the relationships between the structure and properties of engineering materials [P6S_UW_09].

The student plans and conducts experiments, including measurements and computer simulations, and interprets the results in the context of materials science [P6S_UW_09].

The student recognizes and identifies design tasks related to the construction and operation of machines and solves simple design problems in this field [P6S_UW_14].

Social

competences

The student is aware of the impact of material selection on the economy, engineering, marketing, law, and organizational aspects in the product creation process [P6S_KO_02].

The student is conscious of the importance of non-technical and ecological aspects in engineering activity and the responsibility for the decisions made [P6S_KR_01].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

In respect of lectures: on the basis of answers to questions about the knowledge assimilated in previous lectures or assessment based on a written test of knowledge

In respect of laboratory classes: on the basis of answers to questions and reports about the knowledge correspond to given theme

Programme content

Matter

Basics of materials design. Knowledge of engineering materials, their properties and applications

Design of structure, microstructure and properties of materials (crystallization, plastic deformation, recrystallization, heat treatment, phase transformations, diffusion, layers)

Mechanical properties, corrosion, wear resistance, fatigue.

Steel and iron based materials

Nanomaterials

Plastics and composites

Nanotechnology

Materials testing

Teaching methods

Lecture – presentations, Laboratory classes



Bibliography

Basic

Leszek. A. Dobrzański, Podstawy nauki o materiałach, Wydawnictwo Naukowo-Techniczne

Leszek. A. Dobrzański, Metaloznawstwo i obróbka cieplna, Wydawnictwo Naukowo-Techniczne

Skrypt: Materiały w Budowie Maszyn red. Andrzej Barbacki, Wydawnictwo Politechniki Poznańskiej

Additional

Karol Przybyłowicz, Janusz Przybyłowicz, Materiałoznawstwo w pytaniach i odpowiedziach ,
Wydawnictwo Naukowo-Techniczne

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	25	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests, project preparation) ¹	50	2,0

¹ delete or add other activities as appropriate