



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Materials Science [S1FT2>MTRZ]

### Course

Field of study

Technical Physics

Year/Semester

1/2

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

30

Laboratory classes

15

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3,00

### Coordinators

dr hab. inż. Grzegorz Adamek  
grzegorz.adamek@put.poznan.pl

### Lecturers

### Prerequisites

Basic knowledge of physics and chemistry. The ability to solve simple material problems based on the acquired knowledge, the ability to obtain information from indicated sources. Understanding the need to expand your competences.

### Course objective

Provide students with knowledge about engineering and functional materials, nanomaterials, material technologies - including nanotechnology, material properties.

### Course-related learning outcomes

Knowledge:

As a result of the conducted classes, the student:

1. has ordered and theoretically founded general knowledge of the structure and functions of nano- and microworld objects
2. has detailed knowledge related to selected issues of analysis of the properties of functional materials and processes in the nano scale

### Skills:

As a result of the course, the student should demonstrate skills in the following areas (the student will be able to):

1. can select materials with appropriate physicochemical and design properties for laboratory and engineering applications
2. is able to obtain information from literature, databases and other sources, interpret them and draw conclusions, formulate and justify opinions

### Social competences:

As a result of the course, the student will acquire the competences listed below. Completing the course means that:

1. can work independently and in a team on a given task, shows responsibility in this work

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Credit on the basis of a written test or an oral answer carried out at the end of the semester.

Score for each question, pass from 50.1%.

Laboratories: checking knowledge (written or oral) at each class - the final grade is the arithmetic mean of the partial grades. Passing minimum dst for all partial grades.

## Programme content

Engineering materials: ceramics and glass, metals and alloys, polymeric materials, composites; properties, applications and technologies

## Course topics

Structure and microstructure,  
mechanical properties of materials,  
mechanical synthesis,  
biomaterials,  
corrosion of materials,  
steel and other Fe alloys,  
materials surface treatment technologies,  
nanotechnology

LECTURE:  
Structure and microstructure,  
mechanical properties of materials,  
mechanical synthesis,  
biomaterials,  
corrosion of materials,  
steel and other Fe alloys,  
materials surface treatment technologies,  
nanotechnologies,  
Thermal treatment.

nanomaterials,  
powder metallurgy,

LAB:

constantly in delivery condition

Thermal treatment

tool materials

casting alloys

copper alloys

aluminum alloys

surface treatment

composites

wear mechanisms of machine parts,

Thermal treatment.

nanomaterials,

powder metallurgy,

## Teaching methods

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

Laboratory exercises: practical exercises, discussion, team work.

## Bibliography

Basic:

1. L.A. Dobrzański - Podstawy nauki o materiałach
2. Blicharski - Materiałoznawstwo
3. Jurczyk - Nanomateriały
4. Barbacki - Materiały w budowie maszyn
5. Inne dotyczące materiałoznawstwa i nauki o materiałach

Additional:

1. Publikacje JCR podawane przez prowadzącego na zajęciach

## Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00