



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Phase transformations

### Course

Field of study

Year/Semester

Materials Engineering

2/3

Area of study (specialization)

Profile of study

Nanomaterials

general academic

Level of study

Course offered in

Second-cycle studies

polish

Form of study

Requirements

full-time

elective

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

15

15

Tutorials

Projects/seminars

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr inż. Mikołaj Popławski

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Faculty of Materials Engineering and Technical  
Physics

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### Prerequisites

The student has extended and in-depth knowledge of solid state physics, thanks to which he can formulate and solve complex tasks in the field of materials science. In particular, it can describe the crystalline structure of materials, the structure of materials, and its influence on the basic properties of materials, electrical, thermal, magnetic, and mechanical properties of materials.

The student has an organized theoretically founded general knowledge of materials science, thanks to which he can describe the basic functional properties of materials, technological properties of materials, and factors affecting the properties of materials - chemical and phase composition, structure, manufacturing process, working environment.



### Course objective

Deepening and consolidating the knowledge of solid state physics, which the student will be able to formulate and solve complex tasks in the field of material engineering.

### Course-related learning outcomes

Knowledge

1. The student should characterize the basic requirements for materials - [K\_W04] 2. The student should propose appropriate material solutions - [K\_W08]

Skills

1. The student is able to choose the material and technology - [K\_U01]

Social competences

1. The student is able to work in a group - [K\_K03, K\_K06]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: the oral answer to the exam, possibly questions in the form of a multiple-choice test.

Laboratory: Assessment based on an oral or written answer regarding the content of each exercise. To pass, all reports must be passed (pass mark for presentation and responses).

### Programme content

1. Conditions of thermodynamic equilibrium,
2. Diffusion and non-diffusion transformations,
3. Phase equilibrium graphs

### Teaching methods

1. Lecture: presentation illustrated with examples given on the board, solving problems, discussion.
2. Laboratory: individual mental and manual work of the student, discussion on a current topic during work.

### Bibliography

Basic

Jan Sieniawski, Aleksander Cyunczyk :Fizykochemia przemian fazowych, OWPRz , Rzeszów 2008

Ignacy Wierszyłowski: Przemiany fazowe podczas obróbki cieplnej stali ŁH15SG i ich wpływ na wytrzymałość kontaktową, WPP, Poznań 1976

Additional



### Breakdown of average student's workload

	Hours	ECTS
Total workload	68	2,0
Classes requiring direct contact with the teacher	33	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	35	1,0

<sup>1</sup> delete or add other activities as appropriate