



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Solid state physics

### Course

Field of study

Material Engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

Other (e.g. online)

Tutorials

15

Projects/seminars

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr hab. Izabela Szafraniak-Wiza

Responsible for the course/lecturer:

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Technicznej

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### Prerequisites

Basic knowledge of chemistry, physics and materials science. Logical thinking, use of the information obtained from library and Internet. Understanding the need for learning and acquiring new knowledge

### Course objective

The knowledge of the relationships between the crystallographic structures and physical properties.

The knowledge of the basic solid state concepts and theories.



### Course-related learning outcomes

#### Knowledge

1. The student has knowledge about the basis concepts and theories of solid state physics. K\_W01 K\_W08 K\_W10
2. The student has knowledge about modern trends and important research fields of the solid state physics. K\_W01, K\_W08

#### Skills

1. The student can explain the basis facts and the solid state theories and can relate them to materials science. K\_U01, K\_U02, K\_U11
2. The student can relate the physical properties and crystal structure. K\_U01, K\_U02, K\_U11

#### Social competences

1. The student can collaborate in order to obtain and implement the new knowledge. K\_K03
2. The student is aware of importance of solid state physics in modern science, industry and society. K\_K02

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Written test at the end of the semester

Tutorias: Written test at the end of the semester and student activity in whole semester

### Programme content

1. Basic crystallography
2. Crystallization processes
3. The influence of crystallographic structures on physical properties.
4. Optical properties of crystals
5. Dielectrics, piezoelectrics, pyroelectrics and ferroelectrics.
6. Electronic band theory
7. Semiconductors
8. Superconductivity
9. Surface physics

### Teaching methods

Lecture: multimedia presentation



Tutorials: problem solving, discussion

## Bibliography

Basic

1. C. Kittel, Wstęp do fizyki ciała stałego, Wydawnictwo Naukowe PWN, Warszawa, 1999
2. N.W. Ashcroft, N.D. Mermin, Fizyka ciała stałego, Państwowe Wydawnictwo Naukowe, Warszawa, 1986

Additional

1. M. Jurczyk, Nanomateriały, Wydawnictwo Politechniki Poznańskiej, Poznań 2001
2. L. A. Dobrzański, Wprowadzenie do nauki o materiałach, Wydawnictwo Politechniki Śląskiej, Gliwice 2007
3. M. Blicharski, Wstęp do inżynierii materiałowej, Wydawnictwo Naukowo-Techniczne, 2009

## Breakdown of average student's workload

	Hours	ECTS
Total workload	70	3,0
Classes requiring direct contact with the teacher	35	2,0
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