

Introduction to physics of solid state - course description

General information	
Course name	Introduction to physics of solid state
Course ID	13.2-WF-FizP-IPSS-S17
Faculty	Faculty of Physics and Astronomy
Field of study	Physics
Education profile	academic
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2017/2018

Course information	
Semester	5
ECTS credits to win	4
Course type	obligatory
Teaching language	english
Author of syllabus	<ul style="list-style-type: none">prof. dr hab. Mirosław Dudek

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	30	2	-	-	Exam
Class	30	2	-	-	Credit with grade

Aim of the course

The aim of the course is to provide students with basic knowledge of solid state physics, including the basics of crystallography, diffraction methods for determining the crystal structure, the problem of the electron in periodic potential, band structure, selected issues in physics of metals, semiconductors, magnetism and superconductivity.

Prerequisites

General physics

Scope

1. Crystal lattices, the classification of Bravais lattices and crystal structures.
2. Reciprocal lattice, diffraction methods to determine the crystal structure (Laue condition, Bragg equation, Brillouin zones, geometric structural factor).
3. An electron in a periodic potential, the Bloch theorem, band structures
4. Crystals in harmonic approximation (classical and quantum description), dispersive relations, normal modes
5. Selected specific topics: superfluidity and superconductivity.

Teaching methods

lecture and exercises

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Students have a basic knowledge of solid state physics, have general knowledge about experimental and theoretical methods. General knowledge is supported by the ability to calculate simple physical models.		<ul style="list-style-type: none">• a discussion• activity during the classes• an evaluation test• an exam - oral, descriptive, test and other	<ul style="list-style-type: none">• Lecture• Class
Detailed accounting skill for simple models and the ability to explain phenomena.		<ul style="list-style-type: none">• activity during the classes• an evaluation test• an exam - oral, descriptive, test and other	<ul style="list-style-type: none">• Lecture• Class

Assignment conditions

The course ends with an exam grade. Examination is a written test of theoretical knowledge and practical skills in accounting.

Overall rating: arithmetic mean score of the exam and exercises.

Recommended reading

1. C. Kittel, Wstęp do fizyki ciała stałego, PWN Warszawa 1999

2. N.W. Ashcroft, N.D. Mermin, Solid State Physics, Harcourt College Publishers 1976

Further reading

1. F. Reif, Fundamentals of Statistical and Thermal Physics, Mc Graw-Hill, Singapore 1985

Notes

Modified by dr hab. Maria Przybylska, prof. UZ (last modification: 30-07-2018 23:59)

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