

Cracow University of Technology

Course syllabus

binding for the doctoral students of the CUT Doctoral School commencing their studies
in the academic year 2022/2023

Information on the course

Name of the course in Polish	Fizyka materiałów
Name of the course in English	Physics of materials
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Choosable
Field of education	Engineering and technology
Discipline of education	Materials engineering
Person responsible for the course Contact	Janusz Jaglarz, <i>doctor habilitatus</i> , prof. of CUT jjaglarz@pk.edu.pl

Type of course, number of hours in the study programme curriculum

Semester	Credit type (G / NG)*	Lecture	Practical classes	Laboratory	Computer Lab	Project Class	Seminar
2, 3, 4, 5	G	15	0	0	0	0	0

*G – graded credit, NG – non-graded credit

Course objectives

Code	Objective description
Objective 1	Introduction to the elements of solid state physics and the electronic structure of materials
Objective 2	Introduction to the theory of chemical compounds and the crystal structure of materials
Objective 3	Acquiring the ability to evaluate materials based on their energy structure

Learning outcomes

Code	Description of the learning outcome adjusted to the specific characteristics of the discipline	Learning outcome symbol in the CUD DS	Methods of verification
OUTCOMES RELATED TO KNOWLEDGE			
EUW1	The doctoral student knows the basics of condensed phase physics	E_W01, E_W02	Involvement in class activities, a presentation.
EUW2	The doctoral student knows the band structure of materials	E_W01	Involvement in class activities, a presentation.
OUTCOMES RELATED TO SKILLS			

EUU1	The doctoral student is able to identify physical phenomena in condensed matter, useful in a doctoral dissertation.	E_U01	Presentation, discussion.
EUU2	The doctoral student is able to interpret the band structure of the materials they research.	E_U01	Discussion.
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	The doctoral student is able to use the literature relating to the description of matter using the tools of solid state physics.	E_K01, E_K03	Discussion.

Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	Crystal structure of materials and its influence on their physicochemical properties	EKW1	3
W2	The basics of solid state theory.	EKW1	3
W3	Chemical bond theory.	EKW1	3
W4	Free electrons in condensed matter.	EKW1, EKW2	3
W5	Band structure of a solid.	EKW1, EKW2	3

The ECTS points statement

WORKING HOURS SETTLEMENT	
Type of activity	Average number of hours (45 min.) dedicated to the completion of an activity type
SCHEDULED CONTACT HOURS WITH AN ACADEMIC TEACHER	
Hours allotted in the syllabus	15
Consultations	1
Examination / course credit assignment	2
HOURS WITHOUT THE PARTICIPATION OF AN ACADEMIC TEACHER	
Independent study of the course contents	8
Preparation of a paper, a report, a project, a presentation, a discussion	4
ECTS POINTS STATEMENT	
Total number of hours	30
The ECTS points number	1

Preliminary requirements

No.	Requirements
1	Knowledge of differential and integral calculus
2	Basic knowledge of physics

Course credit assignment conditions / method of the final grade calculation

No.	Description
COURSE CREDIT ASSIGNMENT CONDITIONS	

1	75% attendance in class.
2	Presentation of a paper.
METHOD OF THE FINAL GRADE CALCULATION	
Weighted average grade for the presentation	

Additional information

The thematic scope of the lecture, including the level of advancement in presentation and modelling, takes into account the initial preparation and knowledge of the subject by doctoral students.

The course reading list

1	C. Kittel, wstęp do fizyki ciała stałego. PWN Warszawa 2012
2	J.E. Garbarczyk, Wstęp do fizyki ciała stałego, OWPW Warszawa 2017
3	J. Spalek, Wstęp do fizyki materii skondensowanej, PWN Warszawa 2020