



Subject card

Subject name and code	Physics of condensed matter, PG_00057506						
Field of study	Nanotechnology						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2022/2023		
Education level	second-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Zakład ceramiki -> Instytut Nanotechnologii i Inżynierii Materiałowej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Maria Gazda				
	Teachers		prof. dr hab. inż. Maria Gazda dr inż. Tadeusz Miruszewski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	45		3.0		52.0	100
Subject objectives	Learning the basics of the physics of the condensed phase						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_W02		Has in-depth, theoretically founded, detailed knowledge in the field of condensed phase physics		[SW1] Assessment of factual knowledge		
	K7_K03		Can interact and work in a group, assuming various roles in it. Can make a self-assessment and constructive assessment of the effects of other people's work		[SK1] Assessment of group work skills		
	K7_W01		Has an extended and structured knowledge in the field of materials science.		[SW1] Assessment of factual knowledge		
Subject contents	1. Introduction. Review and elaboration of basics, reciprocal lattice, vibrations of atoms.2. Free electron gas. 3. Electrons in a periodic potential.4. Near-free electron approximation. Strongly bound electron approximation.5. Energy bands, effective mass, the concept of a hole. Filling the bands - classification of solids.6. Semiconductors.7. Phenomena of transport.8. Contact phenomena.9. Superconductivity.10. Dielectric and optical properties.						
Prerequisites and co-requisites	no						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam	50.0%	65.0%
	exercise classes assesment	50.0%	35.0%
Recommended reading	Basic literature	Solid State Physics, Kittel Semiconductor Physics, KireevIntroduction to solid state theory, Zimann	
	Supplementary literature	any	
	eResources addresses	Podstawowe https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15182 - Fizyka Fazy Skondensowanej Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Debye model of specific heatassumptions of the almost free electron modelTemperature dependence of the chemical potential of an n-type semiconductorBoltzmann kinetic equationtemperature dependence of electron mobility in a metal / semiconductore.t.c		
Work placement	Not applicable		