



Subject card

Subject name and code	Physics of Condensed Matter, PG_00031954						
Field of study	Technical Physics						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2024/2025		
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	2	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Zakład Fizyki Organicznych i Perowskitowych Struktur Fotowoltaicznych -> Instytut Fizyki i Informatyki Stosowanej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Jan Franz				
	Teachers		dr hab. Jan Franz				
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		5.0		25.0	75
Subject objectives	The aim is to address fundamental questions and to find unifying concepts than can be used to describe and understand a wide range of phenomena in materials and are chemically and structurally divers.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W02] Has enhanced, theoretically-founded, detailed knowledge of selected field of physics, and sufficient knowledge of related fields of science or technology.	The student has extended knowledge in the field of semiconductor physics.			[SW1] Assessment of factual knowledge		
	[K7_W01] Has extended and systematized knowledge of the basics of physics.	Student possess extended knowledge in condensed matter physics.			[SW1] Assessment of factual knowledge		
Subject contents	<ol style="list-style-type: none">1. Properties of electron gas.2. Structure of solids.3. Bonds in solids.4. Lattice vibrations, thermal properties of solids.5. Energy bands in solids.6. Basic properties of semiconductors.7. Generation and recombination of charge carriers in semiconductors.8. Transport of non-equilibrium charge carriers in semiconductors.9. Basic properties of metals, classical and quantum.						
Prerequisites and co-requisites	no						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	written assessment		50.0%		40.0%		
	written assessment		50.0%		60.0%		

Recommended reading	Basic literature	Ph. Hofmann, "Solid State Physics: An Introduction", Wiley-VCH, Weinheim 2022.
	Supplementary literature	R.H. McKenzie, "Condensed matter physics. A very short Introduction.", Oxford University Press, Oxford 2023.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Describe and explain the charge carriers generation processes in semiconductors. Determine the density of states in one- and two-dimensional cases.	
Work placement	Not applicable	