GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physics of intermetallic compounds, PG_00069093		
Field of study	Fizyka związków międzymetalicznych		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Optional subject group
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Strongly Correlated Electronic Systems -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Tomasz Klimczuk	
	Teachers	prof. dr hab. inż. Tomasz Klimczuk	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

E-learning hours included: 0.0

eNauczanie source addresses:

Moodle ID: 2295 Fizyka związków międzymetalicznych
https://enauczanie.pg.edu.pl/2025/course/view.php?id=2295

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	15	2.0	8.0	25

Subject objectives

The course aims to introduce students to the physical properties of compounds made up of two or more metals.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W04] Has enhanced knowledge of materials sciences, within the scope required for describing and understanding the correlation between the chemical composition, structure and mechanical and physical properties.	The knowledge gained allows for the description and understanding of the relationships between the chemical composition, structure, and physical properties of intermetallic materials.	[SW2] Ocena wiedzy zawartej w prezentacji
[K7_K101] acknowledges the importance of knowledge related to the field of study in solving cognitive and practical problems, critically assessing the information obtained	The student critically evaluates the information obtained, understanding the importance of knowledge for his future.	[SK2] Ocena postępów pracy

Subject contents

All topics will be discussed through case studies. I will show successful as well as unsuccessful experiments related to the subject matter.

1. Introduction to intermetallic materials.
2. Synthesis of polycrystalline materials.
3. Basic methods of crystal growth of intermetallic materials.
4. Paramagnetism, Curie-Weiss law.
5. Diamagnetism.
6. Antiferromagnetism and types of antiferromagnetic structures, determination of Neel temperature.
7. Ferromagnetism and the Arrot method for determining the Curie temperature.
8. The three most important measurement techniques: specific heat, electrical resistivity, magnetic susceptibility.
9. Superconductivity and superconductors.

Prerequisites and co-requisites	Basic crystallography.	
Assessment methods and criteria	Subject passing criteria	Passing threshold / Percentage of the final grade
		55.0% / 100.0%
Recommended reading	Basic literature	1. Mary Anne White Properties of Materials, Oxford University Press, 1999; 2. William D. Callister, Jr. Materials Science and Engineering an Introduction, 6th edition, John Wiley & Sons, Inc. 2003;
	Supplementary literature	Review scientific papers selected by the lecturer.
	eResources addresses	
Example issues/ example questions/ tasks being completed	Explain the differences between polycrystalline and crystalline materials. Give the chemical formula of the most commonly used ferromagnet. What superconducting compound is used in the magnetic resonance imaging scanners (MRI)? How do we discover new intermetallic compounds?	
Practical activites within the subject	Not applicable	

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