GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Functional Materials I, PG_00059005		
Field of study	Materials Engineering, Materials Engineering, Materials Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	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		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	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	50.0	100

Subject objectives

learning about the properties of functional materials, selected technologies for their production and applications

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U02	can operate laboratory equipment, e.g. scales, ovens, X-ray diffractometer	[SU1] Assessment of task fulfilment
K6_W03	material science of functional materials and can relate their properties with structure and composition, knows the theoretical description of phenomena occurring in materials, e.g. diffusion, electrical conductivity	[SW1] Assessment of factual knowledge
K6_U01	is able to use properly selected experimental methods and devices to test selected properties of functional materials	[SU1] Assessment of task fulfilment
K6_K01	rozumie potrzebę podnoszenia understands the need to improve professional and personal competences; is aware of his/her own limitations and knows when to turn to experts, is able to appropriately set priorities for the implementation of a given or other task	[SK2] Assessment of progress of work

Subject contents

Introduction Introductory knowledge Revision: structure, defects, bonds and properties, basic thermodynamics; Diffusion; Solid phase reactions.Functional materials due to their electrical properties: Electronic and electrotechnical materials: metals; Electronic and electrotechnical materials: semiconductors; superconductors; dielectrics; Production and shaping of functional materials: Production of single crystals; thin layers; Lithography, etching and other semiconductor technologies; integrated circuit, connections between different materials;Other functional materials Glass and aerogels;

Prerequisites and co-requisites

no

<table>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Lab.: participation, reports</td><td>51.0%</td><td>30.0%</td></tr>
<tr><td>Lecture: written test</td><td>51.0%</td><td>70.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Blicharski, Inżynieria materiałowa</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">e.g. Materials Today</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Podstawowe
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27783 - Moodle course
Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">Solid state diffusion mechanismsFactors affecting the rate of solid state synthesisWhat properties of a superconductor are important if we want to use it to produce an electromagnet with B=10 TMethods of applying thin layers. Describe one.How can you influence: glass color/hydrophilic/phobic properties, etc.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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