GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00052090		
Field of study	Nanotechnology		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
Education level	first-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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jakub Karczewski	
	Teachers	dr hab. inż. Jakub Karczewski	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	15.0	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	6.0	49.0	100

Subject objectives

Understanding modern methods of imaging nanostructures.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U04	The student is able to prepare, perform and interpret an experiment in the field of modern imaging methods.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
K6_W09	The student knows and understands the principles of operation and is able to perform measurements using SEM, AFM, STM microscopy.	[SW1] Assessment of factual knowledge
K6_K04	The student is able to plan and perform an experiment in the field of modern imaging methods in cooperation with a group.	[SK4] Assessment of communication skills, including language correctness [SK1] Assessment of group work skills
K6_W10	The student is able to prepare, perform and interpret an experiment in the field of modern imaging methods.	[SW1] Assessment of factual knowledge

Subject contents

optical microscopy tunneling microscopy atomic force microscopy scanning electron microscopy transmission electron microscopy

Prerequisites and co-requisites

knowledge of basic physics

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>presentation of laboratory results</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>exam</td><td>50.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>Weilie Zhou Zhong Lin Wang "Scanning Microscopy forNanotechnology Techniques and Applications"V. L. Mironov"Fundamentals of Scanning Probe Microscopy"</td></tr>
<tr><td>Supplementary literature</td><td>Nanosurf easyScan 2 - operating instruction</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:
Metody mikroskopowe w nanotechnologii 2024/2025 - Moodle ID: 42036
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=42036</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">principle of atomic force microscopy limitations of SEM microscopy comparison of nanostructure imaging methods</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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