GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Microscopy methods in nanotechnology, PG_00036989		
Field of study	Nanotechnology		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
Education level	second-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	English
Semester of study	1	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute Of Nanotechnology And Materials Engineering -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej		
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	30.0	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

Understanding modern methods of imaging nanostructures

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W03] has general knowledge on current development directions and discoveries in physics, chemistry, technology and applications of nanostructures.	The student has knowledge of modern microscopic methods	[SW1] Assessment of factual knowledge
[K7_W04] has practical and theoretical knowledge of physical and chemical experimental methods of nanotechnology.	The student knows,understands and can perform measurements using SEM, AFM, STM microscopy	[SW1] Assessment of factual knowledge
[K7_U02] has enhanced abilities in laboratory work.	The student is able to prepare perform and interpret experiment in the field modern imaging methods	[SU1] Assessment of task fulfilment
[K7_U05] can plan and conduct experimental and critical research and analyze their results, draw conclusions and formulate reasoned conclusions – within their specialization.	The student is able to prepare perform and interpret experiment in the field modern imaging methods	[SU1] Assessment of task fulfilment

Subject contents

optical microscopytunneling microscopyatomic force microscopyscanning electron microscopytransmission electron microscopy

Prerequisites and co-requisites

Basic physics knowledge

<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>lecture exam</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>laboratory</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 for Nanotechnology 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:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">principle of atomic force microscopylimitations of the SEM microscopycomparison of imaging methods of nanostructures</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
</table>

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