GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Microscopic Methods in Nanotechnology, PG_00069347		
Field of study	Nanotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	1.0
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	0.0	0.0	15.0	0.0	0.0	15

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	15	1.0	9.0	25

Subject objectives

Understanding modern methods of imaging nanostructures.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U04] can plan and conduct experiments, critically analyze their results, draw conclusions and formulate opinions. Has laboratory experience.	The student is able to prepare, perform, and interpret an experiment using 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] Has knowledge of the structure and operation of scientific instruments, measuring and test equipment and in the field of planning and conducting a physical experiment and critical analysis of its results.	The student knows and understands the principles of operation and is able to perform measurements using SEM, AFM, and STM microscopy.	[SW1] Assessment of factual knowledge
[K6_U02] can analyze and solve simple scientific and technical problems based on possessed knowledge, applying analytical, numerical, simulation and experimental methods.	The student is able to prepare samples of nanomaterials for imaging using selected microscopic methods.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents

Imaging of nanomaterials using tunneling microscopy, atomic force microscopy, and scanning electron microscopy

Prerequisites and co-requisites

knowledge of basic physics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
presentation of laboratory work results	50.0%	100.0%

Recommended reading

Basic literature	• Weilie Zhou Zhong Lin Wang "Scanning Microscopy for Nanotechnology Techniques and Applications" • V. L.Mironov"Fundamentals of Scanning Probe Microscopy"
Supplementary literature	Nanosurf easyScan 2 - operating instruction

	eResources addresses	
Example issues/ example questions/ tasks being completed	• Imaging gold nanoparticles using AFM • Imaging carbon nanotubes using SEM	
Work placement	Not applicable	

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