



## Subject card

Subject name and code	MSc thesis laboratory, PG_00070930						
Field of study	Nanotechnology, Nanotechnology						
Date of commencement of studies	February 2027	Academic year of realisation of subject			2027/2028		
Education level	second-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			English		
Semester of study	3	ECTS credits			6.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Agnieszka Witkowska					
	Teachers	dr hab. inż. Agnieszka Witkowska					
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	100.0	0.0	0.0	100
	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	100	2.0	48.0	150		
Subject objectives	The aim of the course is to prepare the student to address and solve scientific and technical problems. The student acquires and consolidates knowledge as well as practical skills necessary for the proper execution of tasks related to the Masters thesis, including experimental planning, development of research methodology, practical implementation of research, analysis of results, and preparation of a comprehensive and reliable report.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_K03] is aware of the importance and understands the non-technical aspects and consequences of engineering activity, including its impact on the environment, and the responsibility associated with decisions taken	By completing a master's project, the student gains awareness of the importance of non-technical aspects and consequences of their research activities (especially in the area of the manufacturing and use of nanostructures and nanosystems) and the associated responsibility for the decisions made. By completing a master's project, the student gains awareness of the importance of non-technical aspects and consequences of their research activities (especially in the area of the manufacturing and use of nanostructures and nanosystems) and the associated responsibility for the decisions made.	[SK5] Assessment of ability to solve problems that arise in practice
	[K7_U04] is able to formulate hypotheses, plan and conduct experimental research, critically analyze results, verify hypotheses, draw conclusions, and formulate well-founded opinions within nanotechnology and related physical and natural sciences. Recognizes economic and non-technical aspects of the activities performed	While carrying out a master's project in experimental nanotechnology, the student is able to plan and conduct experimental research, critically analyze the results, draw conclusions and formulate well-reasoned opinions, as well as identify the economic aspects of the project and assess its economic and environmental viability.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	[K7_U02] has advanced skills in the design of nanomaterials and in conducting laboratory work related to the fabrication and characterization of nanostructures	The student is able to design and conduct laboratory research related to the master's thesis project, including the fabrication of nanomaterials or nanostructures and performing measurements enabling the characterisation of their structural and physicochemical properties.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
	[K7_U05] is able to plan and carry out theoretical and numerical calculations as well as simulations of phenomena and processes, critically analyze their results, draw conclusions, and formulate well-founded opinions in nanotechnology and related physical and natural sciences	The student is able to plan and perform analytical and numerical calculations or computer simulations related to the master's thesis project, as well as carry out analytical and numerical analysis of experimental data, including their qualitative analysis and interpretation, critically evaluate the obtained results, and formulate conclusions and well-reasoned opinions.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
Subject contents	Course content – laboratory Implementation of research tasks related to the selected topic of the diploma project in the team: student-project supervisor.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Realization of laboratory tasks related to the diploma project	50.0%	100.0%
Recommended reading	Basic literature	[1] Nicholas Walliman, Research Methods, The Basics, Taylor & Francis Group, London and New York, 2011 [2] Hugh G. Gauch Jr., Scientific Methods in Brief, Cambridge University Press, 2012	
	Supplementary literature	Scientific literature and specialist reports related to the diploma project	
	eResources addresses		

Example issues/ example questions/ tasks being completed	Micromagnetic structure and its influence on the magnetic properties of ferromagnetic microwires.  Magnetic cobalt-ferrite nanoparticles as a novel therapeutic agent for T-lymphoblastic leukaemia.  Nanoionics: the effect of junctions on ionic conductivity in metal-ion conductors composites.  Comparative analysis of the synthesis and selected physical properties of Au-Ag and Au-Nb nanalloys.
Practical activites within the subject	Not applicable

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