



## Subject card

Subject name and code	, PG_00058876						
Field of study	Nanotechnology						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
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	2	Language of instruction			Polish lack		
Semester of study	3	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
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. Bogusław Kusz					
	Teachers	dr inż. Marek Augustyniak prof. dr hab. inż. Bogusław Kusz					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60	5.0		60.0		125
Subject objectives	Introduce students to nanotechnology tools such as vacuum and cryogenic techniques. The laboratories include practical problem solving in the subject area and designing elements of vacuum and cryogenic technology.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_W10	The student has knowledge in planning and conducting a physical experiment and critically analyzing its results.	[SW3] Assessment of knowledge contained in written work and projects
	K6_W09	The student has basic knowledge of the construction and operation of physical instruments, measuring and research equipment.	[SW1] Assessment of factual knowledge
	K6_K05	The student is able to present the effects of his/her work, convey information in a universally understandable way, communicate, self-assess and constructively evaluate the effects of other people's work.	[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills
	K6_U02	The student is able to analyze and solve simple scientific and technical problems based on his knowledge, using analytical, numerical, simulation and experimental methods.	[SU3] Assessment of ability to use knowledge gained from the subject
K6_U04	The student is able to plan and conduct experiments, critically analyze their results, draw conclusions and formulate opinions	[SU1] Assessment of task fulfilment	
Subject contents	The subject is an attempt to teach students how to solve problems related to vacuum and cryogenic techniques used in nanotechnology.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lecture- final colloquium	50.0%	45.0%
	laboratory - evaluation of reports	90.0%	55.0%
Recommended reading	Basic literature	Internet	
	Supplementary literature	Lack	
	eResources addresses	Adresy na platformie eNauczenie: Podstway Techniki Próżniowej i Kriogeniki - Moodle ID: 33556 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=33556">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=33556</a>	
Example issues/ example questions/ tasks being completed	Lecture: Describe the operation of a high vacuum system. Laboratory: Measure the conductivity of an unknown metal in the temperature range 77-300K		
Work placement	Not applicable		