



## Subject card

Subject name and code	Introduction to Low Temperature and Pressure Techniques, PG_00020931						
Field of study	Nanotechnology						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2021/2022		
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		
Semester of study	3		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Bogusław Kusz				
	Teachers		prof. dr hab. inż. Bogusław Kusz dr inż. Bartosz Trawiński				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie:						
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		18.0		62.0	125
Subject objectives	Gaining knowledge on the fundamentals of vacuum technology and kriotechnology						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W10		The student has knowledge of planning and conducting a physical experiment.		[SW1] Assessment of factual knowledge		
	K6_K04		The student is able to interact and work in a group.		[SK1] Assessment of group work skills		
	K6_U04		The student is able to plan and carry out experiments, critically analyze their results, draw conclusions.		[SU4] Assessment of ability to use methods and tools		
	K6_W09		The student has a basic knowledge of the construction and operation of physical instruments.		[SW1] Assessment of factual knowledge		
	K6_U02		He can analyze and solve simple scientific and technical problems based on his knowledge.		[SU2] Assessment of ability to analyse information		
	K6_K05		The student will be able to present the effects of his work, make self-assessment and constructive assessment of the effects of other people's work.		[SK4] Assessment of communication skills, including language correctness		
Subject contents	Basic knowledge about vacuum, vacuum pumps, vacuum valves, vacuum systems, low temperature, cryostats and physical properties of matter at low temperatures.						

Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Te3st	51.0%	49.0%
	Laboratory-average mark	51.0%	51.0%
Recommended reading	Basic literature	Internet	
	Supplementary literature	No recommendations	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. The idea of operation of a sorption pump.  2. Is the space empty?  3. What is the Casimir Effect?  4. How does the electrical conductivity of superconductors change at low temperatures?  5. How to achieve the temperature of 2.5K?		
Work placement	Not applicable		