



Subject card

Subject name and code	Vacuum technique, PG_00053365						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
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 Specialty 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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Sebastian Bielski					
	Teachers	dr inż. Sebastian Bielski					
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30		2.0		18.0	50
Subject objectives	Knowledge of the following concepts concerning modern vacuum technology: <ul style="list-style-type: none">• properties of gases• surface processes (adsorption and desorption)• creating a vacuum• measuring a vacuum• vacuum components, construction and leak detection						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W02] knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study	The student gains knowledge about construction, operation and use of vacuum devices.	[SW1] Assessment of factual knowledge
	[K7_K01] is ready to create and develop models of proper behaviour in the work and life environment; undertake initiatives; critically evaluate actions of their own, teams and organisations they are part of; lead a group and take responsibility for its actions; responsibly perform professional roles taking into account changing social needs, including: - developing the achievements of the profession, - observing and developing rules of professional ethics and acting to comply to these rules	Students plan and conduct experiments and prepare reports by working in groups.	[SK2] Assessment of progress of work
	[K7_U02] can perform tasks related to the field of study as well as formulate and solve problems applying recent knowledge of physics and other areas of science	The student is able to run, test and use vacuum devices for experimental purposes.	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
Subject contents	Course content – lecture 1) The concept of vacuum in physics and technology 2) The properties of dilute gases 3) The gas flow and surface phenomena 4) Vacuum preparation 5) Mechanical vacuum pumps 6) Jetvacuum pumps 7) Sorption pumps 8) Vacuum measurement 9) Leak Detection 10) Elements of vacuum systems		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written test	50.0%	51.0%
	Laboratories, reports, oral presentations	100.0%	49.0%
Recommended reading	Basic literature	<ul style="list-style-type: none"> S. Bielski, materials published on the moodle platform https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23587 "Modern vacuum physics" Austin Chambers CRC Press 2004 	
	Supplementary literature	Materials and data available on the websites: <ul style="list-style-type: none"> https://www3.nd.edu/~nsl/Lectures/urls/LEYBOLD_FUNDAMENTALS.pdf http://www.idealvac.com/files/manuals/Kinney_Piston_Vacuum_Pump_Brochure.pdf https://www.agilent.com/cs/library/catalogs/public/05_Diffusion_Pumps.pdf http://www.idealvac.com/files/literature/03_Edwards_2011_Vapour_Diffusion_Pumps.pdf http://www.idealvac.com/files/brochures/Pfeiffer-Adixen-Leak-Detectors-Brochure.pdf 	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> Project of a UHV system. Physical basis of vacuum measurements. Construction, operation and properties of a rotary pump. 		
Practical activities within the subject	Not applicable		

Document generated electronically. Does not require a seal or signature.