



Subject card

Subject name and code	NANOTECHNOLOGY, PG_00063190						
Field of study	Chemical Technology						
Date of commencement of studies	February 2027		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group		Obligatory subject group in the field of study		
Mode of study	Full-time studies		Mode of delivery		blended-learning		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Inorganic Chemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Andrzej Okuniewski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	30.0	0.0	60
	E-learning hours included: 15.0						
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	The aim of the course is to acquaint students with the history, present state and future prospects of nanotechnology - an interdisciplinary field combining achievements in physics, chemistry, biology, material science, and many others. Awareness of technological capabilities at the nanoscale will give future graduates a chance to use them in their work.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U09] prepares documentation of experiments and technological processes using professional terminology		is able to prepare reports on the laboratory experiments and project work carried out. They describe synthesis and characterization processes of nanostructures using proper nanotechnology terminology.		[SU5] Assessment of ability to present the results of task		
	[K7_W03] selects methods of data analysis, including statistical and modelling, useful for solving scientific and technological problems		recognizes and selects appropriate calculation methods and data analysis methods to solve specific problems related to nanotechnology. They understand the principles of operation and limitations of each of these methods and are able to assess the suitability of a given method for a specific problem.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[K7_U01] designs experiments using computer methods of data analysis, computer simulations and based on the state of the knowledge in accordance with the latest scientific literature		is able to plan and conduct computer simulations to design nanostructures, analyze their properties, and investigate nanoscale phenomena. As part of the computer project, the student selects appropriate modeling methods and verifies the obtained results against the scientific literature.		[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		

Subject contents	Course content – lecture Molecular modeling. History of nanotechnology. Nanolithography. Nanoelectronics. Computer data storage. Structural research. Coordination and supramolecular chemistry. Carbon nanostructures. Quantum effects in nanostructures. 0-3D nanostructures. Calculation exercises.		
	Course content – laboratory Students independently synthesize four types of nanoparticles. The resulting preparations are subjected to a series of tests to confirm their physical properties.		
	Course content – project Students become acquainted with the basics of molecular modeling and design nanodevices by themselves.		
Prerequisites and co-requisites	Completed courses at the undergraduate level in the following subjects: mathematics, physics, general, inorganic, organic and physical chemistry.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture (written exam)	60.0%	40.0%
	Project (report)	60.0%	30.0%
	Laboratory (tests and reports)	60.0%	30.0%
Recommended reading	Basic literature	<ul style="list-style-type: none">K. Żelechowska: Nanotechnologia w praktyce. <i>Wydawnictwo Naukowe PWN</i> (2016).R. W. Kelsall, I. W. Hamley, M. Geoghegan: Nanotechnologie. <i>Wydawnictwo Naukowe PWN</i> (2008).	
	Supplementary literature	<ul style="list-style-type: none">K. Żelechowska: Nanotechnologia w chemii i medycynie. <i>Wydawnictwo PG</i> (2014)Ch. Binns: Introduction to nanoscience and nanotechnology, <i>Hoboken, N.J. Wiley</i> (2010).Ch. P. Poole Jr., F. J. Owens: Introduction to nanotechnology. <i>Hoboken, N.J. Wiley</i> (2003).B. Dręczewski, A. Herman, P. Wroczyński: Nanotechnologia stan obecny i perspektywy, <i>Wydawnictwo PG</i> (1997).	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Available on the eNauczanie platform.		
Practical activities within the subject	Not applicable		

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