



## Subject card

Subject name and code	Introduction to Bionanotechnology, PG_00069333						
Field of study	Nanotechnology						
Date of commencement of studies	October 2025	Academic year of realisation of subject			2026/2027		
Education level	first-cycle studies	Subject group					
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			3.0		
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 hab. inż. Agnieszka Pladzyk					
	Teachers	dr hab. inż. Agnieszka Pladzyk					
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	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	5.0		40.0		75
Subject objectives	The course aims to familiarise students with biological systems such as cells, proteins, DNA, antibodies and naturally occurring chemical processes and reactions in biological organelles, which are used in the production of advanced materials and structures at the nano- and mesoscopic scales that have practical applications.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W05] has knowledge of inorganic and organic chemistry, physical chemistry and chemical thermodynamics.	The student knows the basic principles of bionanotechnology and has knowledge of the basic research methods used in the identification of biomolecules.			[SW1] Assessment of factual knowledge		
	[K6_W07] has systematic knowledge of the physical and chemical principles of nanotechnology (methods of obtaining nanostructures, types of nanostructures, their properties, basic research methods).	Students learn about phenomena occurring at the molecular level in cells, as well as approaches to designing bionanoparticles and bionano-objects for various target applications. They also gain knowledge about methods for identifying them.			[SW1] Assessment of factual knowledge		
	[K6_U01] can learn independently, obtain information from literature, databases and other properly selected sources	The student is able to list basic bionanostructures and characterise their structure, functions and physicochemical properties, and can also give examples of the application of bionanotechnology in various areas of everyday life.			[SU3] Assessment of ability to use knowledge gained from the subject		
Subject contents	Course content – lecture 1. The structure of DNA as a carrier of genetic information 2. RNA structure, functions and types 3. Cell organelles 4. Single-celled organisms: bacteria 5. Viruses: non-cellular forms of matter 6. Antibodies formation, types and role 7. Proteins, fats, carbohydrates their use in bionanotechnology 8. Proteins as natural biomachines						
Prerequisites and co-requisites	The student has basic knowledge of chemistry and physics.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		lecture test	60.0%
Recommended reading	Basic literature	Podstawy biologii komórki, Bruce Alberts i inni, Wydawnictwo Naukowe PWN, Warszawa, 3, 2019 Mikrobiologia Ogólna, Schlegel Hans G, Wydawnictwo Naukowe PWN, Warszawa, 2, 2008	
	Supplementary literature	Journal of Nanobiotechnology  Publikacje naukowe sugerowane przez prowadzącego na wykładach	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Describe the structure of an antibody.</li> <li>2. List the types and functions of RNA.</li> <li>3. List the differences between the structure of a eukaryotic cell and a prokaryotic cell.</li> <li>4. How does a virus differ from a bacterium?</li> <li>5. Methods of eliminating microorganisms</li> <li>6. List and describe three selected bionanoparticles</li> <li>7. What is biomimetics?</li> </ol>		
Practical activities within the subject	Not applicable		

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