



## Subject card

Subject name and code	Fundamentals of bionanotechnology, PG_00052073						
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		
Semester of study	4	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Inorganic Chemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Agnieszka Pladzyk					
	Teachers	dr hab. inż. Agnieszka Pladzyk dr inż. Martyna Mroczyńska-Szeląg					
Lesson types and methods of instruction	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 Address on the e-learning platform: <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18514">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18514</a>						
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	The purpose of this course is to introduce Students to the field of using evolutionarily optimized biological systems, such as cells, cellular components, nucleic acids, and proteins, to produce functional nanostructured and mesoscopic architectures composed of organic and inorganic materials, with applications in various areas of everyday life.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W07	The student learns about the phenomena occurring at the molecular level in the cell, he/she also learns about the approaches in the design of bionanoparticles and bionano-objects with different target applications, and has knowledge about the methods of their identification			[SW1] Assessment of factual knowledge		
	K6_U01	Students can describe basic bionanostructures, their structure, functions and physico-chemical properties; Student is able to give examples of application of bionanotechnology in different areas of everyday life.			[SU3] Assessment of ability to use knowledge gained from the subject		
	K6_W05	Student knows fundamentals of bionanotechnology, also has the knowledge about basic research methods which allow for the identification of biomolecules			[SW1] Assessment of factual knowledge		

Subject contents	<ol style="list-style-type: none"> <li>1. Structure of DNA as a carrier of genetic information</li> <li>2. RNA- structure, functions and types</li> <li>3. Cell organelles</li> <li>4. Bacteria unicellular organisms</li> <li>5. Viruses Cell-free forms of matter</li> <li>6. Antibodies origin, types and role</li> <li>7. Proteins, lipids, carbohydrates - their application in bionanotechnology</li> <li>8. Proteins as natural bionanomaschines</li> </ol>		
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
	two writing test	60.0%	100.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Podstawy biologii komórki, Bruce Alberts i inni, Wydawnictwo Naukowe PWN, Warszawa, 3, 2019</li> <li>2. Mikrobiologia Ogólna, Schlegel Hans G, Wydawnictwo Naukowe PWN, <b>Warszawa, 2, 2008</b></li> </ol>	
	Supplementary literature	Scientific publications suggested by teacher during lectures	
	eResources addresses	Adresy na platformie eNauczanie:	
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 function of RNA</li> <li>3. List the differences between the structure of a eukaryotic cell and a prokaryotic cell</li> <li>4. What is the difference between a virus and a bacterium</li> <li>5. Methods of eliminating microorganisms</li> <li>6. List and describe three selected bioparticles</li> <li>7. What is biomimetics?</li> <li>8. What is bionanotechnology</li> </ol>		
Work placement	Not applicable		