GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Introduction to Bionanotechnology, PG_00069333		
Field of study	Nanotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Optional 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	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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Agnieszka Pladzyk	
	Teachers	dr hab. inż. Agnieszka Pladzyk dr hab. inż. Justyna Kucińska-Lipka dr inż. Martyna Mroczyńska-Szeląg dr hab. inż. Anna Stanisławska-Sachadyn	

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

eNauczanie source addresses:

Moodle ID: 1548 Wprowadzenie do bionanotechnologii
https://enauczanie.pg.edu.pl/2025/course/view.php?id=1548

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_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
[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_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

<table>
<tr><td>Subject contents</td><td colspan="3">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</td></tr>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">The student has basic knowledge of chemistry and physics.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>lecture test</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Podstawy biologii komórki, Bruce Alberts i inni, Wydawnictwo Naukowe PWN, Warszawa, 3, 2019
Mikrobiologia Ogólna, Schlegel Hans G, Wydawnictwo Naukowe PWN, Warszawa, 2, 2008</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Journal of Nanobiotechnology

Publikacje naukowe sugerowane przez prowadzącego na wykładach</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">1. Describe the structure of an antibody.
2. List the types and functions of RNA.
3. List the differences between the structure of a eukaryotic cell and a prokaryotic cell.
4. How does a virus differ from a bacterium?
5. Methods of eliminating microorganisms
6. List and describe three selected bionanoparticles
7. What is biomimetics?</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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