GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Biophysics, PG_00054714		
Field of study	Biotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Tomasz Laskowski	
	Teachers		

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	2.0	18.0	50

Subject objectives

The aim of the course is to present the physical and physicochemical foundations of biological processes and ways of studying living systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U01	Student is able to process and intepret spectral data in order to describe the properties of biomacromolecules and living systems.	[SU2] Assessment of ability to analyse information
K6_U11	Student uses the knowledge on mathematics, chemistry and physics to describe the properties of living systems.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
K6_W02	The student knows what impact on structure and function of biopolymers have specific properties liquid water and dissolved in salt in it. The student can describe physical and physicochemical basics of determination methods molecular weights biopolymers. Applies classical thermodynamics and non-equilibrium to be described living systems. Describes physical basics advanced techniques microscopic. Explain principles of instrumental operation cell counting techniques and interprets the obtained results.	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Course content – lecture
The presented material includes: influence of the properties of liquid water and salts dissolved in it on the structure of biopolymers andthe phenomenon on their surface methods of experimental determination of molecular weight of biopolymers application of thermodynamics to the description of animate systems principles of microcalorimetry and the possibility of its application in biophysical research advanced microscopic techniques instrumental techniques for counting cells and analyzing cell suspensions membrane receptors and cell signaling principles of sensory organs at the molecular and cellular level medical techniques for imaging the interior of the body</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Preceding subjects: physics, cell biology, biochemistry, physical chemistry.Prerequisites: knowledge of the basics of optics, thermodynamics and physicochemistry of solutions; basicsof knowledge about cell structure and functioning; knowledge about the structure and role of biopolymers inthe cell; basics of enzymology.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>colloquium during the semester</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>written exam</td><td>60.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. J.Mazerski: Podstawy biofizyki, Wydawnictwo PG, Gdańsk 2011

2. Biofizyka, pod red. Z. Jóźwiak i G. Bartosza, PWN, Warszawa 2005

3. Receptory i mechanizmy przekazywania sygnałów, pod red. J.Z.Nowaka i J.B. Zawilskiej, PWN, Warszawa 2004</td></tr>
<tr><td>Supplementary literature</td><td>1. J.M. Berg, J.M. Tymoczko, L. Stryer: Biochemia, PWN, Warszawa 2009</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Models of the electric double layer on the surface of macromolecules in salt solutions2. The principle of the confocal microscope3. Threats associated with specific types of medical imaging</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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