



Subject card

Subject name and code	Biophysics, PG_00054714						
Field of study	Biotechnology						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
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						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Tomasz Laskowski					
	Teachers						
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						
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_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		
	K6_U11	Student uses the knowledge on mathematics, chemistry and physics to describe the properties of living systems.			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject		
	K6_U01	Student is able to process and interpret spectral data in order to describe the properties of biomacromolecules and living systems.			[SU2] Assessment of ability to analyse information		

Subject contents	The presented material includes: influence of the properties of liquid water and salts dissolved in it on the structure of biopolymers and the 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		
Prerequisites and co-requisites	Preceding subjects: physics, cell biology, biochemistry, physical chemistry. Prerequisites: knowledge of the basics of optics, thermodynamics and physicochemistry of solutions; basic knowledge about cell structure and functioning; knowledge about the structure and role of biopolymers in the cell; basics of enzymology.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam	60.0%	50.0%
	colloquium during the semester	60.0%	50.0%
Recommended reading	Basic literature	1. J. Mazerski: Podstawy biofizyki, Wydawnictwo PG, Gdańsk 2011  2. Biofizyka, pod red. Z. Józwiak i G. Bartosza, PWN, Warszawa 2005  3. Receptory i mechanizmy przekazywania sygnałów, pod red. J.Z. Nowaka i J.B. Zawilskiej, PWN, Warszawa 2004	
	Supplementary literature	1. J.M. Berg, J.M. Tymoczko, L. Stryer: Biochemia, PWN, Warszawa 2009	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	1. Models of the electric double layer on the surface of macromolecules in salt solutions 2. The principle of the confocal microscope 3. Threats associated with specific types of medical imaging		
Work placement	Not applicable		

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