

Subject card

Subject name and code	Biophysics of Biological Systems, PG_00182155						
Field of study	Medical Physics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's 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	academic		Assessment form		exam		
Conducting unit	Division of Biomaterials and Medical Physics -> Institute of Experimental Physics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Justyna Strankowska				
	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		0.0		30.0	60
Subject objectives	The course objective is to introduce students to topics related to the physical description of biological systems. This includes: • Understanding the structure and function of living matter from a physical perspective. • Presenting the physical principles of measurement methods used in biophysics. An additional goal of the course is for students to acquire the skills to apply the laws of physics and research techniques to describe biological systems. This includes the ability to independently design experiments involving living matter.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FIZMEDL3_W02] Knows and understands to an advanced level selected biological phenomena and processes, as well as the laws of physics and chemistry underlying them.	The student: Defines ways of describing living matter and knows the types of interactions within living matter. Describes the structure of chemical molecules that constitute living matter. Knows and understands the electrochemical processes occurring in the cell membrane. Describes the structure and function of cells, tissues, and organs using the laws of physics.	[SW4] test/exam - oral or written
	[FIZMEDL3_W01] Knows and understands at an advanced level the phenomena, principles, laws and theories specific to physics and biophysics.	The student: Explains the physical principles, as well as the operating procedures and applications of research methods used to study biological systems.	[SW4] test/exam - oral or written
	[FIZMEDL3_W06] Knows and understands at an advanced level key concepts of human anatomy and physiology, with a particular focus on the physical aspects of biological systems.	The student: Describes the structure and function of cells, tissues, and organs using the laws of physics.	[SW4] test/exam - oral or written
Subject contents	1. Introduction to the description of living matter (characteristics of biological systems: proteins, lipids, DNA, RNA). 2. Elements of molecular biophysics: types of interactions in living matter and the formation of biological structures, kinetics of chemical reactions. 3. Cellular biophysics. 4. Tissue biophysics. 5. Organ biophysics. 6. Research methods used to study biological systems (XRD, UV-Vis, Raman and IR spectroscopy, NMR).		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	xam with open-ended questions	51.0%	100.0%
Recommended reading	Basic literature	not applicable	
	Supplementary literature	not applicable	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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