University of Gdańsk

Subject card

Subject name and code	Physic with elements of biophysics, PG_00203429						
Field of study	Medical Biology						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2027/2028			
Education level	Bachelor's studies		Subject group	Obligatory subject group 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	2.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Laboratory of Protein and Nucleic Acid Biochemistry -> Department of General and Medical Biochemistry -> Faculty of Biology -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Mirosław Jarząb					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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		6.0	14.0	50	
Subject objectives	1. Learning the most important laws of physics and the rules governing the underlying chemical reactionsbiological processes and physical properties of elements and chemical compounds. 2. Understandingbasic biophysical processes. 3. Ability to perform and interpret independentlybiophysical experiences.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOLMEDL3_W10] has an advanced understanding of the principles of assessing processes and phenomena occurring within the body, using physical or chemical measurements, and possesses advanced knowledge of experimental methods and the key techniques of the biological sciences that may be applied in medical biology and diagnostics	The student is able to explain the theoretical basis of experimental methods and list the most important biological science techniques that may be used in medical biology and diagnostics.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
[BIOLMEDL3_U01] is able to use and operate basic research equipment and tools employed in molecular-biochemical analysis or neurobiology and, following the correct sequence of steps, carries out simple physical, biological or chemical observations and measurements in laboratory work in the field of biological or medical sciences	The student is able to use basic laboratory equipment and research tools, maintaining the correct sequence of activities, in order to perform simple physical, biological or chemical observations and measurements in laboratory work in the field of biological or medical sciences.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
[BIOLMEDL3_W06] idefines the key laws and principles of physics and chemistry that underpin biological processes, describes the properties of elements and chemical compounds, and has an advanced knowledge and understanding of the physicochemical and biological foundations of health sciences	The student knows the most important laws and rules of physics and chemistry that underlie biological processes and knows the properties of chemical compounds and elements.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
[BIOLMEDL3_W05] identifies the mathematical tools necessary for understanding the laws of nature and describing biological processes, is familiar with methods of statistical analysis, and understands their significance in interpreting biological phenomena and processes	The student knows the necessary mathematical tools needed to understand the laws of nature and describe life processes.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
[BIOLMEDL3_K04] jest odpowiedzialny za bezpieczeństwo pracy własnej i innych oraz potrafi rozpoznać sytuacje zagrożenia i podjąć odpowiednie działania	The student is responsible for the safety of his/her work and that of others while staying in the laboratory room. He can also recognize a threat and respond to it appropriately.	[SK8] observation of student's independent or team work

Subject contents

Experimental introduction to selected physical issues (fluorescence, spectroscopyabsorption, calorimetry, enthalpy, refractometry, sedimentation). Learning and using techniquesbiophysical in biology.

Prerequisites and co-requisites

Solving biochemical tasks (converting concentrations, preparing solutions, calculating solution concentrations, mixing solutions).

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	50.0%	71.5%
report from laboratory classes	0.0%	28.5%

Recommended reading

Basic literature	1. Biofizyka, collective work edited by Zofia Jóźwiak and Grzegorz Bartosz, PWN, 20082. Principles of fluorescence spectroscopy, 3rd edition, Joseph Lakowicz, Springer Science, 20063. Biophysics. Selected issues with exercises. Z. Jóźwiak, G. Bartosz, PWN, Warsaw, 2005
Supplementary literature	Physical chemistry. Short lectures. A.G. Whittaker, A. R. Mount, M. R. Heal, PWN, Warsaw 2003;

	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Direct and indirect calorimetry2. Sedimentation centrifugation3. Jabłoński's diagram4. Exaltation of molar refraction5. Protein denaturation6. Enthalpy and entropy	
Work placement	Not applicable	

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