

Subject card

Subject name and code	Physic with elements of biophysics, PG_00154403						
Field of study	Biology						
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	3		ECTS credits		3.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Faculty of Biology -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Donata Figaj				
	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		39.0	75
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
	[BIOLL3_W13] The graduate knows and understands the principles of evaluating processes and phenomena using physical and/or chemical measurements	The student is able to evaluate processes and phenomena using physical and/or chemical measurements.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
	[BIOLL3_W09] The graduate knows the most important laws and rules of physics and chemistry underlying biological processes and the properties of chemical elements and compounds	The student knows the most important laws and rules of physics and chemistry that underlie biological processes and the properties of chemical compounds and elements.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
	[BIOLL3_W08] The graduate knows the tools of mathematics necessary to understand the laws of nature and to describe life 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
	[BIOLL3_U02] The graduate will be able to make observations individually and in teams, and carry out basic physical, biological and chemical measurements in the field or laboratory	The student is able to conduct basic laboratory experiments in the field of physics, biology and chemistry, both individually and in teamwork. He can also present observations and conclusions from these experiences.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
	[BIOLL3_U01] The graduate will be able to use basic apparatus and research tools and follow the correct sequence of operations in laboratory and field work	The student is able to correctly use basic research equipment and tools and maintain the correct sequence of activities in laboratory work.	[SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
	[BIOLL3_K05] The graduate is prepared to take responsibility for their own and others' safety at work and to recognise risk situations and take appropriate action	The student is responsible for his own safety and that of others while performing experiments in the laboratory room. He can also recognize threats and respond 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
	report from laboratory classes	0.0%	17.0%
	test	50.0%	83.0%
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		

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