

Subject card

Subject name and code	Physics with elements of biophysics, PG_00147010						
Field of study	Genetics and Experimental 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		
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	Faculty of Biology -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Donata Figaj				
	Teachers		dr inż. Donata Figaj				
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		4.0		16.0	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
	[GBEL3_K08] Responsibility for entrusted equipment/materials and respect for the work of others.	The student is responsible for the equipment and materials provided as part of laboratory exercises	[SK8] observation of student's independent or team work
	[GBEL3_W02] Knowledge of mathematics, physics, and chemistry is necessary for understanding biological phenomena and processes, as well as their application in research methodology.	The student has knowledge of mathematics, physics and chemistry to the extent necessary to understand biological issues. The student is able to apply this knowledge in research methodology.	[SW4] test/exam - oral or written [SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report [SW5] implementation of a problem task
	[GBEL3_U03] Proficient in using research equipment and tools, while following the correct sequence of procedures, to conduct basic physical, biological, or chemical observations and measurements in laboratory work within the field of biological sciences.	The student uses basic research equipment and tools and keeping it correct sequence of activities, performs simple observations and measurements biological, chemical and physical at work laboratory in the field of science biological.	[SU2] presentation/project/paper/report
	[GBEL3_U08] Independently study literature and plan one's own career path.	While learning, the student uses additional sources of information beyond the developed exercise script	[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written
	[GBEL3_K05] Responsibility for the safety of one's own work and others.	The student is responsible for safe behavior while in the exercise room and during experiments.	[SK8] observation of student's independent or team work
	[GBEL3_U01] Independently perform practical tasks in the field of biological sciences and related disciplines, formulate research problems, analyze their results, and draw conclusions.	The student is able to formulate research problems in the field of biological and related sciences, pose hypotheses, conduct experiments, analyze the obtained results and draw conclusions.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report [SU8] 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%	83.0%
	report from laboratory classes	0.0%	17.0%
Recommended reading	Basic literature	1. Biofizyka, collective work edited by Zofia Józwiak and Grzegorz Bartosz, PWN, 20082. Principles of fluorescence spectroscopy, 3rd edition, Joseph Lakowicz, Springer Science, 20063. Biophysics. Selected issues with exercises. Z. Józwiak, 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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