University of Gdańsk

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 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	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		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_W02] A graduate has an advanced knowledge and understanding of:: knowledge of mathematics, physics and chemistry to the extent necessary for understanding biological phenomena and processes and 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_U08] The graduate is able to: study the literature independently and plan your 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_U03] The graduate is able to: use research apparatus and tools and, following the correct sequence of operations, carry out simple physical, biological or chemical observations and measurements in laboratory work in the 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_U01] The graduate is able to: independently perform practical tasks in the biological and related sciences, formulate research problems, analyse 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
[GBEL3_K08] The graduate is prepared to: takes responsibility for equipment/materials entrusted to it and respects 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_K05] The graduate is prepared to: responsibility for their own and others' safety at work	The student is responsible for safe behavior while in the exercise room and during experiments.	[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

Work placement

Not applicable

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