University of Gdańsk

Subject card

Subject name and code	Biophysics, PG_00182666		
Field of study	Physics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master'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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	academic	Assessment form	exam
Conducting unit	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	45.0	75

Subject objectives	The course aims to introduce Physics students to the field of biophysics. It covers the structure and function of biological systems, as well as the physical principles and measurement techniques used in molecular biophysics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[FIZMU2_W04] knows the principle of operation of measuring systems and research equipment specific to the area of physics related to the selected specialization or knows advanced methods of theoretical and mathematical physics	The student analyses and explains the physical principles of advanced research equipment and measurement methods used in biophysics, such as Nuclear Magnetic Resonance (NMR) spectroscopy, X-ray crystallography, and Infrared and Raman spectroscopy.	[SW3] text preparation/written work
[FIZMU2_K01] knows the limitations of his own knowledge and skills; can formulate questions precisely; understands the need for further education and other	The student assesses their own limitations in knowledge and skills, formulates precise research questions, and demonstrates responsibility for their own learning process and continuous scientific development.	[SK3] text preparation/written work
[FIZMU2_W06] has knowledge of the current directions of development of physics and fundamental dilemmas of modern civilization	The student differentiates and evaluates current research trends in biophysics (e.g., in cell research, ion channels, or medical biophysics), justifying their potential impact on solving fundamental problems of modern civilisation, such as combating diseases.	[SW3] text preparation/written work
[FIZMU2_U06] is able to adapt the knowledge and methodology of physics, as well as the applied experimental and theoretical methods to related scientific disciplines	The student can select an appropriate experimental method for researching living systems or biomacromolecules, interpret the results, and analyse and compare them.	[SU3] text preparation/written work [SU5] implementation of a problem task
[FIZMU2_W01] has advanced knowledge of general physics and in-depth knowledge of various areas of physics; knows the history of the development of physics and its importance for the progress of exact and natural sciences, cognition of the world and social development	The student synthesises and integrates advanced knowledge from various fields of physics (thermodynamics, hydrodynamics, electromagnetism) to explain complex biophysical phenomena occurring in living organisms.	[SW3] text preparation/written work

Subject contents

1. Introduction to Living Matter
2. Types of Interactions in Living Matter and the Formation of Biological Structures
3. Characteristics of Biological Macromolecules
4. Biophysics of the Cell, Tissues, Organs, and Systems
5. Biotermodynamics
6. Photosynthesis
7. Methods for Studying Living Systems

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
problem task	51.0%	20.0%
writting test	51.0%	80.0%

Recommended reading

Basic literature	1.Biofizyka, red. F. Jaroszyk, Wydawnictwo Lekarskie PZWL, Warszawa 2. Biofizyka molekularna, G. Ślósarek, Wydawnictwo Naukowe PWN, W 3. Biofizyka dla biologów, red. M. Bryszewska, W. Leyko, Wydawnictwo 4. Fizyczne metody badań w biologii, medycynie i ochronie środowiska, 1999. 5. Podstawy spektroskopii molekularnej, Z. Kęcki, Wydawnictwo Naukow
Supplementary literature	1. NMR w biologii i medycynie, K.H. Hausser, H.R. Kalbitzer, Wydawnict 2. Spektroskopia Ramana i podczerwieni w biologii, J. Twardowski, P. A
eResources addresses	

Example issues/ example questions/ tasks being completed

not applicable

Work placement

Not applicable

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