University of Gdańsk

Subject card

Subject name and code	Biochemical structure of proteins, PG_00196908		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study Optional subject group 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	2.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Szymon Ziętkiewicz	
	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	5.0	15.0	50

Subject objectives

To learn advanced concepts of protein structure, introduce the issues related to protein structural research, and analyss the structure-function relationship. Gaining advanced knowledge about the mechanisms of protein functioning at the molecular level, the interactions that determine the folding process, application of experimental and computational methods for determining protein structures. The student will learn how to interpret structural data, become familiar with the potential problems and limitations of the methods used and with the ongoing development of research techniques.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHL3_W07] The graduate has advanced knowledge of the rules of operation and the possibilities of using research techniques and tools used in biotechnology.	Student knows the physical principles of the methods of structural biology (crystallography, NMR, cryo-EM), knows their limitations and quality criteria	[SW4] test/exam - oral or written
[BIOTECHL3_W01] The graduate possesses structured and advanced knowledge of biological phenomena at the molecular level and understands their importance for biotechnology.	The student is familiar with the physical interactions involved in the formation of protein structures, knows the aspects of the secondary, tertiary and quaternary structure and understands the structure-function relationship of proteins	[SW4] test/exam - oral or written
[BIOTECHL3_K01] The graduate is aware of the scope of their own knowledge and skills; demonstrates a willingness to continuously update them and pursue professional development.	Student is aware of the progress in methodology and knowledge in structural biology and necessity of constant actualization of his/her own knowledge	[SK3] text preparation/written work

<table>
<tr><td>Subject contents</td><td>1. Structural aspects in biochemistry, protein conformation, conformational space, Anfinsen paradox

2. Protein amino acids, peptide bond, physico-chemical basis of interactions involved in creation and stabilization of protein structurebiałkowych.

3. Structure levels, dynamics and thermodynamics of protein folding

4. Empirical and computatinal methods for protein structure determination

5. Structural elements of proteins, helices, sheets, structural motives, domains E

6. Dynamics of proteins, conformational changes

7. Discussion of chosen examples of protein mechanisms and structure-function relationships</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>not applicable</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>[BIOTECHL3_W01] , [BIOTECHL3_W07]</td><td>51.0%</td><td>93.3%</td></tr>
<tr><td>[BIOTECHL3_K01]</td><td>51.0%</td><td>6.7%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. Biofizyka dla biologów, red. M. Bryszewska, W. Leyko,

2. Introduction to Protein Structure, Branden C, Tooze J

3. Introduction to Protein Architecture, Lesk A</td></tr>
<tr><td>Supplementary literature</td><td>not applicable</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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