

Subject card

Subject name and code	Biological chemistry. Analysis of interactions between and intra-molecular biomolecules, PG_00196907						
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	UG Institute of Biotechnology -> Intercollegiate Faculty of Biotechnology UG-MUG -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Monika Górska-Arcisz				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	8.0	10.0	0.0	0.0	0.0	18
	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	18	5.0		27.0	50	
Subject objectives	The course aims to impart principles of gathering and interpreting comprehensive information about a molecule based on its chemical structure. Students will learn to predict intermolecular and intramolecular interactions (attraction or repulsion) of biomolecules, understand chirality and conformational changes in molecules. They will become familiar with important chemical functional groups, their ionization abilities, and free radical formation, as well as applying this analysis to understand biological phenomena.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[BIOTECHL3_W01] The graduate possesses structured and advanced knowledge of biological phenomena at the molecular level and understands their importance for biotechnology.	The student possesses the ability to predict interactions (attraction or repulsion) both within the molecule and with other chemical structures. The student understands the phenomena of chirality and conformational changes in a chemical molecule, and knows the most important chemical functional groups, their ability to ionize, and to form free radical systems.			[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report [SW5] implementation of a problem task		
	[BIOTECHL3_W06] The graduate possesses structured and advanced knowledge of exact and natural sciences necessary to understand biological phenomena and processes, in particular cellular processes at the molecular level.	The student knows the principles of gathering and interpreting comprehensive information about a molecule of a chemical compound based on its chemical structure and other data, such as physicochemical properties.			[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report [SW5] implementation of a problem task		

Subject contents	<p>Lectures:</p> <ul style="list-style-type: none"> - Determining the potential of molecular intermolecular and intramolecular interactions for selected chemical compounds. - The concept of solving chemical problems in biology based on research on structure-activity relationships. - Determination of the relative risk of toxicity and ecotoxicity of benzene towards toluene based on T-SAR. - The potential of intra-molecular interactions present in the unfolded structure of DNA and chromatin. - Analysis of the potential of interactions in higher structures of protein organization (secondary, tertiary, and quaternary). <p>Auditory exercises:</p> <ul style="list-style-type: none"> - Understanding the chemical structure of compounds. - Ability for intra- and intermolecular interactions. - Shape and plasticity of a chemical molecules. - Molecular basis of chemical reactivity of molecules and their biological function. 											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Presentation</td> <td>51.0%</td> <td>15.0%</td> </tr> <tr> <td>Written exam with open-ended and multiple-choice questions</td> <td>51.0%</td> <td>85.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Presentation	51.0%	15.0%	Written exam with open-ended and multiple-choice questions	51.0%	85.0%
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Recommended reading	<p>Basic literature</p> <p>Supplementary literature</p> <p>eResources addresses</p>	<p>1. Wstęp do chemii biologicznej dla studentów biotechnologii. B. Jastorff, R. Stoermann, W. Makarewicz, A.C. Składanowski, A. Borowiec, M. Markuszewski, Gdańsk 2004</p> <p>2. Chemia medyczna, Patrick Graham, Wydawnictwo Naukowe PWN, 2019</p> <p>3. Chemia medyczna - Podstawowe zagadnienia, Patrick Graham, Wydawnictwo WNT, 2003</p> <p>4. Basic Concepts in Medicinal Chemistry, Marc Harrold, Robin Zavod, 2013</p> <p>Chemia organiczna, część 1-5, John McMurry, Wydawnictwo Naukowe PWN, 2021</p>										
Example issues/ example questions/ tasks being completed												
Work placement	Not applicable											

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