

Subject card

Subject name and code	Biological chemistry. Analysis of interactions between and intra-molecular biomolecules, PG_00080479						
Field of study	Chemia biologiczna. Analiza oddziaływań między i wewnątrz-cząsteczkowych biomolekuł						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
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 Górską-Arcisz				
	Teachers		dr Monika Górską-Arcisz				
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		0.0		0.0	18
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 fundamental biological phenomena.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[BIOTECHL3_W01] The graduate knows and understands basic biological phenomena at the molecular level, he/she is familiar with their significance 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/egzamin - ustny lub pisemny [SW1] wypowiedź ustna/rozmowa/ dyskusja [SW2] prezentacja/projekt/referat/ raport [SW5] realizacja zadania problemowego		
	[BIOTECHL3_W06] The graduate knows and understands basic knowledge in science and natural sciences necessary for understanding the phenomena and biological processes, 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/egzamin - ustny lub pisemny [SW1] wypowiedź ustna/rozmowa/ dyskusja [SW2] prezentacja/projekt/referat/ raport [SW5] realizacja zadania problemowego		

Subject contents	Lectures: - 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). Auditory exercises: - 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	The required basic knowledge, competences, and skills specified for Module 01.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam with open-ended and multiple-choice questions	51.0%	85.0%
	Presentation	51.0%	15.0%
Recommended reading	Basic literature	1. Wstęp do chemii biologicznej dla studentów biotechnologii. B. Jastorff, R. Stoermann, W. Makarewicz, A.C. Składanowski, A. Borowiec, M. Markuszewski, Gdańsk 2004 2. Chemia medyczna, Patrick Graham, Wydawnictwo Naukowe PWN, 2019 3. Chemia medyczna - Podstawowe zagadnienia, Patrick Graham, Wydawnictwo WNT, 2003 4. Basic Concepts in Medicinal Chemistry, Marc Harrold, Robin Zavod, 2013	
	Supplementary literature	Chemia organiczna, część 1-5, John McMurry, Wydawnictwo Naukowe PWN, 2021	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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