

1.	Field of study	Environmental Protection
2.	Faculty	Faculty of Natural Sciences
3.	Academic year of entry	2025/2026 (winter term)
4.	Level of qualifications/degree	first-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Chemical fundamentals of biological processes
Module code		1OS_23_42
Number of the ECTS credits		2
Language of instruction		
Purpose and description of the content of education		The module of a propaedeutic character provides basic knowledge of the atomic structure and chemical bonds, their participation in the formation of macromolecules, and the role of individual macromolecules in the design and functioning of cells, with particular emphasis on the structure and functioning of biological membranes, including electrical phenomena and ways of membrane transport. It systematizes the basic knowledge of metabolic processes based on the flow of electrons, emphasizing the chemical basis of the processes of respiration and photosynthesis and the reactions taking place in aqueous solutions as the main component of the cell. Problem and computational tasks related to the chemical basis of life processes are solved during the conversations.
List of modules that must be completed before starting this module (if necessary)		not applicable

8.	Learning outcomes of the module			
Code	Description	Learning outcomes of the programme	Level of competenc (scale 1-5)	
1OS_23_42_01	The student has knowledge of the structure of the atom, makes skillful use of the periodic table, recognizes and characterizes chemical bonds, and describes their role in the formation and stabilization of macromolecules in the cell.	1OS_W01	1	
1OS_23_42_02	Record and balance chemical reactions that proceed with electron exchange and characterise basic cellular processes based on electron exchange.	1OS_W01	1	
1OS_23_42_03	The student knows the chemical structure of biological membranes and their function. Defines, describes or interprets the different types of transport across membranes.	1OS_W01	1	
1OS_23_42_04	Describes the relationship between the chemical structure of various organic compounds and their function in organisms.	1OS_W01	1	
1OS_23_42_05	Knows the phenomena and processes occurring in water, describes the relationship between the structure of molecules and their behaviour in water.	1OS_W01	1	
1OS_23_42_06	Can perform basic chemical and biochemical calculations.	1OS_U01	1	

9. Methods of conducting classes		
Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>
a05	Lecture methods / expository methods	Explanation/clarification <i>explication involving the derivation of a predetermined theorem from other, already known ones, in the number of steps specified by the person teaching the course</i>
b02	Problem-solving methods	Lecture-discussion <i>transmission of content involving interaction with the lecture audience; discussion of lecture-related issues is one of its elements or constitutes its follow-up</i>
b08	Problem-solving methods	Activating method – peer learning <i>learning through the exchange of knowledge in a group/team/pair of students, i.e., in the so-called learning cell; a kind of mutual learning; an approach focused on student activity under the guidance of the person teaching the course; a learning situation where students with a similar level of experience learn from one another</i>
b09	Problem-solving methods	Activating method – flipped classroom <i>anticipatory learning; work in class is based on previously studied material indicated by the person teaching the course; preparation outside the classroom serves the purpose of getting familiar with the issues whose knowledge is necessary for participating in the in-class discussion and the training in the related practical skills; the activity is based on the work of students under the guidance of the person teaching the course</i>
c06	Demonstration methods	Demonstration-imitation <i>a presentation of a model way of performing specific activities accompanied by a commentary; it aims at triggering imitation activities in an individual or in a group of participants observing the activities of the person teaching the course until the right habit is formed through regular exercise; the demonstration-imitation method is combined with a physical practice of activities/behaviours</i>

10. Forms of teaching					
Code	Name	Number of hours	Assessment of the learning outcomes of the module	Learning outcomes of the module	Methods of conducting classes
1OS_23_42_fz_1	lecture	10	course work	1OS_23_42_01, 1OS_23_42_02, 1OS_23_42_03, 1OS_23_42_04, 1OS_23_42_05	a01, b02
1OS_23_42_fz_2	discussion classes	20	course work	1OS_23_42_01, 1OS_23_42_02, 1OS_23_42_03, 1OS_23_42_04, 1OS_23_42_05, 1OS_23_42_06	a05, b08, b09, c06

11. The student's work, apart from participation in classes, includes in particular:			
Code	Category	Name (description)	Is it part of the BUNA?
a01	Preparation for classes	Search for materials and review activities necessary for class participation <i>reviewing literature, documentation, tools and materials as well as the specifics of the syllabus and the range of activities indicated in it as required for full participation in classes</i>	No
a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source</i>	No

		<i>materials to be used in class</i>	
a03	Preparation for classes	Developing practical skills <i>activities involving the repetition, refinement and consolidation of practical skills, including those developed during previous classes or new skills necessary for the implementation of subsequent elements of the curriculum (as preparation for class participation)</i>	No
a04	Preparation for classes	Consulting materials complementary to those indicated in the syllabus <i>agreeing on materials complementary to those indicated in the syllabus, supporting the implementation of tasks resulting from or necessary for class participation</i>	Yes
b01	Consulting the curriculum and the organization of classes	Getting acquainted with the syllabus content <i>reading through the syllabus and getting acquainted with its content</i>	Yes
b02	Consulting the curriculum and the organization of classes	Verification / adjustment / discussion of syllabus provisions <i>consulting the content of the syllabus, possibly in the presence of the year tutor or members of the class group, and, if necessary, reassessing the provisions concerning special conditions for class participation, e.g., space and time requirements, technical and other requirements, including conditions for participation in classes outside the walls of the university, classes organized in blocks, organized online, etc.</i>	Yes
b03	Consulting the curriculum and the organization of classes	Consulting the schedule <i>getting acquainted with the class schedule, possibly in the presence of the year tutor, in order to optimize participation in classes, including those supplementary to the core subjects listed in the pursued study programme</i>	Yes
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.</i>	Yes
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class <i>exploring the studied content, inquiring, considering, assimilating, interpreting it, or organizing knowledge obtained from the literature, documentation, instructions, scenarios, etc., used in class as well as from the notes or other materials/artifacts made in class</i>	No
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>	No
d01	Consulting the results of the verification of learning outcomes	Analysis of the corrective feedback provided by the academic teacher on the results of the verification of learning outcomes <i>reading through the academic teacher's comments, assessments and opinions on the implementation of the task aimed at checking the level of the achieved learning outcomes</i>	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>reviewing and selecting tasks and activities enabling the elimination of errors indicated by the academic teacher, their verification or correction resulting in completing the task with at least the minimum passing grade</i>	Yes
e01	Activities complementary to the classes	Undertaking, on one's own initiative and individually, activities aimed at expanding the scope or depth of the teaching content, also beyond the walls of the University <i>a set of activities undertaken independently and on the student's own initiative, aimed at expanding the depth and scope of knowledge and skills, their revision and repetition, retention or verification, also activities carried outside the university, e.g., in a culture promoting or educational institution, a</i>	No

	<i>laboratory, in the open air, etc.; also self-education</i>	
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Information on the details of the module implementation in a given academic year can be found in the syllabus available in the USOS system: <https://usosweb.us.edu.pl>.