

1.	<b>Field of study</b>	<b>Aquamatics - Interdisciplinary Management of Water Environments</b>
2.	Faculty	Faculty of Natural Sciences
3.	Academic year of entry	2023/2024 (winter term), 2024/2025 (winter term)
4.	Level of qualifications/degree	first-cycle studies (in engineering)
5.	Degree profile	general academic
6.	Mode of study	full-time

<b>7. General information about the module</b>	
<b>Module name</b>	<b>Basics of aquatic microbiology</b>
Module code	W2-AQ-S1-017
Number of the ECTS credits	5
Language of instruction	Polish
Purpose and description of the content of education	<p>Learning outcomes in the field of water microbiology implemented during lectures and laboratory classes are related to the basic knowledge, the acquisition of which allows for basic work with microorganisms. An analysis and assessment of the importance of interactions between the environment and microorganisms of the hydrosphere is undertaken, also in the context of anthropopressure, as well as ways of possible remediation of polluted waters.</p> <p>Of particular importance in education in the field of water microbiology is the acquisition of practical knowledge and skills consisting in recognizing the basic morphological forms of bacteria, developing manual skills in the preparation of microscopic preparations as well as performing microbiological cultures, cultivating microorganisms as well as reading and interpreting the results obtained. Both lectures and laboratory classes are aimed at acquiring knowledge, skills and social competences in the field of basic microbiology in the context of the aquatic environment.</p>
List of modules that must be completed before starting this module (if necessary)	[W2-AQ-S1-008] Basics of hydrobiology

<b>8. Learning outcomes of the module</b>			
Code	Description	Learning outcomes of the programme	Level of competence (scale 1-5)
W2-AQ-S1-017_1	Knows the basics of the structure of cell elements and the morphology of bacteria. Can identify the morphological forms of microorganisms.	AQ1_U03 AQ1_W01	4 4
W2-AQ-S1-017_2	Knows the basic methods of staining microorganisms as well as the basic principles of microscopic observation. Can independently prepare stained slides and perform microscopic observation to identify morphological forms.	AQ1_U03 AQ1_W01	4 4
W2-AQ-S1-017_3	Knows the basic principles of working with microbiological material and basic microbiological substrates. Is able to choose a microbiological medium for the intended purpose of culture and maintain sterile conditions when working with microorganisms.	AQ1_U01 AQ1_W01	4 4
W2-AQ-S1-017_4	Knows the basics of bacterial metabolism and the basic microbiological processes of surface and underground waters. He can determine the role of microorganisms and appropriate physiological groups in shaping the hydrosphere and determine the relationship between microbial groups and the bacterial metabolism.	AQ1_U02 AQ1_U03 AQ1_W02	3 3 3

W2-AQ-S1-017 _5	Knows the basic issues related to the monitoring of the sanitary condition of water. Can perform basic microbiological analysis and isolate microorganisms with markers and those with specific ones properties, make observations and draw practical conclusions based on them.	AQ1_U01 AQ1_U02 AQ1_U04 AQ1_W03	2 2 2 2
W2-AQ-S1-017 _6	Knows the basic methods of assessing the biodiversity of aquatic microorganisms Can assess the role of microorganisms in the process of maintaining biological balance in aquatic ecosystems.	AQ1_K02 AQ1_U01 AQ1_U02 AQ1_U03 AQ1_W04 AQ1_W05	2 2 2 2 2 2

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>
a03	Lecture methods / expository methods	Description <i>a description of objects, phenomena, processes or people; it involves specifying the structure and characteristic features of the object, phenomenon, or process being described; it is usually accompanied by a demonstration of the described object or by its models, drawings, tables, charts, etc.; a description may take the form of an explanation, classification, justification or comparison</i>
b01	Problem-solving methods	Problem-based lecture <i>an analysis of a selected scientific or practical problem accompanied by its assessment and an attempt to provide a solution to the issues presented in the lecture as well as the indication of the consequences of the proposed solution</i>
d03	Programmed learning methods	Working with another teaching tool <i>e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools</i>
e01	Practical methods	Laboratory exercise / experiment <i>[also conducted as fieldwork] a method of practical application of knowledge; implemented in three stages: the recognition of a problem induced by the task content, the formulation of the problem and the attempt to solve it accompanied by the assessment of the effects; the goal is to acquire skills, abilities and habits, and to consolidate the acquired knowledge so that it becomes operational; the laboratory method assumes greater independence of learners than carrying out an experiment</i>
e06	Practical methods	Observation <i>also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences</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
W2-AQ-S1_017_fs_1	lecture	15	exam	W2-AQ-S1-017_1, W2-AQ-S1-017_2, W2-AQ-S1-017_3, W2-AQ-S1-017_4, W2-AQ-	a01, a03, b01

				S1-017_5, W2-AQ-S1-017_6	
W2-AQ-S1_017_fs_2	laboratory classes	30	course work	W2-AQ-S1-017_1, W2-AQ-S1-017_2, W2-AQ-S1-017_3, W2-AQ-S1-017_4, W2-AQ-S1-017_5, W2-AQ-S1-017_6	d03, e01, e06

11. The student's work, apart from participation in classes, includes in particular:			
Code	Category	Name (description)	Is it part of the BUNA?
a05	Preparation for classes	Production/preparation of tools, materials or documentation necessary for class participation <i>developing, preparing and assessing the usefulness of tools and materials (e.g. aids, scenarios, research tools, equipment, etc.) to be employed in class or as an aid when preparing for classes</i>	No
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>	No
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>	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

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>.