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	**Environmental microbiology**
Module code	1OS_23_19
Number of the ECTS credits	3
Language of instruction	
Purpose and description of the content of education	The module familiarizes the student with the basics of environmental microbiology. It presents the structure of microorganism cells, interactions of microorganisms and functions performed by their individual structural elements. It allows to understand the mechanisms determining the adaptation of mechanisms enabling for survival in extreme environments. Characterizes the microflora of soil, water and air and their role in the functioning of these environments. It provides knowledge about the relationship between microorganisms and other organisms, including humans, and the physico-chemical parameters of the environment. Students gets to know the sources of environmental pollution and the functioning of microorganisms in contaminated environments. Student learns the basic microbiological techniques, as well as methods of work based on standardized methodologies in the field of sampling, water and soil analysis, as well as quality control of research. Student acquires the skills of preparing preparations of microorganisms, isolation of microorganisms from the environment. Laboratory classes also teach the analysis and interpretation of the obtained results. Students will also learn the basic principles of quality control of laboratory media. Students acquire theoretical knowledge in the field of general principles of work in the laboratory - they learn the differences between an ordinary and an accredited/certified laboratory.
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)
M01	Knows the structure of prokaryotic cells, understands the processes occurring in the cells of microorganisms Describes the interactions between microorganisms and biotic and abiotic elements of the environment, is able to assess the impact of physicochemical parameters of the environment on the growth and activity of microorganisms	1OS_U07 1OS_W01 1OS_W04	3 4 4

M02	Understands the role of microorganisms in the production and decomposition of organic matter, in the flow of energy and in the circulation of elements in the soil as well as in the life of other living organisms, including humans	1OS_W01 1OS_W04	4 4
M03	Distinguishes zones in water reservoirs and lists the groups of microorganisms present in them, can characterize the air microflora	1OS_W01 1OS_W04	4 4
M04	Describes the mechanisms of the reaction of microorganisms to soil and water pollution and the behavior of organisms in a contaminated environment	1OS_W01 1OS_W02	3 3
M05	Knows methods of isolation of selected groups of microorganisms from soil, water and air and uses basic equipment in a microbiology laboratory Is able to work in a group and shows care for the equipment he uses during the experiments	1OS_K01 1OS_U01 1OS_U02 1OS_W01	3 3 3 4

9. Methods of conducting classes

Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture *a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided*
b03	Problem-solving methods	Activating method – educational games *learning content in the guise of a rule- and/or principle-based game; conducted in a deliberately arranged situation based on the description of relevant facts and processes; learners compete with one another within the framework of rules laid down by the academic teacher; varieties include simulation games – involving a simulation of real situations; decision games – based on the decision-making process and the recognition of the consequences of the decisions made (e.g., a decision tree); psychological games – increasing the emotional-volitional component of the participants' attitudes*
c01	Demonstration methods	Exhibition *preparing an object for public display and displaying it in order to elicit a specific reaction; creating a themed collection of specimens/objects/works to illustrate a specific issue*
c07	Demonstration methods	Screen presentation *a presentation of synthetic image content using computer graphics, e.g., a series of slides or other multimedia forms, usually accompanied by a commentary; typical components of a screen presentation include text organized into bulleted points, charts, images and animations, sometimes sound effects or music; a multimedia illustration of course content presented in the form of a projected image*
d02	Programmed learning methods	Working with a programmed textbook *working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.*
e01	Practical methods	Laboratory exercise / experiment *[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*
e06	Practical methods	Observation *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*

e08	Practical methods	Practice-as-research *also conducted as fieldwork; an activity aimed at confronting the acquired theory with practice through its practical application; students situate themselves in the reality they observe, study and transform through the prism of the theory; the method of practical classes is dominated by the application of knowledge to solving practical tasks*
f01	Methods of self-learning	Self-education *a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one's own; self-study*
f02	Methods of self-learning	Individual work with a text *searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue*

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
F01	lecture	10	course work	M01, M02, M03, M04	a01, b03, c07, d02, f01, f02
F02	laboratory classes	20	course work	M01, M02, M03, M04, M05	c01, e01, e06, e08, f02

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 *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*	No
a02	Preparation for classes	Literature reading / analysis of source materials *reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class*	No
b01	Consulting the curriculum and the organization of classes	Getting acquainted with the syllabus content *reading through the syllabus and getting acquainted with its content*	No
b02	Consulting the curriculum and the organization of classes	Verification / adjustment / discussion of syllabus provisions *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.*	Yes
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes *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.*	Yes
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 *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*	Yes

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.