

1.	Field of study	Biotechnology
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		Micropropagation of plants
Module code		1BT_23_32
Number of the ECTS credits		1
Language of instruction		
Purpose and description of the content of education		The module provides specialized knowledge of the techniques used in plant micropropagation; it familiarizes the student with the principles of working under sterile conditions and the requirements and specifics of the plant micropropagation laboratory. Special emphasis is placed on learning the various methods of in vitro culture of plant tissues and organs used for the effective regeneration of plants of practical importance, including ornamental plants. Chemical-physical and biological factors determining the effectiveness of plant regeneration are discussed and experimentally tested, and exemplary micropropagation systems for various species are presented. In the experiments conducted independently, the student improves the ability to work under aseptic conditions, learns the technique of establishing, maintaining, monitoring, and analyzing plant cultures; collects empirical data, and improves the ability to carry out projects and analyze and interpret the results of the observations made.
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)
1BT_23_32_1	Apply basic in vitro culture techniques, can identify and test factors determining the effectiveness of the micropropagation system in different plant species. Can describe the effects of the experiment, analyze the results, make conclusions, and present them in the form of a report.	1BT_U01 1BT_U03 1BT_U05 1BT_W06 1BT_W09	5 5 5 5 5
1BT_23_32_2	Is able to classify, describe, and distinguish between plant cell and tissue culture techniques used in the plant micropropagation laboratory. Can distinguish types of in vitro cultures and know their advantages and disadvantages in terms of their usefulness in plant micropropagation.	1BT_W06 1BT_W08 1BT_W09	5 5 5
1BT_23_32_3	Has a habit of updating specialized knowledge and critically evaluating the possibility of its practical use. Can skillfully search for protocols for micropropagation of a specific plant species, using available literature data.	1BT_K01 1BT_K02	5 5

		1BT_K03	5
1BT_23_32_4	Follow the rules of working in a specialized laboratory and takes care of the safety of his own work and that of others.	1BT_W13	5
1BT_23_32_5	Can plan basic laboratory equipment for conducting in vitro cultures of plant tissues for plant regeneration.	1BT_K02 1BT_U11 1BT_W09	5 5 5

9. Methods of conducting classes		
Code	Category	Name (description)
d01	Programmed learning methods	Working with a computer <i>e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid down by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline</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>
e02	Practical methods	Production exercise – workshop <i>an activity involving the creation of an object/product according to the rules/principles/description provided by the academic teacher acting as the workshop master</i>
e07	Practical methods	Simulation <i>an indirect method; imitating reality in order to gain experience approximating a real one; recreating a real-world situation so that its participant can acquire an experience close to the authentic one; work on "replacement" material</i>
e08	Practical methods	Practice-as-research <i>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</i>
f01	Methods of self-learning	Self-education <i>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</i>
f02	Methods of self-learning	Individual work with a text <i>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</i>
f03	Methods of self-learning	Conceptual work <i>a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work</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
1BT_23_32	laboratory classes	25	course work	1BT_23_32_1, 1BT_23_32_2, 1BT_23_32_3, 1BT_23_32_4, 1BT_23_32_5	d01, e01, e02, e07, e08, f01, f02, f03

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 materials to be used in class</i>		No
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>		Yes
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
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
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
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		Yes

		<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>	
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

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>.