

1.	Field of study	Biology
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		Methods of imaging plant cells and tissues
Module code		1BL_23_42
Number of the ECTS credits		3
Language of instruction		
Purpose and description of the content of education		In vivo and in vitro cell imaging methods are an intensively developing research field applicable in biology, biotechnology and medicine. The skills of imaging cells and tissues are the basis in modern diagnostics related to both the analysis of basic processes occurring in cells and their response to biotic and abiotic stress. Therefore, the idea of this course is to discuss microscopic methods (light and electron microscopy) in the imaging of plant cells and tissues, but most importantly, to acquire practical skills in cell imaging (with particular emphasis on fluorescence microscopy).
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)	
U01	Students are able to use the basic research techniques and tools of experimental biology as well as advanced microscopic techniques and methods for imaging plant cells.	1BL_U01	4	
		1BL_U05	4	
U02	Students are able to describe, analyze and interpret the obtained microscopic images.	1BL_U09	5	
		1BL_U11	5	
		1BL_U12	3	
W01	Students know and understand the structure and functioning of organisms at every cellular and tissue level, and understand the relationships and influence of the environment on the functioning of plants.	1BL_W03	4	
		1BL_W04	4	
W02	Students know and understand the methodology of experimental biological research allowing for the visualization of plant cells, in particular advanced methods of confocal microscopy.	1BL_W08	3	

9.	Methods of conducting classes		
	Code	Category	Name (description)
	c07	Demonstration methods	Screen presentation

		<i>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</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>

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
L_1	laboratory classes	30	course work	U01, U02, W01, W02	c07, e01

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
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
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

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>.