

Subject card

Subject name and code	Microscopy - application in biotechnology, PG_00196911						
Field of study	Biotechnology						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2026/2027		
Education level	Bachelor's studies	Subject group			Obligatory subject group in the field of study Optional subject group		
Mode of study	full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			2.0		
Learning profile	academic	Assessment form			credit		
Conducting unit	Intercollegiate Faculty of Biotechnology UG-MUG -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Andrea Lipińska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	10.0	14.0	0.0	0.0	24
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	24		5.0		21.0	50
Subject objectives	The specific objective of the course is to familiarise students with the physical principles of microscope operation, the limitations of microscope applicability and the research capabilities of different types of microscopes. The course is provided in cooperation with the socio-economical environment (the KAWAska company expert).						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[BIOTECHL3_W07] The graduate has advanced knowledge of the rules of operation and the possibilities of using research techniques and tools used in biotechnology.		The student has advanced knowledge of imaging methods in confocal microscopy. They are able to use this knowledge to operate a light and fluorescence microscope. They are familiar with laser microdissection, its operation, and applications. They know the principles of fixation and staining of samples.			[SW4] test/exam - oral or written	
	[BIOTECHL3_W06] The graduate possesses structured and advanced knowledge of exact and natural sciences necessary to understand biological phenomena and processes, in particular cellular processes at the molecular level.		The student knows the methods of preparing, fixing, and staining samples for microscopic imaging. They possess advanced understanding of the structure and operation of confocal microscopes and stereoscopic microscopy. They know how to operate a light microscope with a camera, interpret microscopic images, and perform simple measurements. They possess advanced knowledge of karyotyping and the FISH method.			[SW4] test/exam - oral or written	

Subject contents	Auditory classes Preparation, fixation and staining of specimens Introduction to light microscopy Contrast techniques in light microscopy Fluorescence microscopy - operation and applications Construction and operation of confocal microscopes Stereoscopic microscopy From whole organisms to single particles - innovative imaging methods in confocal microscopy Laboratory classes Laser microdissection - operation and applications Setting up Kohler illumination Operating a light microscope with camera Interpretation of the microscopic image. Taking measurements. Image acquisition in fluorescence microscopy. Imaging in stereo microscopes Stereoscopic microscopy data processing Three-dimensional imaging - available 'pseudo-confocal' modules System operation for laser microdissection Cariotyping FISH analysis								
Prerequisites and co-requisites	Knowledge of course content: Module 01_B2								
Assessment methods and criteria	<table border="1" data-bbox="448 620 1487 689"> <thead> <tr> <th data-bbox="448 620 798 651">Subject passing criteria</th> <th data-bbox="802 620 1141 651">Passing threshold</th> <th data-bbox="1145 620 1487 651">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 658 798 689">Programme content</td> <td data-bbox="802 658 1141 689">51.0%</td> <td data-bbox="1145 658 1487 689">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Programme content	51.0%	100.0%
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Programme content	51.0%	100.0%							
Recommended reading	Basic literature	A. Literature required for final course credit (passing the exam): A.1. used in class A.2. studied independently by the student Materials provided in class by the teacher							
	Supplementary literature	Materials provided in class by the instructor Supplementary literature will be provided during the class.							
	eResources addresses								
Example issues/ example questions/ tasks being completed									
Work placement	Not applicable								

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