

Subject card

Subject name and code	Microscopy - application in biotechnology, PG_00080477						
Field of study	Mikroskopia - zastosowania w biotechnologii						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
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		dr hab. Mariusz Grinholc				
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		0.0		0.0	24
Subject objectives	The specific objective of the course is to familiarise students with the physical basis 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_W06] The graduate knows and understands basic knowledge in science and natural sciences necessary for understanding the phenomena and biological processes, particular cellular processes at the molecular level		The student knows the methods of preparing, fixing, and staining samples for microscopic imaging. They possess a basic 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 basic knowledge of karyotyping and the FISH method.		[SW4] test/egzamin - ustny lub pisemny		
	[BIOTECHL3_W07] The graduate knows and understands basic techniques and research tools used in biotechnology.		The student knows imaging methods in confocal microscopy. They are able to operate a light and fluorescence microscope. They are familiar with laser microdissection, its operation, and applications. They can prepare, fix, and stain samples.		[SW4] test/egzamin - ustny lub pisemny		

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	Subject passing criteria	Passing threshold	Percentage of the final grade
	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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