University of Gdańsk

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

<table>
<tr><td>Subject contents</td><td>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</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of course content: Module 01_B2</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Programme content</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>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</td></tr><tr><td>Supplementary literature</td><td>Materials provided in class by the instructor
Supplementary literature will be provided during the class.</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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