University of Gdańsk

Subject card

Subject name and code	Microscopic techniques, PG_00099396						
Field of study	Marine Biotechnology						
Date of commencement of studies	October 2025		Academic year of realisation of subject	2026/2027			
Education level	Master's studies		Subject group	Optional subject group			
Mode of study	full-time studies		Mode of delivery	at the university			
Year of study	2		Language of instruction	English			
Semester of study	4		ECTS credits	1.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	UG Institute of Biotechnology -> Intercollegiate Faculty of Biotechnology UG-MUG -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Magdalena Weidner-Glunde				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	0.0	0.0	15
	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	15		2.0	10.0	27	
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						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MBMU2-KU01] Can plan and carry out tests in the laboratory and at sea, and document activities and results; can use laboratory equipment under the guidance of a tutor; applies principles of occupational health and safety	Knowledge: The student knows the theoretical basis of the operation of different types of microscopes (light, fluorescence, electron) and their applications in biological research including marine samples. He/she knows the principles of preparing microscope specimens and interprets microscope images in the context of the samples analysed. Skills: Able to operate basic microscope equipment under the guidance of a tutor and to carry out microscopic observations according to laboratory procedures. Is able to prepare slides for microscopic observation and document findings in the form of laboratory notes and reports. Be able to plan and carry out simple experiments using microscopic techniques. Social competences: Observes the principles of health and safety in the microscope laboratory. Demonstrates responsibility for the equipment entrusted to him/her and the quality of the observations and analyses performed.	[SU2] presentation/project/paper/report
	[MBMU2-KU02] Can collect and interpret empirical data; applies statistical methods and computer tools in data analysis; formulates conclusions based on empirical data	Knowledge: The student knows the basic methods of quantitative and qualitative analysis of microscopic data and understands the importance of documentation of observation results. Skills: Is able to collect empirical data during microscopic observations and interpret them in the context of their research. Uses basic statistical methods and IT tools (e.g. image analysis software, spreadsheets) to analyse microscopic data. Formulates correct conclusions based on the obtained results of microscopic observations and measurements. Social competences: Demonstrates diligence and reliability in compiling and reporting empirical data.	[SU2] presentation/project/paper/report

<table>
<tr><td>Subject contents</td><td>Auditory classes

1. Preparation, fixation and staining of specimens

2. Introduction to light microscopy

3. Contrast techniques in light microscopy

4. Fluorescence microscopy - operation and applications

5. Construction and operation of confocal microscopes

6. From whole organisms to single particles innovative imaging methods in confocal microscopy

Laboratory classes

7. Sample preparation, fixation and staining

8. Fluorescence microscope image acquisition

9. Interpretation of the microscopic image. Taking measurements.

10. Fluorescence microscopy data processing

11. Live imaging

12. Confocal imaging and acquisition of three-dimensional images</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></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>presentation/project/paper/report</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 in 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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