University of Gdańsk

Subject card

Subject name and code	Imaging techniques, PG_00146893		
Field of study	Genetics and Experimental Biology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	undergraduate studies	Subject group	Obligatory subject group in the field of study
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	1.0
Learning profile	academic	Assessment form	
Conducting unit	Laboratorium Bioobrazowania -> Faculty of Biology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Magdalena Narajczyk	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	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	8.0	25

Subject objectives

1 Learning modern imaging techniques used in biological sciences.2 Ability to apply appropriate techniques and research tools in the field of biology.3 Ability to plan and conduct experiments using light and electron microscopes and to record and interpret the results.4 Ability to work safely in the laboratory, plan and conduct experiments using fluorescence and electron microscopy, and record and interpret results.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GBEL3_W05] the principles of research planning based on achievements in biological sciences and related fields, the potential application of their results in practice, the principles of operation of equipment and apparatus used in molecular genetics research, and the principle of interpreting biological phenomena and processes based on empirical data in research and practical activities, with consideration for sustainable use of biological diversity.	Knows the principles of planning research based on the achievements of biological sciences and the possibility of using their results in practice, the principles of operation of equipment and apparatus used in research in genetics and experimental biology, and the principles of interpreting biological phenomena and processes based on empirical data in research work and practical activities, taking into account the sustainable use of biodiversity	[SW4] test/exam - oral or written
[GBEL3_K02] Critical assessment of one's own knowledge and methods in the field of molecular biology and related disciplines, as well as the commercialization of research.	Is ready to critically evaluate and select methods in molecular biology	[SK8] observation of student's independent or team work

<table>
<tr><td>Subject contents</td><td>Students will become familiar with the construction of the following microscopes: optical, fluorescence, confocal, high-resolution, transmission and scanning electron, atomic force, scanning tunneling microscope. They will be introduced to the methodology of biological research: staining of samples for optical microscopy, preparation used in fluorescence microscopy, transmission microscopy, cryo-TEM, scanning microscopy. Students will learn about the use of all microscopes in biological research, and, based on the electronograms presented, the possibilities for analyzing biological samples. The use of electron microscopy in disease diagnosis will be presented. Students will learn about research methods using in situ hybridizations - fluorescence in situ hybridization (FISH), genomic in situ hybridization (GISH) and RNA-ish.</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>test</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>Wędzony M. Mikroskopia fluorescencyjna dla botaników. 1996 Monografia 5 PAN Zakład Fizjologii Roślin

Rogalska S, J. Małuszyńska, M.J. Olszewska (red.). 2005. Podstawy cytogenetyki roślin, PWN, Warszawa

Ruzin SE.1999. Plant microtechnique and microscopy . Oxford, New York: Oxford University Press

Litwin JA, Gajda M, 2011. Podstawy technik mikroskopowych, Wydawnictwo Uniwersytetu Jagiellońskiego</td></tr><tr><td>Supplementary literature</td><td>Bozzola J. J., Russell L. D. 1992. Electron Microscopy (Principles and Techniques for Biologists). Jones and Barlett Publishers, Boston.

Schwarzacher T., Heslop-Harrison P. 2000 Practical in situ Hybridization Springer

https://imagej.nih.gov/ij/docs/guide/

Wróbel B., Zienkiewicz K, Smoliński DJ, Niedojadło J, Świdziński M 2005. Podstawy mikroskopii elektronowej, Wydawnictwo UMK</td></tr><tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</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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