University of Gdańsk

Subject card

Subject name and code	Unicellular organisms - Methods, PG_00197617		
Field of study	Biotechnology		
Date of commencement of studies	October 2025	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 Subject group related to scientific research in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	3.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Dorota Krzyżanowska	
	Teachers	dr Alicja Chmielewska dr hab. Krzysztof Hinc dr hab. Joanna Nakonieczna, prof. UG dr hab. Katarzyna Węgrzyn dr Magdalena Rajewska	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	0.0	30.0	30
	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	30	5.0	40.0	75

Subject objectives	The aim of the course is to prepare students for the theoretical development of advanced laboratory methods and procedures used, among others, in molecular biology. Under the teachers supervision and based on available literature, students prepare, present, and discuss selected advanced techniques in molecular biology. The course assumes both individual and students group work in preparation for the classes. During the course, students have the opportunity to learn and improve their presentation skills and will become familiar with the professional terminology related to the discussed topics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHL3_U07] The graduate is able to prepare and present a short oral presentation in Polish and/or English, covering detailed issues in the field of biotechnology, using scientific language, and is able to conduct discussions	Student is able to prepare, present, and discuss selected advanced techniques in molecular biology based on available literature.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
[BIOTECHL3_U05] The graduate is able to use the English language in the scope enabling the understanding of statements and reading with comprehension of literature and simple scientific studies in the fields of science and scientific disciplines relevant to biotechnology; prepare a short written study and an oral presentation in English on specific issues of biotechnology	The student, based on available English-language literature, is able to prepare and present a presentation on selected advanced techniques in molecular biology.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
[BIOTECHL3_U02] The graduate is able to plan and organise work effectively, independently or as part of a team, in particular work in a laboratory	Student, individually and as part of a team, is able to prepare, present, and discuss selected advanced techniques in molecular biology based on available literature.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
[BIOTECHL3_W09] The graduate possesses structured and advanced knowledge of the terminology and concepts used in biological and medical sciences and related disciplines.	Student is able to prepare a theoretical elaboration on advanced laboratory methods and procedures used, among others, in molecular biology. Student is familiar with the professional terminology related to the discussed topics.	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report

Subject contents

The curriculum includes topics related to advanced methods in molecular biology, descriptions of the methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The classes will cover the following topics:

- EMSA
- Footprinting
- SPR, BLI, MST
- 2H system, BiFC
- Microarrays technology
- Mass Spectrometry
- Antibodies and their application (ELISA, IP, ChiP)
- Microscopy (fluorescent/confocal/TIRF/ EM/cryo-EM/AFM)
- Fluorescence-based methods (FRET, FRAP, FROS, FISH)
- Magnetic/Optical tweezers

Depending on the group selected, students will learn the discussed methods through examples reflecting the expertise and research interests of the instructor.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Presentations	50.0%	80.0%
Activity	0.0%	20.0%

Recommended reading

Basic literature	• Materials prepared by the teacher • Materials independently researched and selected by students for the classes using library resources and electronic information sources • Selected publications (review and experimental) • *Handbook of Surface Plasmon Resonance* by Richard B. M. Schasfoort, Anna J. Tudos 2008 • *Introduction to Atomic Force Microscopy: Theory, Practice, Applications* by Paul E. West 2006 • *DNA-protein Interactions: A Practical Approach* by Andrew Arthur Travers, Malcolm Buckle - 2000
Supplementary literature	-
eResources addresses	

Example issues/ example questions/ tasks being completed

Work placement

Not applicable

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