University of Gdańsk

Subject card

Subject name and code	Unicellular organisms - Structure, diversity and environment Methodology (M03_B1), PG_00196914		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
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	Research and Development Laboratory -> UG Institute of Biotechnology -> Intercollegiate Faculty of Biotechnology UG-MUG -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Natalia Kaczyńska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	24.0	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	10.0	41.0	75

Subject objectives

The aim of this course is to familiarize students with the diversity of unicellular organisms, their adaptation to different environments, and their interactions with higher organisms. The students will acquire skills related to planning and conducting experiments using microorganisms. They will obtain all the necessary skills for conducting laboratory tasks safetly (independently or in a group). They will be able to analyze, evaluate, and discuss the obtained results and draw conclusions based on them. In the case of an experiment failure, they will be able to identify its putative causes.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	The student is able to plan microbiological experiments and organize team-based work, including assigning roles, using collaboration tools, and managing data exchange.	[SU1] oral statement/conversation/ discussion [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
[BIOTECHL3_U01] The graduate possesses practical skills in performing laboratory procedures, documenting results, and applying techniques necessary in biotechnology, including methods of isolation, modification, selection, and analysis of organisms, tissues, cells, and molecules; has the ability to operate advanced laboratory.	The student is able to apply advanced microbiological techniques and independently operate standard laboratory equipment (including a microwave sterilizer and an incubator). The student correctly performs inoculations, prepares culture media, cultivates microorganisms, and carries out and interprets bacterial and yeast cell staining. All procedures and results are documented in a laboratory notebook.	[SU2] presentation/project/paper/ report [SU3] text preparation/written work [SU4] test/exam - oral or written [SU5] implementation of a problem task [SU6] demonstration of practical skills
[BIOTECHL3_W03] The graduate possesses structured and advanced knowledge of organism-environment relationships and their importance for understanding biological processes and biotechnological applications.	The student understands how physicochemical factors affect the functioning of microorganisms and is familiar with selected examples of microbial adaptation to specific environmental conditions.	[SW4] test/exam - oral or written
[BIOTECHL3_W01] The graduate possesses structured and advanced knowledge of biological phenomena at the molecular level and understands their importance for biotechnology.	The student understands biological and physiological properties of microorganisms, including cell structure, morphology, staining reactions, and the effects of physicochemical factors. The student knows the importance of these characteristics for work in a microbiological laboratory.	[SW4] test/exam - oral or written
[BIOTECHL3_K04] The graduate is aware of the importance of occupational safety rules, is able to apply them and react in hazardous situations, ensuring their own safety and the safety of others.	The student follows safety rules when working with microorganisms, uses personal protective equipment (such as a lab coat and gloves), and properly manages the segregation of biological waste.	[SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[BIOTECHL3_K01] The graduate is aware of the scope of their own knowledge and skills; demonstrates a willingness to continuously update them and pursue professional development.	The student is able to search for up-to-date information on the current state of knowledge and techniques in microbiology and use it to update their own knowledge. The student analyzes the causes of experimental failure and identifies potential sources of error (e.g., contamination, pipetting errors).	[SK1] oral statement/conversation/ discussion [SK8] observation of student's independent or team work

Subject contents

Laboratory Classes

M1. Bacteriology (24 h)
Preparation for work in a microbiological laboratory; types of microbiological media, their preparation and sterilization; types of inoculation techniques. Morphological forms and differences in the cell wall structure of microorganisms; microscopy; staining of bacteria, yeasts, capsules, and endospores. Effects of physicochemical factors on microorganisms, including UV radiation, temperature, pH, salinity, and disinfectants. Physiological microbiota, hemolysis, halophiles, and bioluminescent bacteria.

Depending on the chosen group, students attend classes in either Polish or English, gaining subject knowledge in the selected language while building discipline-specific vocabulary.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Part M1	51.0%	100.0%

Recommended reading	Basic literature	Prescotts Microbiology (wybrane rozdziały: 27,28,29, part of 30, 40, 41,42) J. M. Willey, L. M. Sherwood, C. J. Woolverton, 8th edition, McGraw-Hill, 2011 Mikrobiologia - Jadwiga Baj (red. nauk.) Wydawnictwo Naukowe PWN SA, Warszawa 2018. Życie bakterii Kunicki-Goldfinger, red. J. Baj, Z. Markiewicz, Wydawnictwo Naukowe PWN, W-wa 2005 i późniejsze Mikrobiologia techniczna. T. 1 Mikroorganizmy i środowiska ich występowania (wybrane rozdziały) - Zdzisława Libudzisz (red.), Krystyna Kowal (red.), Zofia Żakowska (red.), 2007, Wydawnictwo Naukowe PWN Cappuccino, James G.; Welsh, Chad T, Microbiology: A Laboratory Manual, Global Edition Pearson Education Limited : Pearson, 2017
	Supplementary literature	Microbiology: an introduction. Gerard J. Tortora, Berdell R. Funke, Christine L. Case, 2016, Pearson Prescotts Microbiology Joanne Willey [10th ed.] 2016. McGraw-Hill Education, Mikrobiologia Murray Rosenthal Wydanie 2018 EDRA URBAN & PARTNER Brock biology of microorganisms, global edition, 15/e M. T. Madigan, K. S. Bender, D. H. Buckley, W. M. Sattley, D. A. Stahl, 2018. Pearson. Sherman F., (2002) Getting started with yeast. Methods Enzymol. 350: 3-41.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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