University of Gdańsk

Subject card

Subject name and code	Unicellular organisms - Structure, diversity and environment Fundaments (M03_B1), PG_00196913		
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 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	4.0
Learning profile	academic	Assessment form	exam
Conducting unit	Intercollegiate Faculty of Biotechnology UG-MUG -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Dorota Krzyżanowska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	38.0	0.0	0.0	0.0	0.0	38

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	38	10.0	52.0	100

Subject objectives

The aim of the course is to familiarize students with the diversity of unicellular organisms, their adaptation to different environments, and their interactions with higher organisms. Students will learn about the role of microorganisms in biogeochemical processes, as well as gain knowledge about the mechanisms of mutual interactions between microorganisms and other organisms.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 knows the diversity of unicellular microorganisms and their environments and understands how cell structure, physiological processes, and interactions with other organisms reflect their adaptation to 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 the molecular basis of microbial adaptations to diverse environments and the mechanisms of their interactions with other organisms. The student is familiar with the biological foundations of microbial involvement in biogeochemical processes and their significance.	[SW4] test/exam - oral or written

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

Introduction (1 h)

F1.
Overview of microorganisms in the group of unicellular organisms (8 h):
- Taxonomy and evolution
- Prokaryotes: true bacteria, archaea
- Cyanobacteria
- Eukaryotes: yeasts
- Unicellular algae
- Protists

Living Environment (10 h):
- Water, soil, air, extreme environments, VBNC (Viable But Non-Culturable)
- Biogeochemical processes

F2.
Details of cel structure depending on taxonomic position and living environment (8 h):
- Transport and secretion
- Nitrogen fixation
- Caulobacter
- Biofilm
- Spore forms

Interactions Between Microorganisms and Other Organisms (10 h):
- QS (Quorum Sensing) in Gram-negative bacteria
- QS in Gram-positive bacteria
- Concept of physiological microbiota
- Antibiotics
- Microorganism-infecting viruses
- Viruses of protists

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<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>

Subject passing criteria	Passing threshold	Percentage of the final grade
Comprehensive integrating exam	50.0%	40.0%
F1-F2	51.0%	60.0%

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<tr><td>Recommended reading</td><td>

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. Mikrobiologia techniczna. T. 1 Mikroorganizmy i środowiska ich występowania (wybrane rozdziały) - Zdzisława Libudzisz (red.), Krystyna Kowal (red.), Zofia Żakowska (red.), 2007, Wydawnictwo Naukowe PWN
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. Cappuccino, James G.; Welsh, Chad T, Microbiology: A Laboratory Manual, Global Edition Pearson Education Limited : Pearson, 2017 Sherman F., (2002) Getting started with yeast. Methods Enzymol. 350: 3-41.
eResources addresses	

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<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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