

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	

Subject contents	<p>Introduction (1 h)</p> <p>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</p> <p>F2. Details of cell structure depending on taxonomic position and living environment (8 h): - Transport and secretion - Nitrogen fixation - Caulobacter - Biofilm - Spore forms</p> <p>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</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 898 794 927">Subject passing criteria</th> <th data-bbox="799 898 1137 927">Passing threshold</th> <th data-bbox="1142 898 1469 927">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 934 794 963">Comprehensive integrating exam</td> <td data-bbox="799 934 1137 963">50.0%</td> <td data-bbox="1142 934 1469 963">40.0%</td> </tr> <tr> <td data-bbox="456 969 794 994">F1-F2</td> <td data-bbox="799 969 1137 994">51.0%</td> <td data-bbox="1142 969 1469 994">60.0%</td> </tr> </tbody> </table>			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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Comprehensive integrating exam	50.0%	40.0%										
F1-F2	51.0%	60.0%										
Recommended reading	Basic literature	<p>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.</p> <p>Mikrobiologia techniczna. T. 1 Mikroorganizmy i środowiska ich występowania (wybrane rozdziały) - Zdzisława Libudziś (red.), Krystyna Kowal (red.), Zofia Żakowska (red.), 2007, Wydawnictwo Naukowe PWN</p>										
	Supplementary literature	<p>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.</p>										
	eResources addresses											
Example issues/ example questions/ tasks being completed												
Work placement	Not applicable											

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