GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	General Mikrobiology, PG_00054680		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	first-cycle 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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Anna Brillowska-Dąbrowska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	30.0	0.0	0.0	60

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	60	8.0	32.0	100

Subject objectives

Obtaining knowledge on the basic problems of microbiology, mainly in the field of microbiology used in biotechnology. Mastering the practical skills of performing selected microbiological techniques, especially those used in biotechnology.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W04	The student learns about the biology, physiology and functions of microorganisms.	[SW1] Assessment of factual knowledge
K6_U04	The student acquires the ability to use basic microbiological techniques.	[SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Microorganisms and Microbiology. Microorganisms as cells. Microorganisms and their natural environments. The impact of microorganisms on humans. The history of discoveries in microbiology. Overview of microbial life forms (cell structure and evolution of life, the three domains of life, physiological diversity of microorganisms, biodiversity of prokaryotic organisms and eukaryotic microorganisms). Cell structure and function. Nutrition, laboratory cultivation, and metabolism of microorganisms. Microbial growth. Microbiological taxonomy. Microbial ecology. Microorganisms useful for industry and scientific research. The human microbiome.

Course content – laboratory

The laboratory course is designed to provide practical training in fundamental microbiological techniques, the principles of aseptic work, and selected methods for cultivating, identifying, and assessing the activity of microorganisms.

The thematic scope of the exercises includes:

• microbiological work techniques, including methods for sterilizing laboratory materials and tools;
• in vitro cultivation of microorganisms: types of microbiological media, growth patterns, inoculation techniques, and isolation of pure cultures;
• examination of bacterial metabolism using various diagnostic media, including Kliglers medium for hydrogen sulfide detection and dairy-based media;
• principles and methods of chemical and physical disinfection (parts 1 and 2);
• quantitative cultures and determination of microbial counts in biological samples;
• assessment of bacterial sensitivity to natural bactericidal substances (phytoncides, essential oils) and antibiotics using the disk diffusion method, as well as evaluation of interactions between antibiotics;
• selected microscopy techniques: observation of prepared slides, Gram staining, methods for visualizing cellular structures, and microscopic examination of fungi;
• practical refinement of microbiological staining techniques, including testing and retesting of Gram staining proficiency.</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>Two lecture's tests</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Reports (classes 2 to 10)</td><td>60.0%</td><td>45.0%</td></tr>
<tr><td>Microscopy</td><td>60.0%</td><td>5.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Jaime S. Colome, A. M Kubinski, Raul Cano, D. V. Grady Laboratory Exercises in Microbiology</td></tr>
<tr><td>Supplementary literature</td><td>Michael Madigan "Biology of microorganisms" - Pearson; 16th edition (1 July 2021)</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>1.The generation time is: the time required for cell division the time required to break down genetic material time of logarithmic growth of bacteria in stationary culture the time required for bacteria to adapt to the new environment 2.Anaerobes: they grow in microaerophilic conditions they grow in the presence of 21% oxygen in the atmosphere they grow in anaerobic conditions they do not grow in anaerobic conditions</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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