GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	General Mikrobiology, PG_00054680		
Field of study	Biotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
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	Department of Microbiology -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Anna Brillowska-Dąbrowska	
	Teachers	dr hab. inż. Anna Brillowska-Dąbrowska	

Lesson types and methods of instruction

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

Subject contents

LECTURE Microorganisms and microbiology. Microorganisms as cells. Microorganisms and their natural environments. The influence of microorganisms on humans. A history of discoveries in microbiology. Overview of the life forms of microorganisms (cell structure and life evolution, three domains of life, physiological diversity of microorganisms, biodiversity of prokaryotes and eukaryotic microorganisms).Cell structure and function (microscopy and cell morphology, cell membranes, cell walls, surface structures and inclusions, cell movement). Nutrition, laboratory culture and metabolism of microorganisms. Microbial growth (bacterial cell division, growth of bacterial populations, measuring microbial growth, environmental effects on microbial growth). Molecular biology of microorganisms (genes and gene expression, DNA structure, DNA replication, DNA manipulation tools, RNA synthesis, protein biosynthesis).Metabolism regulation (regulation of enzyme activity, DNA-binding proteins and transcription regulation, general regulation mechanisms, other regulation mechanisms). Virology (virus and virion, growth and quantification, viral replication, viral diversity). Bacterial genetics (mutations and recombination, transformation, transduction, plasmids, transposons and insertion sequences, bacterial genetics and gene cloning, bacterial chromosome). Microbiological taxonomy. Bacterial filogenza. Archaea phylogeny. Cell biology of eukaryotic microorganisms. Microbiological ecology (cycle of carbon, nitrogen, phosphorus, sulfur and microorganisms, nitrogen fixation, water microbiology, pathogenic microorganisms in waters, coliform bacteria as indicators of the sanitary condition of the aquatic environment, sources of microbiological contamination of food, pathogenic microorganisms in food). Microorganisms useful for industry and research.LABORATORY 1. Introduction 2. Macroscopic observations 3. Microscopy 4. Microscopy and staining 5. Microscopy and staining 6. Microscopy and staining - practical test 7. Sterilization and disinfection 8. Culture of microorganisms - practical test (reduction culture) 9. Quantitative analysis of bacteria 10. The metabolism of microorganisms (hydrolysis of starch, fats, proteins, fermentation) 11. Interactions between microorganisms (commensalism, synergism, antagonism) 12. Environmental factors influencing microbial growth (temperature, pH, osmotic pressure, ultraviolet light) 13. Oxygen requirements of microorganisms in anaerobic cultures 14. Antimicrobial factors 15. Catch-up activities

Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Two lecture's tests	60.0%	60.0%
Quizes during classes 9-13	60.0%	40.0%

Recommended reading	Basic literature	Jaime S. Colome, A. M Kubinski, Raul Cano, D. V. Grady Laboratory Exercises in Microbiology
	Supplementary literature	Michael Madigan "Biology of microorganisms" - Pearson; 16th edition (1 July 2021)
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	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	
Work placement	Not applicable	