GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	General microbiology, PG_00057767						
Field of study	Green Technologies						
Date of commencement of studies	October 2025		Academic year of realisation of subject	2025/2026			
Education level	first-cycle studies		Subject group	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	1		Language of instruction	English			
Semester of study	2		ECTS credits	4.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Department of Microbiology -> Faculty Of Chemistry -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Anna Brillowska-Dąbrowska				
	Teachers						
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		5.0		35.0	100
Subject objectives	The aim of the course is to gain he theoretical foundations of general microbiology and the basic techniques used in microbiology laboratories. The acquired knowledge will allow both understanding of the processes occurring in nature with the participation of microorganisms, as well as their practical use. In addition, it will enable the design and conduct of experiments on the identification of microorganisms and their characterization.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_K02] is aware of the social role of a technical college graduate, take the reflections on the ethical, scientific and social aspects of the work performed, understands the need to promote, formulating and providing the public with information and opinions concerning the activities of the profession of engineer.	The graduate can analyze various aspects of tasks performed in microbiological laboratories	[SK3] Assessment of ability to organize work
	[K6_U02] is able to operate equipment and perform typical analyzes of studies of environmental pollution, is able to carry out an analysis of typical environmental pollution and simple devices according to specification	The graduate knows the equipment necessary for the work of a microbiological laboratory	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	[K6_W03] has a basic knowledge of soil, air and water pollutants, design and supervision of environmentally friendly technologies and technologies which do not produce waste, knows technology of cleaning and neutralization of industrial waste and wastewater management, has a basic understanding of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants	The graduate is able to collect environmental samples for microbiological analysis and analyze them	[SW3] Assessment of knowledge contained in written work and projects
	[K6_W04] is aware of the importance of environmental protection and has a basic knowledge of chemical and biological threats to the environment, with particular emphasis on anthropogenic factors, has a basic knowledge of knowledge of the principles of sustainable development as well as national and European environmental management conditions.	The graduate knows the principles of the classification of microorganisms. Knows and understands the basic requirements of microorganisms. Is able to characterize the benefits and threats of particular groups of microorganisms for humans and the environment.	[SW1] Assessment of factual knowledge
	[K6_U04] capable of formulating and solving design tasks in the field of environmental technology to recognize their non-technical aspects, including environmental, economic and legal. Is capable of applying the principles of occupational health and safety. Is able to make initial assessment of engineering solutions and actions	The graduate is able to indicate the importance of microorganisms. The graduate understands the methodology of works used in microbiology.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information

Subject contents	Introduction to general microbiology Characteristics and classification of microorganisms Growth of microorganisms Microorganism health, disease Impact of microorganisms Principles of isolation, cultivation and identification of microorganisms Basic techniques used in microbiology, macroscopic and microscopic observation Nutritional requirements of microbial cells microbial metabolism based identification Test Antimicrobial agents Introduction to genetics of microorganisms Molecular biology techniques in microbiology laboratory Immunodetection In microbiology laboratory Identification of unknown microorganisms in microbiology laboratory Test LABORATORIES: Exercise 1. Safety and rules in the laboratory of microbiology Exercise 2. Working conditions in the laboratory - sterilization and disinfection. Exercise 3. Cultivation of microorganisms. Exercise 4. Macroscopic and microscopic observations.. Exercise 5. Gram staining of microorganisms. Exercise 6. Gram staining of microorganisms - bacteria, yeasts and molds. Exercise 7. Gram staining of microorganisms - test. Exercise 8. The impact of external conditions on the cultivation of microorganisms.

Exercise 9. Antibiotics.

Exercise 10. Bacteria counting.

Exercise 11. Isolation of genomic DNA - the different methods, the measurement of the concentration of DNA, electrophoresis.

Exercise 12. Macro-and microscopic observations(species identification).

Exercise 13. Purification of genomic DNA and PCR (identification of the species).

Exercise 14. Checking and preparation of PCR products for sequencing (species identification).

Exercise 15. Discussion of the results of sequencing (species identification).

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Test I lecture	60.0%	25.0%
Test I lecture	60.0%	25.0%
Short tests (laboraories)	60.0%	50.0%

Recommended reading

Basic literature	M.T. Madigan Brock Biology of Microorganisms - 12th Edition, Pearson A.E. Brown "Benson"s Microbiological Applications: General Microbiology, Short Version", 11th Edition, McGraw-Hill Science Engineering E. Rosenberg, U. Gophna(Eds.) "Beneficial Microorganisms in Multicellular Life Forms" - Springer J. T. Satyanarayana, N. Bhavdish, P. Anil (Eds.) "Microorganisms in Environmental Management" M.T. Madigan Brock Biology of Microorganisms - 12th Edition, Pearson A.E. Brown "Benson"s Microbiological Applications: General Microbiology, Short Version", 11th Edition, McGraw-Hill Science Engineering E. Rosenberg, U. Gophna(Eds.) "Beneficial Microorganisms in Multicellular Life Forms" - Springer J. T. Satyanarayana, N. Bhavdish, P. Anil (Eds.) "Microorganisms in Environmental Management" Springer Practicals - Technical University of Gdansk: "Microbiology"
Supplementary literature	not applicable
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. Bacteria identification methods 2. Application of PCR in a microbiological laboratory
Work placement	Not applicable

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