GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00037562		
Field of study	Green Technologies		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2022/2023
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	2	Language of instruction	English
Semester of study	4	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	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	5.0	35.0	100

Subject objectives

The aim of the course is to acquaint students with the theoretical foundations of general microbiology and basic techniques applied in microbiological laboratories. This knowledge will enable both the understanding of natural processes involving microorganisms and their practical use. In addition, enable the design and conduct experiments on the identification of microorganisms and to carry out their characteristics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 rules for classifying microorganisms. He knows and understands the basic requirements of microorganisms. He can characterize the benefits and threats that various groups of microorganisms bring to humans and 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 can indicate the importance of microorganisms. The graduate understands the methodology of the works used in microbiology. The graduate knows methods of combating microorganisms.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools

Subject contents	Introduction to general microbiology 2 h. Characteristics and classification of microorganisms 2 h. Growth of microorganisms 2 h. Microorganism health, disease -2 h. Impact of microorganisms 2 h. Principles of isolation, cultivation and identification of microorganisms - 2 h. Basic techniques used in microbiology, macroscopic and microscopic observation 2 h. Nutritional requirements of microbial cells microbial metabolism based identification 2 h. Test 1 h Antimicrobial agents 2 h. Introduction to genetics of microorganisms 2 h. Molecular biology techniques in microbiology laboratory -4 h. Immunodetection In microbiology laboratory - 2 h. Identification of unknown microorganisms in microbiology laboratory -2 h Test 1 h 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
Final test	60.0%	25.0%
Short tests	60.0%	25.0%
Test I lecture	60.0%	25.0%
Test II lecture	60.0%	25.0%

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	n/a
eResources addresses	Adresy na platformie eNauczanie: Microbiology - Moodle ID: 29062 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29062

Example issues/ example questions/ tasks being completed	1. Methods for identification of bacteria 2. Application of PCR in the laboratory of microbiology
Work placement	Not applicable