



## Subject card

Subject name and code	Microbiology, PG_00036274						
Field of study	Green Technologies						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
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			Polish		
Semester of study	4	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. Beata Krawczyk					
	Teachers	dr hab. Beata Krawczyk Aleksandra Rosińska					
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 Adresy na platformie eNauczanie:						
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 the student with the laboratory techniques used in the microbiological laboratory, to gain knowledge about the structure of micro-organisms, understanding of their function in the environment.						

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 student knows the environmental and clinical microorganisms (causing infections in humans and animals) and the relationships between them. The student has a basic knowledge of the effects of chemical and biological factors on the environment and living organisms inhabiting ecosystems and biological (bioindicative) and microbiological methods used to assess the degree of soil, water and air pollution.	[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	He knows the principles of safe work in a microbiological laboratory. Students can use the methods and tools used in the microbiological laboratory Student acquired knowledge about conventional and molecular methods in microbiology.  The student draws correct conclusions from the experiments and observations performed, uses the correct terminology and is able to use various sources of knowledge, including scientific literature in the field of environmental biology and microbiology.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
Subject contents	<p>Lecture: Why study Microbiology. Classification and identification of microorganisms. Modern prokaryotic classification. Scope and history of Microbiology. Koch's postulates. Microscopy and Staining. Microbial nutrition, growth of microbial populations (phase) and culturing microorganisms (obtaining pure cultures, culture media, special culture techniques, preserving cultures. Measuring microbial growth. Controlling microbial growth, sterilization and disinfection. Molecular diagnostics in microbiology. Cell structure and function. Microbial ecology. Host-Microbe relationships.</p> <p>Laboratory: Laboratory organization. Safety in handling microorganisms . Sterilization and disinfection. Cultivation of microorganisms (culture media and nutritional requirements of cell), Patterns of growth: colony morphology, growth patterns in broth, agar slant and agar deep-tube. Pure culture techniques (spread plate technique, streak plate technique, specific media). Cultivation of anaerobes. Microscopic techniques and bacteria staining (Gram staining). Environmental factors affecting microbial growth- temperature, pH, osmotic pressure, UV, chemical disinfectants., antibiotics, phytoncides</p>		
Prerequisites and co-requisites	Preliminary demands not required.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written test - lecture	60.0%	50.0%
	laboratory - test, report	60.0%	50.0%
Recommended reading	Basic literature	Mikrobiologia ogólna podręcznik akademicki A.Brillowska-Dabrowska, L.Holec-Gąsior, M. Olszewski, K.Werbony, J. Kur Wydawnictwo PG, 2009. Życie bakterii Władysław J.H. Kunicki - Goldfinger Wydawnictwo Naukowe PWN, 2008. Bakterie w biologii, biotechnologii i medycynie P. Singleton; Wydawnictwo Naukowe PWN, 2000	
	Supplementary literature	Mikrobiologia, różnorodność, chorobotwórczość i środowisko Abigail A. Salyers, Dixie D. Whitt PWN W-wa, 2006. Mikrobiologia ogólna H.G. Schlegel PWN, 2001. Krótkie wykłady Mikrobiologia J.Nicklin, K. Graeme-Cook wydanie: drugie, poprawione i unowocześnione, Wydawnictwo Naukowe PWN, 2007.	
	eResources addresses	Uzupełniająca	
Example issues/ example questions/ tasks being completed	Give mutualistic examples of the interactions of microorganisms		
Work placement	Not applicable		