



## Subject card

Subject name and code	ENVIRONMENTAL MICROBIOLOGY, PG_00059997						
Field of study	Environmental Engineering						
Date of commencement of studies	February 2024		Academic year of realisation of subject		2023/2024		
Education level	second-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		English		
Semester of study	1		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Environmental Engineering Technology -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Aneta Łuczkiwicz				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30	5.0		20.0	55	
Subject objectives	The course aims to provide students with comprehensive knowledge of engineering microbiology. The lectures will cover issues related to microbiology of anthropogenically impacted environments: biodiversity, elements circulation, and microbiological hazards. In the laboratory - the presence, activity and microbial contamination will be analysed.						
Learning outcomes	Course outcome	Subject outcome		Method of verification			
	[K7_K02] understands the need to formulate and communicate to the public information and opinions on the achievements in the environmental engineering and other aspects of the engineering activity in the sanitary sector; is aware of the importance and understands non-technical aspects and effects of engineering activities; strives to convey such information and opinions in a universally understandable manner, presenting various points of view	The student is aware of the nontechnical aspects of engineering activities, understands the need to inform and public participation in the proceedings regarding environmental impact assessments of technical facilities.		[SK1] Assessment of group work skills [SK4] Assessment of communication skills, including language correctness [SK3] Assessment of ability to organize work			
	K7_W07	The student understands how microbiological processes are used in municipal management, in particular in technologies related to the water-wastewater sector		[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects			
K7_U07	The student is able to design and carry out or improve an existing engineering solution in the field of environmental engineering		[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools				

Subject contents	<p>Technical aspects of environmental microbiology will be discussed during the course. Classical methods for testing biodiversity of microorganisms (microscopy and breeding methods) will be combined with modern biochemical, molecular and bioinformatics analyzes. The metabolic activity of microorganisms (sources of energy and carbon, sources of other biogenic elements, oxygen and anaerobic respiration) in natural systems and technological systems (e.g. methanogenesis, nitrification, denitrification, microbiological transformation of mercury, iron, sulfur) will be discussed. Research on human microbiome will be discussed in the aspect of the problem of contamination of various environmental niches.</p> <p>Laboratory works will concern (I) microbiological air quality analysis, (II) microbiological analysis of watercourses in urban areas (field works) and (III) analysis of activated sludge activity using laboratory SBR reactors (e.g. AUR, NUR, NIR tests). Analytical procedures and techniques will be discussed in terms of their practical application.</p>		
Prerequisites and co-requisites	Fundamentals of microbiology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lectures	60.0%	60.0%
	laboratory,	60.0%	40.0%
Recommended reading	Basic literature	<p>Tchobanoglous et al. Wastewater engineering, treatment and reuse, 5th edition, Metcalf and Eddy. Handouts.</p> <p>Volodymyr Ivanov Environmental microbiology for engineers CRC Press/Taylor &amp; Francis Group 6000 Broken Sound Parkway, NW Suite 300 Boca Raton, FL 33487</p>	
	Supplementary literature	-	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	-		
Work placement	Not applicable		