

**Subject card**

Subject name and code	Microbiology, PG_00082050						
Field of study	Chemistry						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2026/2027		
Education level	Bachelor's studies	Subject group			Obligatory subject group in the field of study		
Mode of study	full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish 1. Attendance and performance of exercises 2. Passing the entrance tests for classes 2, 3, 4, 5, 6, 8 points each (8x5=40) 3. Report after each exercise – 2 points (2x5=10) 4. Test: 1 descriptive questions – 2 points each 6 test questions – 1 point each 4. Colloquia cover theoretical and practical issues. 5. Final test - release of points 41-50. 6. Additional points - activity, having notes, presentation 7. Presentation can be done when 2 points are missing for the grade exempting from the final test.		
Semester of study	5	ECTS credits			2.0		
Learning profile	academic	Assessment form			credit		
Conducting unit	Laboratory of Bionanotechnology -> Department of Molecular Biotechnology -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Piotr Skowron					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	E-learning hours included: 0.0						
	Additional information: laboratory exercises, multimedia presentation						
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		15.0	50
Subject objectives	Familiarizing students with all the issues mentioned in the syllabus of exercises, introducing students to methods of cultivating microorganisms, familiarizing students with methods of identifying microorganisms, familiarizing students with methods for determining the properties of microorganisms, developing the skills of aseptic work and following procedures for working with microorganisms, developing the ability to independently plan and carry out microbiological experiment.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.	Performs experiments specified in the laboratory manual and speaks about microbiological issues in understandable professional language.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
	[CHEML3_W12] Characterises the basic principles of health and safety at work in a chemical laboratory; knows and describes the hazards associated with working with hazardous substances, ways to counteract these hazards and rules of conduct during an accident.	Knows sterilization methods, types of microbiological media and breeding methods microorganisms in laboratory conditions.	[SW4] test/exam - oral or written [SW1] oral statement/conversation/discussion
	[CHEML3_W01] Enumerates basic laws and theories in chemistry, physics, mathematics and biology.	Demonstrates knowledge of the structure of the cell, methods of its observation and knows selected groups of microorganisms.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report
	[CHEML3_K05] Observes established procedures in laboratory work and is responsible for the safety of her/his and others' work.	Is able to prepare a workstation, work aseptically, follows established research procedures and procedures for working with microorganisms, is careful when dealing with chemical substances and materials of biological origin.	[SK6] demonstration of practical skills [SK8] observation of student's independent or team work
	[CHEML3_K03] Establishes priorities in the right way for the implementation of tasks specified by herself/himself and/or by others.	Independently plans the course of microbiological experiments.	[SK2] presentation/project/paper/report [SK6] demonstration of practical skills [SK8] observation of student's independent or team work
	[CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.	Prepares a report on the results obtained in the laboratory.	[SU2] presentation/project/paper/report [SU3] text preparation/written work
	[CHEML3_K02] Works individually demonstrating initiative and independence of activity and cooperates in a team fulfilling various roles in it.	Works in the microbiology laboratory independently and in groups.	[SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[CHEML3_W02] Describes the properties of elements and the most important chemical compounds, enumerates the methods of their preparation and methods of analysis.	Demonstrates knowledge of biochemical processes occurring in a living cell.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report	
Subject contents	Learning basic techniques of working in a microbiological laboratory (sterilization methods, methods performing cultures and microorganisms), the influence of physical factors (temperature, osmotic pressure, UV radiation) and chemicals on microorganisms, morphology of microorganisms - preparation of stained microscopic preparations and their observation, flora human physiological and pathogenicity, chemotherapeutics and drug sensitivity determination, physiology and metabolism of microorganisms, collection and testing environmental samples for the presence of microorganisms, the use of microorganisms in industry and environmental protection.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lab report/book	30.0%	20.0%
	test	51.0%	80.0%

Recommended reading	Basic literature	Salyers, A.A., Whitt, D.D.: Mikrobiologia. Różnorodność, chorobotwórczość i środowisko. Wydawnictwo Naukowe PWN, Warszawa 2003 Kunicki-Goldfinger, W.J.H. Życie bakterii. Wydawnictwo Naukowe PWN, Warszawa 2005 Schlegel, H.G. Mikrobiologia ogólna. Wydawnictwo Naukowe PWN, Warszawa 2000 Libudzisz, Z., Kowal, K., Żakowska, Z. (red.) Mikrobiologia techniczna. Mikroorganizmy i środowiska ich występowania. Wydawnictwo Naukowe PWN, Warszawa 2007 Libudzisz, Z., Kowal, K., Żakowska, Z. (red.) Mikrobiologia techniczna. Mikroorganizmy w biotechnologii, ochronie środowiska i produkcji żywności. Wydawnictwo Naukowe PWN, Warszawa 2008 Kur, J.: Ćwiczenia z mikrobiologii ogólnej. Wydawnictwo Politechniki Gdańskiej, Gdańsk 1993 Tortora, G.J., Funke, B.R., Case, C.L. Microbiology. An introduction. Pearson International Edition, San Francisco 2007
	Supplementary literature	E. M. Szewczyk Diagnostyka bakteriologiczna. Wydawnictwo Naukowe PWN, Warszawa 2005 Brown T. A. [red. wyd. pol. Piotr Węglński] Genomy, Wydawnictwo Naukowe PWN, Warszawa, latest ed. Stryer L. Biochemia. Wydawnictwo Naukowe PWN, Warszawa, latest ed. J. Baj, Z. Markiewicz Biologia molekularna bakterii. Warszawa 2006
	eResources addresses	
Example issues/ example questions/ tasks being completed	sterilization techniques, types of media, growth curves of bacterial cultures, determination of the number of microorganisms including CFU, microscopy, detection of microorganisms	
Work placement	Not applicable	

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