

**Subject card**

<b>Subject name and code</b>	Biotechnology in medicine - The human organism - homeostasis and the pathological state - Methodology (M05_B1), PG_00197675						
<b>Field of study</b>	Biotechnology						
<b>Date of commencement of studies</b>	October 2024	<b>Academic year of realisation of subject</b>			2026/2027		
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	3	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	5	<b>ECTS credits</b>			4.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			credit		
<b>Conducting unit</b>	Intercollegiate Faculty of Biotechnology UG-MUG -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Grzegorz Stasiłojć				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	2.0	0.0	56.0	0.0	4.0	62
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	62		5.0		33.0	100
<b>Subject objectives</b>	By fusing practical laboratory skills with histology, cytology, and toxicological knowledge, Block 1- Methodology aims to educate students for advanced cellular studies, including evaluating the effects of external influences on human health.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOTECHL3_W07] The graduate knows and understands basic techniques and research tools used in biotechnology.	Student know the methodology related to the analysis of the cell in the pathological state and the related specific conceptual apparatus and terminology.	[SW4] test/exam - oral or written [SW3] text preparation/written work
	[BIOTECHL3_W09] The graduate knows and understands the basic concepts and terminology used in biological and medical sciences as well as concepts from related scientific disciplines	Basic terms used in histology, cytology, and toxicology, such as cellular homeostasis, apoptosis, necrosis, or mechanisms of cellular adaptation, will be familiar to the student. He or she is aware of the ultrastructural makeup of tissues and cells and is able to connect molecular functional abnormalities to morphological changes. The student or students comprehend the cellular and tissue-level modes of action of certain hazardous agents (chemical, physical, and biological).	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report [SW3] text preparation/written work
	[BIOTECHL3_K04] The graduate is willing to understand the importance of work safety rules, in particular laboratory work; apply the principles of work safety; be responsible for his/her own safety and that of others; be able to act in emergency situations.	The student is aware of the importance of safety rules, possible risks and responsibility for the safety of others. Student knows the rules of working in laboratories with different levels of BSL and understands the risks associated with the various levels of biosafety.	[SK3] text preparation/written work [SK5] implementation of a problem task
	[BIOTECHL3_W04] The graduate knows and understands the structure and functions of the body in terms of anatomy, histology, physiology relevant from the point of view of medicine	The student is able to characterize the microscopic and macroscopic structure of the main organs and systems of man, linking their structure to their functions. The student understands the basic physiological mechanisms underlying the functioning of the human organism at the cellular, tissue and organ levels. The student is able to explain the relationship between structure and function at different levels of organization of the organism.	[SW4] test/exam - oral or written [SW3] text preparation/written work
	[BIOTECHL3_U08] The graduate is able to learn independently in a targeted manner	The student is able to study independently from the indicated materials including scripts and presentations. The student is able to take notes to reproduce the experiments performed. The student is able to conduct a review of the scientific literature in Polish and English, and then synthesize the information obtained in a coherent and logical manner.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU3] text preparation/written work
	[BIOTECHL3_U06] The graduate is able to prepare a targeted written study in Polish and/or English, covering detailed issues in the field of biotechnology, using scientific language, including specialist terminology and conceptual apparatus appropriate for biotechnology	The student is able to prepare a detailed report on the ecotoxicological risk assessment of a selected chemical substance, taking into account current guidelines and standards. The student is able to correctly apply specialized ecotoxicological terminology in the prepared study. The student is able to present the results of his analysis in a clear and comprehensible manner for an audience of varying levels of sophistication.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work

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Subject contents	<ul style="list-style-type: none"> <li>• <b>Methodology 1 - Proseminar.</b> Methods of analyzing a cell in a pathological state</li> <li>• <b>Methodology 2- Seminar.</b> Prospective ecotoxicological risk assessment of a chemical compound</li> <li>• <b>Methodology 3 - Laboratory classes (Histology)</b></li> <li>• Analysis of the structure and function of human organs and their systems: histological analysis of human organs forming systems: cardiovascular, respiratory, digestive including accessory organs, endocrine, urinary, nervous including organs of sight, hearing and balance, and Reproductive organs and skin with its appendages; linking structure to function</li> <li>• <b>Methodology 4 - Laboratory classes in animal cell culture.</b></li> <li>• Safety signs and labeling of hazardous substances.</li> <li>• Basics of aseptic work.</li> <li>• The ability to properly and safely operate equipment.</li> <li>• Passage of cells (suspension, adherent) and induction of death.</li> <li>• Counting and viability assessment. Freezing and thawing of cells Identification of infection by Mycoplasma.</li> <li>• Proliferation assay. Cell cycle analysis. Hemolytic test. Analysis of membrane proteins by flow cytometry and Fluorescence microscopy.</li> <li>• Characterization of cell morphology</li> </ul>												
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Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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