University of Gdańsk

Subject card

Subject name and code	Multicellular organisms - Human body organisation and physiology Methodology (M04_B2), PG_00196931		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
Education level	Bachelor's 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	5.0
Learning profile	academic	Assessment form	credit
Conducting unit	Intercollegiate Faculty of Biotechnology UG-MUG -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Adam Iwanicki	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	45.0	30.0	0.0	0.0	75
	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	75	5.0	45.0	125

Subject objectives	The program block provides detailed knowledge about the principles of cell organization into higher-order structures in the human body, biological processes related to cell functioning, and the mechanisms of differentiation and specialization of human cells, tissues and organs in connection with their functions. During the exercises, students will become familiar with the techniques and research tools used in the study of cellular processes and imaging of the morphological structure of tissues and organs.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHL3_W09] The graduate possesses structured and advanced knowledge of the terminology and concepts used in biological and medical sciences and related disciplines.	The student knows and is be able to skillfully apply concepts and terminology used in cell biology and used to describe the structure of cells, tissues and organs, their functioning and interactions.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[BIOTECHL3_W02] The graduate knows and understands at an advanced level selected processes at the cell, tissue, and organism level, important from the biological point of view	The student knows the principles of cell organization into higher-order structures in the human body, biological processes related to cell functioning and the mechanisms of differentiation and specialization of human cells, tissues and organs in connection with their functions.	[SW4] test/exam - oral or written
[BIOTECHL3_K04] The graduate is aware of the importance of occupational safety rules, is able to apply them and react in hazardous situations, ensuring their own safety and the safety of others.	The student is aware of the importance of safety rules, possible threats and responsibility for the safety of others.	[SK8] observation of student's independent or team work
[BIOTECHL3_W08] The graduate knows the principles of occupational health and safety, understands the risks associated with laboratory work, including infectious materials, GMOs and GMMs, and knows the legal regulations relating to these areas.	The student is able to work in the laboratory in accordance with the principles of occupational health and safety, knows the risks of working with infectious material, GMO and GMM.	[SW4] test/exam - oral or written
[BIOTECHL3_U08] The graduate is able to learn independently and in a targeted manner, develop his or her competences and plan their improvement.	The student has the ability to learn independently from the materials and literature sources indicated by the instructor.	[SU4] test/exam - oral or written
[BIOTECHL3_U07] The graduate is able to prepare and present a short oral presentation in Polish and/or English, covering detailed issues in the field of biotechnology, using scientific language, and is able to conduct discussions	The student is able to express himself and participate in discussions, using scientific language, including specialized terminology and conceptual apparatus specific to biotechnology.	[SU1] oral statement/conversation/ discussion
[BIOTECHL3_U01] The graduate possesses practical skills in performing laboratory procedures, documenting results, and applying techniques necessary in biotechnology, including methods of isolation, modification, selection, and analysis of organisms, tissues, cells, and molecules; has the ability to operate advanced laboratory.	The student is able to recognize and describe the histological structures of organs and tissues. The student has advanced skills in operating laboratory equipment, such as efficient operation of a light microscope, including the use of immersion.	[SU8] observation of student's independent or team work
[BIOTECHL3_W07] The graduate has advanced knowledge of the rules of operation and the possibilities of using research techniques and tools used in biotechnology.	The student knows the techniques and research tools used in researching cellular processes and imaging the morphological structure of tissues and organs.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[BIOTECHL3_W04] The graduate has an advanced level of knowledge on the structure and functions of the human body in terms of anatomy, histology and physiology and understands their importance for medicine and medical biotechnology.	The student possesses the knowledge about human embryonic development, as well as the proper features of the morphological structure and functioning of tissues and individual organs and systems of the human body, important from the point of view of medicine	[SW4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td>M1. Auditorium exercises:
Methods of analyzing the mechanisms of differentiation and specialization of human cells/tissues/organs: - Methods of proliferation analysis; methods of cell death analysis; adhesion, shape, cell movement and their analysis; single cell analysis (genome and transcriptome sequencing). - Methodology of research on the embryonic development of mammals and other animals, methods of isolation, cultivation and analysis of the potential, self-renewal and differentiation of cells
embryonic and reprogrammed pluripotent cells.

M2. Auditorium exercises in human anatomy:
Upper and lower limbs. - Spine and back. - Chest. - Abdomen - abdominal wall and its spaces. - Head and neck.

M3. Auditorium exercises on animal cell culture:
Hybrid e-learning classes (B-learning). - History of cell/tissue culture. Applications, advantages and limitations of cell culture in biotechnology, medicine, pharmacy. - Risk factors. Safety of work in a breeding laboratory, including genetically modified cell lines, and levels of biological safety. - Equipping the breeding laboratory. Cell culture materials. - Principles of aseptic work with cell cultures in vitro. - Types of farm infections prevention, detection, treatment. - Cytotoxic/proliferative tests. Application of cytometry in cell culture. - Presentation of issues developed by students related to the methodology of cell culture research based on scientific publications. Discussion of the methods and results of the publication.

M4. Laboratory exercises in histology:
Application of light microscopy techniques. - Subcellular structures in light microscopy. Karyokinesis and cytokinesis. - Epithelial tissue.Glands. - Connective tissue. - Skeletal connective tissue. Ossification. - Muscle tissue. - Nervous tissue and nervous system. - Peripheral blood.Bone marrow. Blood formation. - Lymphatic system</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>M4: test</td><td>0.0%</td><td>15.0%</td></tr>
<tr><td>M4: entry tests</td><td>0.0%</td><td>18.0%</td></tr>
<tr><td>M2: test</td><td>0.0%</td><td>20.0%</td></tr>
<tr><td>M4: practical evaluation</td><td>0.0%</td><td>22.0%</td></tr>
<tr><td>M1: testy</td><td>0.0%</td><td>20.0%</td></tr>
<tr><td>M4: presentation</td><td>0.0%</td><td>5.0%</td></tr>
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</td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>Materials provided by the teacher Teaching materials on anatomy placed on the electronic educational platform of the Medical University of Gdańsk Teaching materials on animal cell culture placed on the electronic educational platform of the University of Gdańsk Histologia, W. Sawicki, PZWL, 2012 Animal Cell Culture R.I. Freshney 4th ed. Hodowla komórek i tkanek S. Stokłosa wyd. 1.</td></tr>
<tr><td>Supplementary literature</td><td>N/A</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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