University of Gdańsk

Subject card

Subject name and code	Biotechnology - The Cell Methodology (M01_B3), PG_00192246		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Stanisław Ołdziej, prof. UG	
	Teachers	dr hab. Stanisław Ołdziej, prof. UG prof. dr hab. Aleksandra Królicka dr Anna Ihnatowicz dr Magdalena Rajewska	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	26.0	0.0	0.0	0.0	26
	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	26	5.0	19.0	50

Subject objectives	The purpose of the class is to familiarize the student with the structure and functioning of the cell as the basic unit of life. During the course of the course, the Student will gain detailed knowledge of the organization of the structure of the prokaryotic cell, the animal eukaryotic cell, and the plant and fungal eukaryotic cell . The student will become familiar with the legal regulations related to working with a biological agent, learn techniques and research tools used in cell biology to observe and analyze the functioning of cells and their components . The student will be able to indicate the differences in the structure of different types of cells, will be able to indicate the distinguishing features of cells of given types of organisms and the features common to the discussed types of cells.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	Student has detailed and advanced knowledge of the organization of the structure of the prokaryotic cell, the animal eukaryotic cell, and the plant and fungal eukaryotic cell.	[SW4] test/exam - oral or written
[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 knows and applies the principles of occupational health and safety in the laboratory, identifies hazards associated with working with infectious materials, GMOs and GMMs, and interprets legal regulations regarding biosafety.	[SW4] test/exam - oral or written
[BIOTECHL3_K03] The graduate is willing to understand risks and dilemmas, including ethical dilemmas related to conducting scientific research and introducing advanced technologies using the achievements of biotechnology; understand and appreciate the importance of intellectual property; behave ethically.	The student understands the ethical aspects of conducting biological research, in particular research on cells and biological materials, knows the principal principles of intellectual property protection in scientific activities, knows the principles of intellectual property protection in scientific activities and recognizes the importance of responsible use of biological research results in biotechnological science and practice.	[SK4] 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 is able to indicate the differences in the structure of different types of cells, is able to indicate the distinguishing features of cells of given types of organisms and the features common to the discussed types of cells	[SU4] test/exam - oral or written
[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 characterizes the principles of operation of advanced laboratory techniques used in cell biology to observe and analyze the functioning of cells and their components, distinguishes and selects appropriate research techniques for specific research problems in prokaryotic and eukaryotic cell biology, and describes the possibilities and limitations of using selected research tools and methods in this field.	[SW4] test/exam - oral or written

Subject contents

M1. Prokaryotic cell Working with microorganisms. Biosafety classes. - Observation of cells - microscopy - Culture of microorganisms and population dynamics - Labeling of prokaryotic cells.

M2. Animal eukaryotic cell Animal eukaryotic cell methodology: cell culture, types of microscopy, fractionation, flow cytometry, immunoprecipitation, immunolocalization, DNA labeling, karyotyping, proliferation assays, colorimetric assays.

M3. Plant eukaryotic cell Interaction of organelles in the plant cell. - Origin and evolution of the plant cell. - Secondary metabolites. - Protoplasts/fusions. - Types of plant cell culture i*n vitro*.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Part M3	51.0%	25.0%
Part M1	51.0%	25.0%
Part M2	51.0%	50.0%

Recommended reading	Basic literature	Prokaryotic cell and fungi cell Mikrobiologia - Jadwiga Baj (red. nauk), Wydawnictwo Naukowe PWN SA, Warszawa 2018. Rozporządzenie Ministra Zdrowia z dnia 22 kwietnia 2005 r w sprawie szkodliwych czynników biologicznych dla zdrowia w środowisku pracy oraz ochrony zdrowia pracowników narażonych na te czynniki (Dz. U. Nr 81 Poz. 716). Mikrobiologia techniczna. T. 1 Mikroorganizmy i środowiska ich występowania (wybrane rozdziały) - Zdzisława Libudzisz (red.), Krystyna Kowal (red.), Zofia Żakowska (red.), 2007, Wydawnictwo Naukowe PWN wybrane rozdziały: Część I: 1-7 Animal eukaryotic cell Podstawy biologii komórki (lub nowsze wydanie) autorstwa: Bruce Alberts, Dennis Bray, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter, PWN 2009 Molecular Biology of the Cell. Fifth Edition (lub nowsze wydanie), autorstwa: Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts i Peter Walter, Wydawnictwo Gerland Science 2008. Molecular Cell Biology, Fifth Edition (lub nowsze wydanie), autorstwa: Harvey Lodish, Arnold Berk, Paul Matsudaira, Chris A. Kaiser, Monty Krieger, Matthew P. Scott, Wydawnictwo Freeman, W. H. & Company 2003 Plant eukaryotic cell Lack AJ, Evans DE. 2003. Biologia roślin krótkie wykłady. PWN SA, Warszawa. Wojtaszek P, Woźny A, i inni. 2018. Biologia komórki roślinnej, Tom 1, Struktura. Wydawnictwo Naukowe PWN, Warszawa. Wojtaszek P, Woźny A i inni. 2018. Biologia komórki roślinnej, Tom 2, Funkcja. Wydawnictwo Naukowe PWN, Warszawa
	Supplementary literature	none
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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