

**Subject card**

<b>Subject name and code</b>	Cytology, PG_00198277						
<b>Field of study</b>	Genetics and Experimental Biology						
<b>Date of commencement of studies</b>	October 2026	<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>	1	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	1	<b>ECTS credits</b>			4.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			credit		
<b>Conducting unit</b>	Laboratory of Plant Cytology and Embryology -> Department of Experimental Biology and Plant Biotechnology -> Faculty of Biology -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Natalia Wiśniewska				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	0.0	45.0	0.0	0.0	45
	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>	45		10.0		45.0	100
<b>Subject objectives</b>	<p>1. Understanding the basics of functioning of organisms at the cell level.</p> <p>2. Understanding the structure of prokaryotic and eukaryotic cells.</p> <p>3. Ability to analyze the relationship between the structure of cellular structures and their functions</p> <p>.4. Ability to work safely in the laboratory, plan and conduct experiments using a light microscope, and record and interpret results</p>						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GBEL3_W01] A graduate has an advanced knowledge and understanding of: the structure and properties of the main types of biological macromolecules; the molecular mechanisms of basic metabolic pathways and genetic information flow; the sources of genetic variation in organisms and the mechanisms of evolution. They can explain the principles of inheritance, the differences in structure and function between prokaryotic and eukaryotic cells, as well as the structure and functional relationships at the cellular and tissue levels.	The graduate understands the importance of individual compartments in the functioning of cells and explains their role in the adaptation of cells to changing environmental conditions or the function performed in a plant or animal body.	[SW4] test/exam - oral or written
	[GBEL3_U03] The graduate is able to: use research apparatus and tools and, following the correct sequence of operations, carry out simple physical, biological or chemical observations and measurements in laboratory work in the biological sciences.	The graduate is able to properly use chemical equipment, tools and reagents. Is able to plan and perform simple experiments and chemical stainings as well as interpret the obtained results.	[SU8] observation of student's independent or team work
	[GBEL3_K08] The graduate is prepared to: takes responsibility for equipment/materials entrusted to it and respects the work of others.	The graduate is able to properly work with a light microscope and knows the principles of occupational health and safety. Is able to work safely in the laboratory and conduct experiments.	[SK8] observation of student's independent or team work
Subject contents	<p>Laboratory exercises: 1. Learning the techniques and research methods used in cytology 2. Structure and function of a plant cell 3. Cell growth and division 4. Cell cycle and its regulation 5. Genetic material of prokaryotic and eukaryotic cells, the impact of numerical and structural aberrations on the functioning of the body 6. Cytoskeleton 7. Polyploidization of cells 8. Programmed cell death</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	tests, reports on laboratory work, notebook, teamwork (preparation of presentations).	51.0%	100.0%

Recommended reading	Basic literature	<p>A. Literature required to pass the course:</p> <ol style="list-style-type: none"> <li>1. 1. used during classes: <ul style="list-style-type: none"> <li>• Alberts B. i wsp. Podstawy biologii komórki. 2005, PWN Warszawa</li> <li>• Kilarski, W. Strukturalne podstawy biologii komórki. PWN 2003</li> <li>• Kłyszajko-Stefanowicz L. Cytobiochemia. 2002, Wyd. Naukowe PWN</li> <li>• Wojtaszek P., Michejda J., Ratajczak, Biologia komórki roślinnej. T. 1 Struktura, T.2 Funkcja. PWN 2008/2009</li> <li>• Woźny A. i in. [red.] 2001. Podstawy biologii komórki roślinnej, Wyd. Naukowe UAM, Poznań</li> </ul> </li> <li>1. 2. studied independently by the student: <ul style="list-style-type: none"> <li>• Rogalska S, J. Małuszyńska, M.J. Olszewska (red.). 2005. Podstawy cytogenetyki roślin, PWN, Warszawa</li> </ul> </li> </ol>
	Supplementary literature	<ul style="list-style-type: none"> <li>• Litwin JA. 1999. Podstawy technik mikroskopowych. Wydawnictwo Uniwersytetu Jagiellońskiego, Kraków</li> <li>• Alberts B. (red.), Johnson A, Lewis J, et al. Wstęp do biologii molekularnej. Książka on-line New York: Garland Science, 2002</li> <li>• Kozieradzka-Kiszkurno M, Płachno BJ. (2013): Diversity of plastid morphology and structure along the micropyle-chalaza axis of different Crassulaceae. Flora 208: 128-137.</li> <li>• Pawlik, A., Wała, M., Hać, A., Felczykowska, A., &amp; Herman-Antosiewicz, A. (2017). Sulforaphane, an isothiocyanate present in radish plants, inhibits proliferation of human breast cancer cells. Phytomedicine, 29, 1-10.</li> <li>• Wiczak, A., Hofman, D., Konopa, G., &amp; Herman-Antosiewicz, A. (2012). Sulforaphane, a cruciferous vegetable-derived isothiocyanate, inhibits protein synthesis in human prostate cancer cells. Biochimica et Biophysica Acta (BBA)-Molecular Cell Research, 1823(8), 1295-1305.</li> <li>• Pawlik, A., Wiczak, A., Kaczyńska, A., Antosiewicz, J., &amp; Herman-Antosiewicz, A. (2013). Sulforaphane inhibits growth of phenotypically different breast cancer cells. European journal of nutrition, 52(8), 1949-1958.</li> <li>• Hać, A., Domachowska, A., Narajczyk, M., Cyske, K., Pawlik, A., &amp; Herman-Antosiewicz, A. (2015). S6K1 controls autophagosome maturation in autophagy induced by sulforaphane or serum deprivation. European journal of cell biology, 94(10), 470-481.</li> <li>• Płachno, B.J.; Kapusta, M.; Stolarczyk, P.; Świątek, P. Arabinogalactan Proteins in the Digestive Glands of <i>Dionaea muscipula</i> J.Ellis Traps. Cells 2022, 11, 586. <a href="https://doi.org/10.3390/cells11030586">https://doi.org/10.3390/cells11030586</a></li> </ul>
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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