

Nazwa zajęć/ <i>Course title:</i>	Biologia komórki	ECTS	5
Nazwa zajęć w j. angielskim/ <i>Course title in English:</i>	Cell Biology		
Zajęcia dla kierunku studiów/ <i>Degree program name:</i>	Biotechnology		

Język kursu/ <i>Course language:</i> English		Poziom studiów/ <i>Study level:</i>	
Typ studiów/ <i>Form of studies:</i> <input checked="" type="checkbox"/> intramural <input type="checkbox"/> extramural	Status zajęć/ <i>Course status</i> <input type="checkbox"/> podstawowe/ <i>basic</i> <input checked="" type="checkbox"/> kierunkowe/ <i>major</i>	<input checked="" type="checkbox"/> obowiązkowe/ <i>mandatory</i> <input type="checkbox"/> do wyboru/ <i>elective</i>	Semestr/ <i>Semester:</i> 1 <input checked="" type="checkbox"/> semestr zimowy/ <i>winter semester</i> <input type="checkbox"/> semestr letni/ <i>summer semester</i>
Rok akademicki/ <i>Academic year:</i> 2022/2023		Numer katalogowy/ <i>Catalogue number:</i>	BBT_BTa-1S-1Z-4

Koordynator zajęć/ <i>Course coordinator:</i>	Dr. Mirosław Sobczak			
Prowadzący zajęcia/ <i>Teachers responsible for the course:</i>	Dr. Mirosław Sobczak, Dr. hab. Justyna Sokołowska, Dr. hab. Maciej Szmidt, Dr. Kaja Urbańska, Dr. Sławomir Janakowski, Dr. Wojciech Kurek, Dr. Mirosława Górecka, Dr. hab. Marzena Sujkowska-Rybkowska, Dr. hab. Ewa Muszyńska-Sadłowska			
Założenia, cele i opis zajęć/ <i>Aims, objectives and description of the course:</i>	<p>The main goal of the subject is to acquaint students with cellular theory of plant and animal bodies organisation. Students will gain knowledge on ultrastructure of plant and animal cells, as well as basic knowledge concerning functions of organelles and processes implicated in differentiation of diverse cell types in different tissues. Special emphasis is put on understanding of correlations between cell structure and played functions.</p> <p>Lectures: (1) Prokaryotic and eukaryotic cells organisation. Research methods used in modern cell biology. (2) Cytoplasm, functions of selected proteins, role of calcium ions, cytoskeleton, membranous systems. (3) Organisation, biogenesis and functions of ribosomes. Types and functions of ribosomal RNAs. (4) Nucleus at interphase, chromatin, nucleolus, nuclear matrix, nuclear envelope. (5) Structure of chromosomes and division spindles. Cell cycle and its control. Mitosis and meiosis. (6) Ultrastructure of plastids and mitochondria, their functions, genome and protein synthesis. (7) Plant cell vacuole: biogenesis and functions. (8) Cell wall: structure, chemical composition, modifications, functions. Plasmodesmata: structure and role in transport. (9) Ultrastructural diversification of animal cells. Characteristics of epithelial tissue. (10) Characteristics of connective tissue. (11) Characteristics of cartilage and bone tissue. (12) Characteristics of nerve tissue and blood cells. (13) Characteristics of muscle tissue. (14) Characteristics and histological structure of blood vessels. (15) Characteristics of lymphatic tissue</p> <p>Laboratory classes: (1) Safety rules in laboratory of microscopy. Assembly of light microscope and rules of handling. Fabrication of microscopic specimens. Staining with dyes. Differentiation between dead and vivid cells. (2) Properties and chemical composition of vacuole. Cytoplasm streaming. (3) Mitochondria and plastids at light and transmission electron microscope levels. (4) Identification of storage materials: starch, inulin, aleurone proteins and lipids. (5) Cell wall: identification of chemical components: cellulose, lignin, cutin, suberin, callose. (6) Nucleus: DNA detection, analysis of mitotic stages, impact of antimetabolites (colchicine) on mitosis. (7) Features of different types of animal cells and their multiplication. (8) Morphology and histological structure of epithelial tissue. (9) Morphology and histological structure of connective tissue, glands, fat cells (10) Morphology and histological structure of cartilage and bone tissue. (11) Morphology and histological structure of nerve tissue and blood cells. (12) Morphology and histological structure of muscle tissue. (13) Morphology and histological structure of blood vessels. (14) Morphology and histological structure of lymphatic tissue. (15) Final exam.</p>			
Formy dydaktyczne, liczba godzin/ <i>Teaching forms, number of hours:</i>	a) lecture; number of hours 30; b) laboratory classes; number of hours 30;			
Metody dydaktyczne/ <i>Teaching methods:</i>	Monographic lectures based on multimedia presentations; microscopic laboratory exercises using light and fluorescence microscopes and examinations of self-prepared microscopic specimens stained with dyes; analysis of permanent cytological and histological specimens; analysis of electronograms of organelles and different cell types; individual consultations. In particular situations (e.g. pandemics), there is a possibility to conduct lectures and classes online.			
Wymagania formalne i założenia wstępne/ <i>Formal requirements and prerequisites</i>	Knowledge and skills acquired in secondary schools with extended biology and chemistry.			
Efekty uczenia się/ <i>Learning outcomes:</i>	treść efektu przypisanego do zajęć/ <i>the content of the effect assigned to the course:</i>		Odniesienie do efektu kierunkowego/ <i>Relation to the course outcomes</i>	Siła dla ef. kier*/ <i>Impact on the course outcomes*</i>
Wiedza (absolwent zna i rozumie) / <i>Knowledge: (the graduate knows and understands)</i>	W1	the terminology used to describe cellular structures, their function and chemical composition	K_W06 K_W08	2 1
	W2	the significance of generation and evolution of a cell in the development of living organisms on Earth and the relationships between the structure and the function of a cell	K_W10	2
	W3	knowledge about the cellular and tissue-based organisation of plants and animals as well as the processes occurring in organelles and compartments of a eukaryotic cell	K_W05 K_W08 K_W09	1 2 2
	W4	the empirical interpretation of the variability of cellular structures, being able to extend the knowledge related to cell biology, using the available sources of electronic	K_W07 K_W08	3 1

		information	K_W09	2
	W5	how to observe the occupational safety of oneself and the others, and how to behave in emergencies	K_W11 K_W14	3 1
Umiejętności (absolwent potrafi) /Skills: (the graduate is able to)	U1	utilise the techniques of microscopic examinations and cytochemical methods used in cell biology	K_U03 K_U05 K_U06 K_U07 K_U15 K_U21 K_U22	2 1 2 2 1 3 2
	U2			
Kompetencje (absolwent jest gotów do) /Competences: (The graduate is ready to)	K1	solve cognitive and practical problems	K_K01	2
	K2	ready to perform safe work in a laboratory	K_K03	1
Treści programowe zapewniające uzyskanie efektów uczenia się: /Program contents ensuring the achievement of the learning outcomes:	Cellular structure of animal and plant organisms, ultrastructure of animal and plant cells, functions of organelles and cell differentiation processes in various types of tissues, with particular emphasis on understanding the correlation between the structure of the cell and the served function.			
Sposób weryfikacji efektów uczenia się/ Methods of the verification of the learning outcomes:	Tests during exercises, a mark for the work performed during classes, written exam.			
Szczegóły dotyczące sposobów weryfikacji i form dokumentacji osiągniętych efektów uczenia się: /Details on the verification methods and of the ways of documenting the learning outcomes:	Personal student's certificate containing remarks concerning attendances and her/his activity during laboratory classes. Periodic written tests and exams. The files will be stored according to official rules provided in WULS regulations. There is a possibility to use remote learning and testing tools to verify learning outcomes in particular situations (e.g. pandemics).			
Elementy i wagi mające wpływ na ocenę końcową: /Elements and weights influencing the final grade:	The final mark consists of following elements: 1 – average mark from two parts exam (the first concerning plant cell, the second devoted to animal cell), 2 – average mark from two laboratory classes tests (the first concerning plant cell, the second devoted to animal cell), 3 – average mark from evaluation of student activity during laboratory classes (bipartite). Each element is rated as max. 100 points. Weights of above elements are as follows: 1 - 45%, 2 - 45%, 3 - 10%. It is obligatory to achieve min. 50% points from part 1 and 2.			
Miejsce realizacji zajęć: /Teaching place:	Lectures halls of WULS equipped with video projectors and laboratory rooms of the Department of Botany of the Institute of Biology and Chair of Histology and Embryology of the Department of Morphological Sciences of the Institute of Veterinary Medicine equipped with light microscopes. If necessary the lectures and classes will be carried out online (MS Teams platform).			
Literatura/Literature:	<ol style="list-style-type: none"> 1. Alberts B. et al. (2005 or newer) „Molecular Biology of the cell”, Garland Publ., 2. Sawicki W. (2009) „Histologia”, Wydawnictwo Lekarskie PZWL 3. Lack A.J., Evans D.E. (2001 or newer) “Instant Notes in Plant Biology”, BIOS Scientific. 4. Bresinsky A., et al. (2013 or newer) “Strasburger’s Plant Sciences”, Springer. 4. WWW pages and “open access” publications recommended by a teacher. 			
UWAGI/ANNOTATIONS:	According to WULS regulations the final grade corresponds to percentage of point collected by the student and it is calculated as follows: 91-100% Very good (5,0); 81-90% Good plus (4,5); 71-80% Good (4,0); 61-70% Satisfactory plus (3,5); 50-60% Satisfactory (3,0); <50% Unsatisfactory (2,0; an insufficient grade does not entitle the student to pass the course).			

*) 3 – zaawansowany i szczegółowy, 2 – znaczący, 1 – podstawowy/ 3 – significant and detailed, 2 – considerable, 1 – basic,

Wskaźniki ilościowe charakteryzujące moduł/przedmiot/Quantitative summary of the course:

Szacunkowa sumaryczna liczba godzin pracy studenta (kontaktowych i pracy własnej) niezbędna dla osiągnięcia zakładanych dla zajęć efektów uczenia się - na tej podstawie należy wypełnić pole ECTS /Estimated number of work hours per student (contact and self-study) essential to achieve the presumed learning outcomes - basis for the calculation of ECTS credits:	115 h
Łączna liczba punktów ECTS, którą student uzyskuje na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich lub innych osób prowadzących zajęcia/ Total number of ECTS credits accumulated by the student during contact learning:	2.4 ECTS