



Syllabus for academic year: 2021/2022													
Training cycle: 2020-2026													
Description of the course													
Course	HISTOLOGIA Z CYTOFIZIOLOGIĄ (2) HISTOLOGY WITH CYTOPHYSIOLOGY (2)								Group of detailed education results				
									Group code	Group name			
									A	Morphological Science			
									B	Scientific basis of medicine			
Faculty	Faculty of Medicine												
Major	medicine												
Level of studies	<input checked="" type="checkbox"/> X uniform magister studies <input type="checkbox"/> 1 st degree studies <input type="checkbox"/> 2 nd degree studies <input type="checkbox"/> 3 rd degree studies <input type="checkbox"/> postgraduate studies												
Form of studies	<input checked="" type="checkbox"/> X full-time <input type="checkbox"/> part-time												
Year of studies	II							Semester:	<input checked="" type="checkbox"/> X winter <input type="checkbox"/> summer				
Type of course	<input checked="" type="checkbox"/> X obligatory <input type="checkbox"/> limited choice <input type="checkbox"/> free choice / optional												
Language of study	<input type="checkbox"/> Polish <input checked="" type="checkbox"/> X English												
Number of hours													
Form of education													
	Lectures (L)	Seminars (SE)	Auditorium classes (AC)	Major Classes – not clinical (MC)	Clinical Classes (CC)	Laboratory Classes (LC)	Classes in Simulated Conditions (CSC)	Practical Classes with Patient (PCP)	Foreign language Course (FLC)	Physical Education (PE)	Vocational Practice (VP)	Directed Self-Study (DSS)	E-learning (EL)
Winter semester:													
Department of Human Morphology Department of Histology and Embryology (Dep. in charge of the course)													
Direct (contact) education ¹				60									
Distance learning ²	10												

¹ Education conducted with direct participation of university teachers or other academics

² Education with applied methods and techniques for distance learning



Department of Ultrastructural Research (Dep. in charge of the course)													
Direct (contact) education				60									
Distance learning													
Summer semester:													
Department of Human Morphology Department of Histology and Embryology (Dep. in charge of the course)													
Direct (contact) education													
Distance learning													
Department of Ultrastructural Research (Dep. in charge of the course)													
Direct (contact) education													
Distance learning													
TOTAL per year: 70													
Department of Human Morphology Department of Histology and Embryology Dep. in charge of the course)													
Direct (contact) education				60									
Distance learning	10												
Department of Ultrastructural Research (Dep. in charge of the course)													
Direct (contact) education				60									
Distance learning													
Educational objectives (max. 6 items)													
C1. During histology classes, the student will be acquainted with: <ul style="list-style-type: none"> principles of the basic techniques used in morphological studies, organization of the cell model, its structure and functions; structure and functions of cell organelles the structure and functions of selected, important specialized units, classification, features, origin, histological organization and the role of tissues, histological organization of systems and organs as well as their role and basic mechanisms regulating their function. 													
C2. During cytophysiology classes, the student will be acquainted with: <ul style="list-style-type: none"> processes taking place in cell organelles and mechanisms of their regulation, cell cycle, cell differentiation, regulation of these processes and cell aging, types of cell death (apoptosis, necrosis, autophagy, mitotic catastrophe) intercellular interactions and their importance, 													



- Selected, important processes related to, i.a. immune response, cancerogenesis and cell adhesion
- selected cytoplasmic processes

C3. Creating social competences needed to practice the medical profession, in line with the graduate's profile

Education result for course in relation to verification methods of the intended education result and the type of class:

Number of detailed education result	Student who completes the course knows/is able to	Methods of verification of intended education results	Form of didactic class <i>*enter the abbreviation</i>
A.W1.	knows anatomical, histological and embryological vocabulary in English;	oral answer, written test, exam	MC, L
A.W4.	knows basic cellular structures and their functional specialisations;	oral answer, written test, exam	MC, L
A.W5.	knows the micro-architecture of tissues, extracellular matrix and organs;	oral answer, written test, exam	MC, L
B.W14.	knows the functions of the human genome, transcriptome and proteome and the principal methods used to study them, the processes of DNA replication, repair and recombination, transcription and translation and the degradation of DNA, RNA and proteins, and the concepts of regulation of gene expression;	oral answer, written test, exam	MC, L
B.W17.	knows the ways in which cells communicate with each other and with the extracellular matrix, and the pathways for transmitting signals within the cell, and examples of disruption of these processes leading to cancer and other diseases;	oral answer, written test, exam	MC, L
B.W18.	knows the processes: cell cycle, proliferation, differentiation and ageing of cells, apoptosis and necrosis and their significance for the functioning of an organism;	oral answer, written test, exam	MC, L
B.W19.	knows to a basic extent the issue of stem cells and their application in medicine;	oral answer, written test, exam	MC, L
B.W20.	knows the basics of stimulation and conduction in the nervous system and higher nervous functions, as well as striated and smooth muscle physiology and blood functions;	oral answer, written test, exam	MC, L
A.U1.	Is able to operate an optical microscope, including the use of immersion;	practical test	MC
A.U2.	Is able to recognize in optical or electron microscope images the histological structures corresponding to organs, tissues, cells and cellular structures, describe	oral answer, written test, practical test, exam	MC



	and interpret these structures and the relationship between structure and function;		
A.U5.	Is able to use verbal and written anatomical, histological and embryological terminology.	oral answer, written test, practical test, exam	MC
* L- lecture; SE- seminar; AC- auditorium classes; MC- major classes (non-clinical); CC- clinical classes; LC- laboratory classes; CSC- classes in simulated conditions; PCP- practical classes with patient; FLC- foreign language course; PE- physical education; VP- vocational practice; DSS- directed self-study; EL- E-learning			
Student's amount of work (balance of ECTS points):			
Student's workload (class participation, activity, preparation, etc.)		Student Workload	
1. Number of hours of direct contact:		60	
2. Number of hours of distance learning:		10	
3. Number of hours of student's own work:		114	
4. Number of hours of directed self-study		n/a	
Total student's workload		184	
ECTS points for course		10,5	
Content of classes: (please enter topic words of specific classes divided into their didactic form and remember how it is translated to intended educational effects)			
Lectures (L)			
WINTER SEMESTER (10 hours)			
<ol style="list-style-type: none"> 1. Alimentary tract: liver and pancreas. (1 hour) 2. Endocrine system: the hypothalamus, pituitary gland, thyroid and parathyroid, adrenal, pancreas, ovary and testis, diffused neuroendocrine system. (1 hour) 3. Respiratory system: conductive and respiratory parts. (1 hour) 4. Urinary system: kidney, structure and function of the nephron – corpuscle and tubules. (1 hour) 5. Reproductive system male and female: ovary and uterus, testis and epididymis, hormonal control. (1 hour) 6. Nervous system: structure and function of neurons, glial tissue, central and peripheral nervous system. (1 hour) 7. The skin and mammary gland. (1 hour) 8. Sensory organs: eye and ear. (1 hour) 9. Recognition of histological sections I (repeat). (1 hour) 10. Recognition of histological sections II (repeat). (1 hour) 			
Seminars not applicable			
Classes			
<u>CLASSES (MC-30 hours) - WINTER SEMESTER – HISTOLOGY</u>			
<ol style="list-style-type: none"> 1. The digestive tract - digestive glands (presented slides: liver - H + E staining and injected liver - analysis of liver vascularization in relation to function; pancreas). (3 hours) 2. Endocrine system: hypothalamus, pituitary gland, thyroid and parathyroid glands, adrenal glands, pancreas, endocrine part, diffuse neuroendocrine system (presented slides: pituitary, thyroid, parathyroid glands, adrenal glands). (3 hours) 3. The respiratory system: conductive parts, respiratory part (presented slides: nasal cavity - respiratory and olfactory area, trachea, lung - bronchi and bronchiole). (3 hours) 4. Urinary system: kidney, structure and function of the nephron – corpuscle and tubules (presented slides: kidney - H + E staining and injected kidney - analysis of renal vascularization in relation to function, ureter, urinary bladder). (3 hours) 5. Male reproductive system: testicle, epididymis, vas deferens, prostate; hormonal regulation. (presented slides: testicle, epididymis, prostate gland, vas deferens. (3 hours) 			



6. Female reproductive system: ovaries, fallopian tubes, uterus, hormonal control - ovarian cycle and uterine cycle (presented slides: ovary, fallopian tube, uterus). (3 hours)
7. Nervous system: structure and function of neurons, glial tissue, central and peripheral nervous system (presented slides: spinal cord, ganglion, brain, cerebellum, nerve trunk). (2 hours)
8. Skin and mammary gland (presented slides: hairy skin - hair structure, sebaceous gland; hairless skin - epidermis structure; sweat glands, nerve endings; mammary gland) (3 hours)
9. Sensory organs: eye and ear (presented slides: eye - anterior part; eye posterior part - optic disc; eyelid, inner ear) (3 hours)
10. Recognition of histological specimens I (revision). (2 hours)
11. Recognition of histological specimens II (revision). Practical test. (2 hours)

CLASSES (MC - 30 hours) - WINTER SEMESTER – CYTOPHYSIOLOGY

1. Methods of studying the structure and function of cells, images of cell ultrastructure from an electron microscope (presented electronograms: nucleus, nucleolus, nuclear envelope, mitochondria, Golgi apparatus, rough endoplasmic reticulum, free ribosomes). (3 hours)
2. Organization and functioning of the cell nucleus. Genes and Genetic Engineering. (3 hours)
3. Biological membranes and transport across membranes (cell membrane, lipid bilayer, membrane proteins, glycocalyx, simple, facilitated, active, endocytosis, caveolae, multidrug resistance, membrane fusion). (2 hours)
4. Cell cycle and cell aging. (2 hours)
5. Types of cell death: apoptosis, autophagy, necrosis. (3 hours)
6. Cytoskeleton (microtubules, MAP, karyokinetic spindle, cilia and twigs, intermediate filaments, microfilaments, actin binding proteins, motor proteins, microvilli, cell cortex). (2 hours)
7. Selected cytoplasmic processes (addressing proteins in the cell, translocation of proteins to the endoplasmic reticulum, sorting proteins of membranous organelles, vesicular transport, chaperones, protein ubiquitination, peroxisomes, proteasomes). (3 hours)
8. Intercellular communication (receptor, ligand, agonist, antagonist, primary and secondary informant, methods of intercellular communication depending on the method of information dissemination and origin of the informant, G protein, protein kinases and phosphatases, types of synapses). (2 hours)
9. Adhesive molecules and intercellular substance (selectins, integrins, cadherins, immunoglobulin superfamily, collagen, elastin, fibrillin, fibronectin, laminin, structure of connective tissue intercellular substance, importance of adhesive molecules in physiology and pathology). (2 hours)
10. Basics of immune defense (antigen, acute phase proteins, cytokines, defensins, complement, NK cell, immune response cells, lysozyme, MHC, acquired response, innate response, antibody, TNF). (2 hours)
11. Endothelium (role of endothelial cells in angiogenesis, endothelial regeneration, dysfunction of endothelial cells in cardiovascular diseases, role of endothelium in neoplastic diseases - tumor angiogenesis, endothelium and inflammatory processes). (2 hours)
12. Carcinogenesis (basic disorders in a cancer cell, no immune defense against cancer, immune tolerance, clonal tumor growth, benign and malignant neoplasms, oncogenes, viral oncogenes, oncogen suppressor genes). (2 hours)
13. Repertory - test I / II term (2 hours)

Other not applicable

Basic literature (list according to importance, no more than 3 items)

1. Basic Histology. L. Carlos Junqueira, Jose Carneiro, Robert O. Kelly, 15-th edition, 2020.
2. Human Histology. Alan Stevens, James Lowe, 3-rd edition, 2004.



3. Exercise notebook for medicine and dentistry student (ed. MaciejZabel). Elsevier Urban & Partner, Wrocław 2010

Additional literature and other materials (no more than 3 items)

1. Histology and Cell Biology: An Introduction to Pathology. Abraham Kierszenbaum, 5th edition, 2019
2. Histology: a text and atlas. Michael H. Ross, Gordon I. Kaye, WojciechPawlina, 2019
3. Medical Cell Biology. Steven R. Goodman. 3-rd edition, 2020

Preliminary conditions: (minimum requirements to be met by the student before starting the course)

The student should be prepared for exercises according to the schedule provided at the beginning of the semester. The condition for continuing classes in the winter semester is passing the summer semester - passing the first year of studies.

Conditions to receive credit for the course: (specify the form and conditions of receiving credit for classes included in the course, admission terms to final theoretical or practical examination, its form and requirements to be met by the student to pass it and criteria for specific grades)

THE CONDITIONS TO RECEIVE CREDIT IN THE WINTER SEMESTER

The condition for completing the course in the winter semester is oral or written credit for individual exercises and:

1. **CHECKING PRACTICAL SKILLS** : 10 general slides, 5 targeted slides, 2 electronograms (maximum 17 points) - correct recognition of at least 7 general slides, 3 targeted slides and 1 electronogram (minimum 11 points - 7 + 3 + 1) must be passed. Failure to obtain the minimum number of points in a given category (general slide, targeted slide, electronogram) results in an unsatisfactory grade, despite obtaining a total sum of 11 points or more. The student takes the second term of the practical test.

2. **CYTOPHYZIOLOGY TEST**, form: written, 50 single-choice questions. There are 26 correct answers required to pass.

The final grade for completing the course in the winter semester is the result of the practical test.

The criteria for the individual assessments are presented in the table below.

Condition for admission to the theoretical final exam: passing the third semester.

Grade:	Criteria for courses ending with a grade in winter semester ³
Very Good (5.0)	Practical test – 17 pkt
Good Above (4.5)	Practical test – 16 pkt
Good (4.0)	Practical test – 15 pkt
Satisfactory Plus (3.5)	Practical test – 13-14 pkt
Satisfactory (3.0)	Practical test – 11-12 pkt
	Criteria for courses ending with a credit ³
Credit	not applicable
Grade:	Criteria for courses ending with a grade in summer semester ⁴
Very Good (5.0)	

³ The verification must cover all education results, which are realized in all forms of classes within the course

⁴ The verification must cover all education results, which are realized in all forms of classes within the course



Good Above (4.5)	
Good (4.0)	
Satisfactory Plus (3.5)	
Satisfactory (3.0)	
	Criteria for courses ending with a credit ³
Credit	not applicable

Grade:	Criteria for exam ³
	Exam form: test MCQ type A
Very Good (5.0)	minimum 88% correct answers
Good Above (4.5)	minimum 81% of correct answers
Good (4.0)	minimum 74% of correct answers
Satisfactory Plus (3.5)	minimum 67% of correct answers
Satisfactory (3.0)	minimum 60% of correct answers

Department in charge of the course:	Department of Histology and Embryology, Wrocław Medical University
Department address:	ul. Chalubinskiego 6a, 50-368 Wrocław
Telephone:	(71) 784-13-54(55), fax: (71) 784-00-82
E-Mail:	justyna.kosek@umed.wroc.pl
Department in charge of the course:	Department of Ultrastructural Research
Department address:	ul. Chalubinskiego 6a, 50-368 Wrocław
Telephone:	(71) 784-13-54(55), fax: (71) 784-00-82
E-Mail:	justyna.kosek@umed.wroc.pl

Person in charge for the course:	Marzenna Podhorska-Okolow MD, PhD, Prof.
Telephone:	71 784-13-54 (55)
E-Mail:	marzenna.podhorska-okolow@umed.wroc.pl

List of persons conducting specific classes:

Name and surname	Degree/scientific or professional title	Discipline	Performed profession	Form of classes
Marzenna Podhorska-Okolow	MD, PhD, Prof.	Medical science	Academic teacher	MC, L
Urszula Ciesielska	PhD	Medical science	Academic teacher	MC, L
Christopher Kobierzycki	MD, PhD	Medical science	Academic teacher	MC, L
Katarzyna Hacziewicz-Leśniak	PhD	Medical science	Academic teacher	MC, L
Karolina Jabłńska	PhD	Medical science	Academic teacher	MC, L
Mateusz Olbromski	PhD	Medical science	Academic teacher	MC, L

Date of Syllabus development

30.06.2021

Syllabus developed by

Urszula Ciesielska,
Karolina Jabłńska



Wrocław Medical University
Faculty of Medicine
Vice-Dean for Research Studies
Dean's signature
prof. Dr hab. Beata Cichocińska, PhD

Signature of Head(s) of teaching unit(s)
ZAKŁAD HISTORII I EMBRIOLOGII
prof. dr hab. Piotr Dzięgieł