



Syllabus 2017/2018														
Description of the course														
Module/Course	Immunohistochemistry and electron microscopy methods in evaluation of the morphology of various tissues and organs							Group of detailed education results						
								Group code	A, B, C					
Faculty	Medicine													
Major	medicine													
Specialties	not applicable													
Level of studies	Uniform magister studies X* 1 st degree studies <input type="checkbox"/> 2 nd degree studies <input type="checkbox"/> 3 rd degree studies <input type="checkbox"/> postgraduate studies <input type="checkbox"/>													
Form of studies	<input type="checkbox"/> full-time <input checked="" type="checkbox"/> part-time													
Year of studies	I-II					Semester		<input type="checkbox"/> Winter <input checked="" type="checkbox"/> Summer						
Type of course	<input type="checkbox"/> obligatory <input type="checkbox"/> limited choice <input checked="" type="checkbox"/> free choice / elective													
Course	<input checked="" type="checkbox"/> major <input type="checkbox"/> basic													
Language of instruction	<input type="checkbox"/> Polish <input checked="" type="checkbox"/> English <input type="checkbox"/> other													
* mark <input type="checkbox"/> with an X														
Number of hours														
Form of education														
Unit teaching the course	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)	Specialist Classes – magister studies (SCM)	Foreign language Course (FLC)	Physical Education obligatory (PE)	Vocational Practice (VP)	Self-Study (Student's own work)	E-learning (EL)
	Winter Semester													
Summer Semester														



						10													
TOTAL per year: 10																			

Educational objectives (max. 6 items)

- C1.** To familiarize students with major methods used in immunohistochemistry (IHC), which are routinely used in morphological examination and histopathological diagnosis and with the principle of transmission electron microscope (TEM) operation.
- C2.** To familiarize students with IHC reactions and their results showing the correct structure of cells and tissues, and tumor specific antigens applicable in the differential diagnosis of benign and malignant neoplasms.
- C3.** To familiarize students with the process of preparing biological material for IHC reactions and methods of evaluating their results.
- C4.** To familiarize students with the method of preparing research material for TEM and the possibilities of using this method in the evaluation of cells and tissues ultrastructure and in clinical diagnostics (the so called ultrastructural pathology).
- C5.** To familiarize students with typical ultrastructural images of normal and pathological cells.

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

Number of course education result	Number of major education result	Student who completes the module/course knows/is able to	Methods of verification of intended education results (forming and summarising)	Form of didactic class <i>**enter the abbreviation</i>
W 01	A. W4.	The student knows basic cellular structures and their functional specializations	Oral response	LC
W 02	B. W34.	The student knows the principles of scientific, observational and experimental research	Oral response	LC
W 03	B. W34.	The student knows the equipment of IHC and TEM laboratories and basic reagents	Oral response	LC
W 04	B. W34.	The student possesses the necessary knowledge of biological material preparation for the IHC reaction and TEM examination	Activity in the discussion	LC
W 05	C. W25.	The student operates fluently the pathological nomenclature	Activity in the discussion	LC
W 06	C. W30.	The student explains the basic issues in the field of detailed ultrastructural pathology of organs and microscopic images	Oral response	LC
U 01	A. U2.	The student recognizes the cellular structure in the electron	Oral response	LC



		microscope images, makes a description and interprets their structure and the relationship between the structure and function		
U 02	C. U8.	The student uses the antigen - antibody reaction in current modifications and techniques for the diagnosis of cancer	Presentation	LC
U 03	C. U8	Student is able to prepare biological material for research in TEM	Presentation	LC
U 04	C. U8	Student is able to make a basic assessment of the results of IHC reactions and images in TEM (electronograms)	Oral response	LC

** L - lecture; SE - seminar; AC – auditorium classes; MC – major classes (non-clinical); CC – clinical classes; LC – laboratory classes; SCM – specialist classes (magister studies); CSC – classes in simulated conditions; FLC – foreign language course; PCP practical classes with patient; PE – physical education (obligatory); VP – vocational practice; SS – self-study, EL – E-learning .

Please mark on scale 1-5 how the above effects place your classes in the following categories:

communication of knowledge, skills or forming attitudes:

Knowledge: 5

Skills: 3

Social competences: -

Student's amount of work (balance of ECTS points)

Student's workload (class participation, activity, preparation, etc.)	Student Workload (h)
1. Contact hours:	10
2. Student's own work (self-study):	3
Total student's workload	13
ECTS points for module/course	0.5
Comments	

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

not applicable

Seminars

not applicable

Laboratory classes (LC)

I Immunohistochemistry methods (IHC, 5 hours)

1. Markers used in immunohistochemical methods.

2. Preparation of material for the IHC reaction (tissue fixation, paraffin sections obtaining).

3. Antibodies - characteristics, production, detection.

4. Types and selection of immunohistochemical reactions with special methods (avidin-biotin system).

5. Examples of applied stainings, evaluation of reaction, methodological problems in IHC and their solutions.

6. Immunohistochemistry in the diagnosis and histogenesis of tumors (selection of chemical reactions, the role of immunohistochemistry in determining the origin of the tumor markers specific for certain



types of cancer, the importance of the results of immunohistochemistry in determining the prognostic and predictive factors of some cancers).

7. Performance of exemplary IHC reaction.

8. Evaluation of slides.

II Transmission electron microscopy (TEM, 5 hours)

1. The construction and principle of operation a transmission electron microscope.

2. Preparation of samples for study (obtaining, dual fixation method, dehydration and embedding material in the epoxy resin).

3. Performing semithin sections and staining them with toluidine blue.

4. Epon blocks trimming.

5. Demonstration of ultra-thin sections cutting with diamond knife.

6. Counterstaining, the principle of image formation in the TME.

7. Observation of selected cells in TME and discuss their ultrastructure, documentation design in the form of electronograms.

8. The ultrastructural basis of selected diseases.

Other:

not applicable

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

1. Junqueira's Basic Histology Text and Atlas. The McGraw-Hill Companies, 2016r.

2. B. Young, J. S. Lowe, A. Stevens, J. W. Heath. Wheater,s functional histology A text and Colour Atlas. Churchill Livingstone Elsevier, 2006r.

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

1. N. F. Cheville. Ultrastructural Pathology. The comparative cellular basis of disease. Wiley-Blackwell, 2009r.

2. A. M. Dworak, R. A. Monahan-Earley. Diagnostic Ultrastructural Pathology I. CRC Press, 1992r.

3. M. A. Hayat. Principles and techniques of Electron Microscopy Van Nostrand Reinhold Company, 1973r.

Didactic resources requirements (e.g. laboratory, multimedia projector, other...)

Laboratory, fume hood, Autostainer Link 48, optical microscope, transmission electron microscope Jeol JEM 1011, ultramicrotome, laboratory desks, laboratory glass, IHC and TEM reagents, seminar room, multimedia projector.

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

lack

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

The course ends with a credit (not a grade). Conditions for subject completion is the active participation in the discussion ending each class.

Grade:	Criteria (only for courses/modules ending with an examination)
Very Good (5.0)	
Good Plus (4.5)	



Good (4.0)	
Satisfactory Plus (3.5)	
Satisfactory (3.0)	

Name and address of module/course teaching unit, contact: telephone and e-mail address

Department of Histology and Embryology
Chałubińskiego 6a
50-368 Wrocław
Tel. +48 71 784 13 54
justyna.kosek@umed.wroc.pl

Coordinator / Person responsible for module/course, contact: telephone and e-mail address

Prof. dr hab. Marzenna Podhorska-Okolów, tel. 071 784 16 70,
marzenna.podhorska-okolow@umed.wroc.pl

Signature of person responsible for module

.....

List of persons conducting specific classes: full name, degree/scientific or professional title, discipline, performed profession, form of classes.

Paweł Surowiak (prof.) - laboratory classes
Katarzyna Haczkiwicz (PhD, assistant) - laboratory classes

Date of Syllabus development

08.03.2018r.

Syllabus developed by

Katarzyna Haczkiwicz

Signature of Faculty Dean

.....
Prof. Andrzej Hendrich, PhD

Uniwersytet Medyczny we Wrocławiu
Signature of Head of teaching unit
HISTOLOGII I EMBRIOLOGII
.....
Prof. dr hab. Piotr Dziegiel