

HISTOLOGY WITH LABORATORY TECHNIQUES	
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Study Programme	Undergraduate University Study of Medical Laboratory Diagnostics
Status of the course	mandatory
Year of study, semester	1 st year, 1 st semester
ECTS	9
Workload (hours)	Lectures: 45; Seminars: 15; Laboratory exercises: 45
Expected number of students	30-35
COURSE DESCRIPTION	
Course objectives	
Acquiring knowledge about the structure and properties of different types of tissue and their structural and functional joining into organs and organ systems. Acquiring knowledge about the preparation of tissue samples for investigation using different contemporary histological methods that are very important in medical diagnostics, and about the laboratory work with human tissues and essential protective measures.	
Enrolment requirements and entry competencies	
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Learning outcomes at the Programme level	
1.1, 1.2, 2.1, 2.2, 2.7, 3.1	
Learning outcomes at the course level	
After completing lectures, seminars and exercises, independent study and passing the exam, students will be able to:	
<ol style="list-style-type: none"> 1. choose the appropriate procedure for making histologic preparations with regard to the required morphological analysis of the tissues and organs. 2. ascertain the importance of histological technique knowledge for overcoming the medical problems in clinical practice successfully. 3. critically evaluate the quality of a histologic preparation and artifacts as well as possible issues with the interpretation of a histologic preparation. 4. compare different types of microscopy for studying cells and tissues and the specific issues with producing adequate preparations. 5. interpret histologic preparations of tissues and organs based on the properties of cells and extracellular matrix, their arrangement and spatial relations. 6. make conclusions about the functions of cells and tissues based on their histomorphological properties. 	
Course content	
Lectures: Introduction into histology and histology methods. Light microscopy histological techniques. Electron microscopy histological techniques. Cell structure. Types of tissue. Epithelial tissue. Structure and types of connective tissue. Cartilage and bone. Ossification. Nervous tissue. Muscle tissue. Vascular system. Blood cells. Immune system and lymphoid organs. Digestive system: basic structure of gastrointestinal tract, gastrointestinal tract mucosa. Glands associated with the digestive tract. Respiratory system structure. Skin and skin derivatives. Urinary system. Male reproductive system. Female reproductive system. Neuroendocrine system. The eye and the ear.	

Seminars: Histomorphological study methods. Epithelial tissue. Cells and extracellular matrix of the connective tissue. Nervous tissue and muscular tissue. The circulatory system. Lymphoid organs. Digestive system structure. Urinary and reproductive system. Knowledge repetition.

Exercises: Preparation, processing and staining of tissue for histological analysis, staining methods I. Preparation, processing of tissue for histological analysis, staining methods II. Preparation, processing of tissue for histological analysis, staining methods III. Keratinized and nonkeratinized stratified squamous epithelium, pseudostratified columnar epithelium with cilia and goblet cells, transitional epithelium. Irregular connective tissue, tendon, hyaline cartilage, decalcified bone. Spinal cord, cranial and spinal ganglion, peripheral nerve. Skeletal, smooth and cardiac muscular tissue. Blood vessels, blood smear. Lymph node, spleen, palatine tonsil. Esophagus, stomach, small intestine. Large intestine. Parotid gland, liver, pancreas. Trachea, lungs. Skin, mammary gland. Kidney, urinary bladder, testis, prostate. Ovary, fallopian tube, uterus, vagina. Pituitary gland, thyroid and adrenal gland The eye. The ear. Preparation repetition.

Mode of teaching

Lectures, seminars, exercises (independent tasks).

Student obligations

All types of classes are mandatory. Justified absence from 30% of classes is allowed. Missed exercise must be made up during the designated corrective term.

Monitoring student work (Connectivity of learning outcomes, teaching methods and grading)

Completing the exam: written, practical and oral part of the exam.

Teaching activity	ECTS	Learning outcome	Student activity	Assessment methods	Grade points	
					Min.	Max.
Attending classes	0.36		Attendance at classes	Keeping records	1	4
Seminars	2.16		Active participation in seminars and exercises, written evaluation	Keeping records of seminar activity, written evaluation score and exercise logs	12	24
Exercises	2.88				24	32
Final exam	1.35		Studying for the final exam	Written part	4	15
	0.9			Practical part	6	10
	1.35			Oral part	3	15
Total	9				50	100

Final exam

The student that completed all types of classes (a minimum of 70%) has qualified for signature and applying for the final exam. The final exam is mandatory and consists of the written, practical and oral part. The student needs to meet the minimal criteria for each part (written, practical, oral) to have the minimal conditions for grade points and passing the final exam.

The written part of the exam consists of 50 questions. Passed written part of the exam is valid for 12 months.

Evaluation of the written part of the final exam:

Percentage of correct answers (%)	Grade points
60.00-64.99	4
65.00-69.99	6
70.00-74.99	8
75.00-79.99	9
80.00-84.99	10
85.00-89.99	11
90.00-94.99	13
95.00-100	15

Practical part of the exam: the student receives 10 histological preparations which need to be independently analysed using a microscope, and the correct tissue or organ must be determined. Passed practical part of the exam is valid for 12 months.

Evaluation of the practical part of the exam:

6 grade points: 6 correctly determined preparations
7 grade points: 7 correctly determined preparations
8 grade points: 8 correctly determined preparations
9 grade points: 9 correctly determined preparations
10 grade points: 10 correctly determined preparations

The written part of the exam consists of (6) questions: 2 questions on general histology, 2 questions on special histology and 2 questions on histological techniques. The student “pulls” the question cards by himself/herself.

Evaluation of the oral part of the final exam:

3-6 grade points: the knowledge meets the minimal criteria
7-9 grade points: average knowledge with noticeable mistakes
10-12 grade points: very good knowledge with minor mistakes
13-15 grade points: excellent knowledge

Calculation of final grade:

The points granted for the final exam are added to the grade points awarded during class attendance. The grading process is conducted by absolute distribution, i.e., based on total achievements, and compared to the numerical system in the following manner:
A – Excellent (5): 80-100 grade points; B – Very Good (4): 70-79.99 grade points; C – Good (3): 60-69.99 grade points; D – sufficient (2): 50-59.99 grade points.

Required reading (available in the library and through other media)

Title	Number of copies in the library	Availability through other media
Junqueira LC, Carneiro J: Osnove histologije, udžbenik i atlas prema 10. američkom izdanju. Školska knjiga, Zagreb, 2005.	12	
Durst-Živković B: Praktikum iz histologije, IV. prerađeno izdanje, Školska knjiga, Zagreb, 1998.	5	

Additional reading

1. Sobotta J, Welsh U: Histološki atlas, Naklada Slap, Zagreb, 2004.
2. Bradmante, Ž., Švajger, A.: Slike histoloških preparata (I. i II. dio), Kaligraf, Zagreb, 2002
3. Suvarna SK, Layton C, Bancroft JD. : Bancroft's Theory and Practice of Histological Techniques, Churchill Livingstone; 7th edition, 2012).

Course evaluation procedures

Anonymous, quantitative, standardised student survey on the course and the teacher's work implemented by the Quality improvement office of the Faculty of Medicine Osijek.