

SYLLABUS

1. Studies program data

1.1 University	"VICTOR BABES" UNIVERSITY OF MEDICINE AND PHARMACY TIMISOARA
1.2 Faculty	FACULTY OF MEDICINE
1.3 Department	II – Microscopic morphology
1.4 Studies area..... ¹⁾	License
1.5 Cycle of studies ²⁾	License
1.6 Studies program	Dental Medicine in English

2. Discipline data

2.1 Subject name	Histology							
2.2 Lecture activity tutor/holder	Cîmpean Anca Maria, MD, PhD, Professor							
2.3 Practice activity tutors/holders	Sârbo Simona, MD, PhD, Senior lecturer Ceașu Amalia Raluca, MD, PhD, Assoc. Prof. Comșa Serban, MD, PhD, Senior lecturer Jitariu Andreea Adriana, Assist							
2.4 Year of study	I	2.5 Semester	II	2.6 Assessment type	Exam	2.7 Type of Discipline	Content ³⁾	DF
							Compulsory ⁴⁾	DI

3. Estimated total time (hours per semester of teaching activities)

3.1 Number of hours per week	5	3.2 from which: lecture	3	3.3 laboratory	2
3.4 Total hours of the curriculum	70 (5 X 14/ IInd Semester)	3.5 from which: lecture	42 (3X14/ II nd Semester)	3.6 laboratory	28 (2X14/ II nd Semester)
Distribution of time					hours
Study after manual, lecture material, references and notes					40
Additional documentation in the library, on the specialized electronic platforms and on the field					10
Training seminars / practice / projects, themes, papers, portfolios and essays					54
Tutoring					-
Exams					6
Other activities					-
3.7 Total hours of individual study	104				
3.8 Total hours per semester	180				
3.9 Number of credits¹⁾	6				

4. Prerequisite

4.1 of curriculum	Celular biology, Anatomy
4.2 of competences	Not the case

5. Conditions

5.1 lecture	<ul style="list-style-type: none"> Mobile phones will be closed during classes, conversations are not tolerated during lecture, neither leaving the classroom to retrieve personal phone calls. It is forbidden the use of phones to film, register or taking photos during lectures. The students' delay in the lecture will not be tolerated as it is proven disruptive to the educational process; The attendance at the lecture is compulsory, 75% of the lecture.
5.2 laboratory/practical work	<ul style="list-style-type: none"> Mobile phones will be closed during the practice, are not tolerated telephone conversations during the practice, nor students leaving the room. It is forbidden the use of phones to film, register or taking photos during practical work. The students' delay will not be tolerated as it proves disruptive to the educational process; The attendance at the lecture is compulsory, 85% of the practical work. Recovery of absences is allowed in those weeks that are specially allocated for recovery (except for medical cases that will require individual approval of the Dean). The practical exam will be held in the last week of the semester or in the ordinary session, from the topic of the practical works / laboratories displayed in advance.

6. Specific skills

Professional Skills	<ol style="list-style-type: none"> 1. Histology terms and basic notions, general principles of histologic technique. 2. The ability to identify morphologic, histochemical, immunohistochemical and cytologic stainings. 3. Microscopic criteria for tissue and organ diagnosis through microscopic examination of the provided specimens and the usage of specific protocols for each laboratory. 4. General criteria for the microscopic structure of the dental organ and its implications in pathology through the microscopic examination of dental structures and the use of specific protocols for each laboratory. 5. Diagnostic skills for interpreting the histopathologic result. 6. Application of accumulated skills as the principal basis to promote the histology exam
Transversal Skills	<ol style="list-style-type: none"> 1. Interest for professional development by engaging critical thinking skills demonstrated through active participation in the lecture and practical work/laboratory; 2. Involvement in scientific research activities by participating in the elaboration of papers, studies, specialized articles; 3. Effective use of information sources and communication resources and assisted training (Internet portals, specialized software applications, databases, on-line courses, etc.) in an international language.

7. Discipline objectives(based on the specific competences)

7.1 General objective of Discipline	Accumulation and understading of theoretical notions regarding the general structure of the cell, tissues and organs. Accumulation and understading of theoretical notions regarding the general structure of the dental organ (specific and supporting tissues).
7.2 Specific objectives	Proccesing, staining and interpretation methods for bipsies. Recognition of normal cell and tissue structure. Fundamental types of tissues. Tissue and organ histology. Organ diagnostic criteria and the pathological implications of normal structures. General criteria for the identification of the microscopic structure of the dental organ and its supporting tissues and the pathological implications of normal structures.

8. Contents

8.1 Lecture	Teaching methods	No. of hours	Notifications
<ol style="list-style-type: none"> 1. Histochemical methods, cytology and immunohistochemistry. Electron microscopy. General organization of the cell. General criteria for recognition of the tissues. Definition and histogenesis of epithelial tissues. General characters and classification of epithelia. Classification of covering epithelia. Morphofunctional correlations in covering epithelia. Basement membrane: morphology and function. Junctions between epithelial cells. Differentiations of epithelial cell membrane. General characteristics of glandular epithelium. Classification of exocrine glands. Exocrine glandular cell types. Forms of organization of the endocrine glandular epithelium. Epithelial regeneration. Morphological features of secretory epithelial cells. General biology of the epithelium. Epithelial immunity: humoral and cellular immunity. Transition from normal epithelium to malignant tumors. 	INTERACTIVE PRESENTATION	3	<ul style="list-style-type: none"> • Interactive presentation of the teaching material, using multimedia, PowerPoint presentations. • Lectures for students is reviewed and updated with the latest information according to the international database. • Each lecture initially presents the eduacational objectives and ends with a brief presentation of the gaigned notions.
<ol style="list-style-type: none"> 2. Connective tissue: Definition, general characters, classification and histogenesis. Stem cell. Fixed cells of the connective tissue: mesenchymal reticular fibroblasts, fibrocyte, myofibroblast, mast cell, adipose cell, pericyte. Mobile cells of connective tissue macrophage, lymphocyte, plasma cell, monocyte, neutrophilic and eosinophilic granulocyte. Ground substance. Connective tissue fibers: collagen, reticulin, elastic and oxytalanic. Fibrillogenesis. Connective tissue types. Mesenchymal tissue. Loose connective tissue. Ordered and disordered dense connective tissues. Seromembranos tissue (serous membranes). Reticular connective tissue. Mucous tissue. Implications of connective tissue in degenerative diseases and allergies. Cartilaginous tissues. Definition, general character and histogenesis. Hyaline, elastic and fibrous 		3	

<p>cartilage. Cartilaginous tissue cells. Cartilaginous tissue matrix. Cartilage growth. Nutrition cartilage and cartilage canals. Cartilage repair, and replacement with bone calcification.</p> <p>Bone tissue. Definition, general characters and classification. Bone cells: osteoprogenitor, osteoblasts, osteoclasts, and osteocytes. Bone extracellular matrix. The general structure of the bone. Types of bone. Bone as an organ. Endomembranous osteogenesis and chondroid tissue. Endochondral osteogenesis. Bone growth in length. Bone remodeling. Fracture repair. Histology of joints.</p>			
<p>3. Muscle tissues. Definition, general characters, histogenesis and classification. Striated skeletal muscle. Miofilaments and myofibrils. Types of muscle fibers. Contraction mechanism. Motor innervation of striated skeletal muscle. Sensory innervation. Cardiac striated muscle tissue. Nodal tissue. Smooth muscle. The contraction in smooth muscle. Injury, repair and regeneration of muscle tissue.</p>		3	
<p>4. Organization of the central nervous system. Nervous system and tissue. Components and general properties. Phylogenesis, embryogenesis and histogenesis. Neural stem cell. Neuron. Classification and types of neurons. Neuron body, dendrites and axon. Axonal transport system. Synapses. Synaptic transmission. Neuromediators. Supporting cells. Astrocytes. Oligodendrocytes. Microglia. Ependymal cells, choroid plexus and cerebrospinal fluid. Gray matter and white matter. Brain nuclei. Cortex. Cerebellum. Spinal cord. Connective sheaths of the CNS.</p>		3	
<p>5. Organization of the peripheral nervous system. Schwann cells and the myelin sheath. Satellite cells. Nervous ganglia. Nerve fibers. Connective tissue components of peripheral nerve. Sensitive receptors. The autonomic nervous system. Cellular bases of learning and memorizing. Neuron response to injury and nerve regeneration.</p>		3	
<p>6. Blood. Definition, components and general functions. Blood plasma. Blood counts: erythrocyte, platelets, neutrophil granulocyte, eosinophilic granulocyte, basophilic granulocyte, lymphocyte, plasma cell, monocyte. Leukocytes. Practical applications of blood cytology. Hematopoiesis. Definition and general characters. Major stages of hematopoiesis. Intrauterine hematopoiesis. Postnatal hematopoiesis. Regulation of hematopoiesis. Criteria for recognition of microscopic blood counts and bone marrow.</p> <p>Hematolymphopoietic organs. General characters. Myeloid tissue and bone marrow. Lymphoid tissue types. Lymphoid follicle. Histophysiology of the thymus and immunity. Lymph nodes - structure and histophysiology. Spleen - structure and functions. Tonsils. Mucosa associated lymphoid tissue. Value of histologic diagnosis in lymphoid tissue lesions (extra-curriculum).</p>		3	
<p>7. Mouth: embryological development. General organization. Oral mucosa and submucosa. Oral epithelium. Histological structure of the cheeks. Palate and uvula. Floor of mouth. Chievitz's body. Lips. Language. Lingual papillae. Taste buds.</p> <p>Major salivary glands: embryological development. Histological structure. Particular characters. Minor salivary glands. Saliva.</p>		3	
<p>8. Dental organ development: tooth development stages. Description of the enamel organ. Structure of the dental bud and dental papilla. Supporting tissue development. Cementogenesis. Hertwig root sheath degeneration.</p>		3	

Periodontal ligament formation. Alveolar bone formation. Dentogingival junction development. Tooth eruption.			
9. General organization of differentiated tooth: anatomical landmarks. Histological structure and organization of the dental pulp. Odontoblasts. Dentine structure. Types of dentin. Dentinogenesis. Enamel structure. Ameloblasts. Amelogenesis.		3	
10. Histological structure of the differentiated tooth supporting tissues. Cement. Gums. Junctional epithelium morpho-functional features. Periodontal ligament. Alveolar bone.		3	
11. The overall structure of the digestive tract. Oropharynx histology. Structure of the esophagus. Stomach: general structure, gastric glands. Morphology of gastric epithelial cells. Regional peculiarities of the stomach structure. Small intestine: general structure, differences involved in absorption and secretion, intestinal epithelial cells, regional features. Colon: structure and function. Vermiform appendix. Rectum and anal canal. Liver: lobular and acinar architecture. Portal spaces. Hepatocytes, sinusoidal and perisinusoidal cells. Microscopic vasculature. Bile. Histophysiology of the liver. Extrahepatic bile: liver ducts, bile duct, ampulla of Vater, gallbladder. Pancreas: general organization. Exocrine pancreas: acini, ducts and histophysiology. Endocrine pancreas: compact island component, diffuse and extrainsular component.		3	
12. General organization of the cardiovascular system. Histogenesis and angiogenesis. Endothelial cell. General organization of blood vessels. Histology of arteries, veins, capillaries. Histology of the heart. The structure of the lymphatic vascular system. Special vascular structures. Organization and development of respiratory system. Nasal cavities epithelium. Paranasal sinuses. Nasopharynx. Larynx. Trachea. Bronchial tree. Pulmonary alveoli. Inter-alveolar septa and pulmonary stroma. Microscopic fundamentals of gas exchange. Microscopic lung vascularization and innervation. Pleura.		3	
13. Microscopic organization and development of the urinary system. Kidney: general morphology. Nephron: tubular system renal corpuscles. Mesangial. Juxtaglomerular apparatus. Proximal tubule, intermediate segment, distal and collector tubes. Renal interstitium. Microscopic kidney vasculature. Non-renal urinary tract: calyces, renal pelvis, ureters, bladder and urethra (male and female). General organization of the endocrine system. Hormone secretion and receptor specificities. Pituitary: general organization, structure and cells of the adenohypophysis. Neurohypophysis. Pituitary portal system. Epiphysis: structure and histophysiology. Thyroid: parenchyma and stroma. Thyroid follicle, functional forms. Cells "C". Thyroid stroma. Thyroid hormones. Parathyroid: structure and function. Adrenal glands: adrenal and medulla. Adrenal cells and specific hormones. Paraganglia. Islands of endocrine cells. Diffuse neuroendocrine system.		3	
14. Organization and differentiation of female genital system. Female Gonad: general structure. Follicles - functional forms. Ovulation and fertilization. Follicular atresia. Ovarian stroma. Vascularization and innervation. Organization and development of male genitalia. Male gonads. Seminiferous tubules. Seminal line cells. Sertoli cell. Interstitial gland. Microscopic vascularization and innervation of the testicle. Intratesticular genital tract: efferent ducts and rete testis. General organization of the skin. Functions. Epidermis.		3	

<p>Keratinization process. Non-epithelial cells of the epidermis. Dermis: structure and functions. Annexes of the skin: hair follicles, sebaceous and sweat glands. General organization of the sense organs. Olfactory mucosa.</p>			
<p>Mandatory references:</p> <ol style="list-style-type: none"> 1. Avery JK, Oral Development and Histology. Third edition, Thieme, 2001. 2. Nanci Antonio - Ten Cate's Oral Histology, Development, structure and function. 8 th edition The CV Mosby Company, ST Louis- Baltimore-Toronto. 3. Fundamentals of Oral Histology and Physiology, First Edition. Arthur R. Hand and Marion E. Frank. Inc. Published 2014 by John Wiley & Sons 4. Basic Histology – Junqueira LC, Carneiro J, Lange Med Publ, 2013. 5. Histology – a textbook and atlas. Ross M, Pawlina W, Williams & Wilkins, 2011. 6. A textbook of histology. Fawcett DW, Chapman Hill, 1998 7. Essential histology. Cormack DH, Lippincott, 2001 <p>Optional references:</p> <ol style="list-style-type: none"> 1. Puşa Nela Gaje, Anca Maria Cîmpean, Raluca Amalia Balica, Cristian Suci: Histologie orală: dezvoltare, structură, funcție, Editura Mirton Mirton, Timișoara, 2014, ISBN 978-973-52-1484-2 2. Pusa Gaje, Marius Raica, Ovidiu Mederle: Histologie orală. Ce trebuie să știe studentul de Anul I în Medicină Dentară, Litografia UMF, Timișoara, 2010. 3. Raica M, Mederle O: Histologia cavității bucale. Editura Mirton, Timișoara, 2001. 4. Alexa A, Baderca F, Lighezan R, Raica M: Histologia țesuturilor, Editura Mirton, 2012 5. Raica M, Cărunțu ID, Cîmpean AM, Suci C: Histologia organelor, LITO UMF, 2009 6. M Raica, O Mederle, ID Caruntu, AM Chindriș: Histologie teoretică și practică, Ed Brumar, 2004. 7. M Raica, A Alexa, M Iacovliev, R Lighezan,: Histologie generală Ed Mirton, Timișoara, 1998 			
8.2 Practical work / laboratory	Teaching-learning methods	No. of hours	Notifications
<p>1. Microscope. Optical and virtual microscopy. Microscopic technique. Histochemical and immunohistochemical methods. Cell. General criteria for recognition of tissue. Stains: <i>HE, PAS, toluidine blue, anti-actin</i>. Covering epithelia: simple, stratified and pseudostratified. Basal membrane. Stains: <i>HE, Silver staining, PAS, pan-cytokeratine</i>. Exocrine glandular epithelium: types of acini and tubular glands. Endocrine glandular epithelia: nests, follicles cords. Stains: <i>HE, PAS, Alcian blue, cytokeratin 8</i>.</p>	INTERACTIVE PRESENTATION	2	<ul style="list-style-type: none"> • The oral presentation is supported by images in the teleconsultation system by means of virtual specimens loaded in the discipline server. • Staining methods and techniques for histological specimens. • Evaluation of accumulated skills during laboratory lectures through the introduction of a 10 minutes test at the end of the sessions.
<p>2. Connective cells fixed and mobile. Connective fibers. Stains: <i>HE, Alcian blue, trichrome, orcein, silver staining</i>. Connective tissue types. Loose connective tissue. Disordered and ordered dense connective tissues. Adipose tissue. Reticular connective tissue. Seromembranous tissue (mesentery). Stains: <i>HE, silver staining</i>. Cartilage: hyaline, elastic and fibrous. Stains: <i>HE, trichrome, toluidine blue</i>. Bone: bone types, haversian systems. Stains: <i>HE, orcein, trichrome, alizarin, Evans blue</i>. Bone cells. Endomembranous and endochondral ossification. Bone growth in length. Stains: <i>HE, trichrome</i>.</p>		2	
<p>3. Muscle tissues. Striated skeletal muscle. Motor end plate. Cardiac striated muscle tissue. Nodal tissue. Smooth muscle. Stains: <i>HE, Heidenhein, trichrome, silver staining, anti-desmin</i>.</p>		2	
<p>4. Nervous tissue. Neurons and supporting cells. Stains: <i>HE, toluidine blue, silver staining neuron specific enolase, glial fibril acidic protein</i>. Nervous system. Cerebral cortex. Cerebellum. Spinal cord. Nervous ganglia. Nerve fibers. Stains: <i>HE, silver staining, osmium tetroxide</i>.</p>		2	
<p>5. Blood. Blood smear. Recognition of blood elements. Leukocyte counts. Hematolymphopoietic organs. Bone marrow and the general appearance of normal myelogram. Lymphoid tissue types. Stains: <i>HE, May Grunwald Giemsa, silver staining</i>. Thymus. Spleen, lymph nodes. Tonsils. Stains:</p>		2	

<i>HE, trichrome, silver staining, leukocyte common antigen.</i>			
6. Oral cavity: Oral mucosa and submucosa. Lips. Tongue. Stains: <i>HE, trichrome, silver staining, cytokeratin</i> . Major salivary glands: parotid, sublingual, submandibular. Stains: <i>HE, trichrome, toluidine blue, anti-actin</i> .		2	
7. Dental organ development: stages of tooth development: bud, cap, bell, apposition. Stains: <i>HE, trichrome</i> .		2	
8. Histological structure of differentiated teeth: dental pulp, odontoblasts, dentin. Stains: <i>HE, trichrome</i> . Enamel structure, ameloblasts. Stains: <i>HE, trichrome, dried and polished tooth preparations</i> .		2	
9. Histological structure supporting tissues: Cementum, gums, periodontal ligament and alveolar bone. Stains: <i>HE, trichrome, BPT, toluidine blue</i> .		2	
10. Digestive tract 1: pharynx, esophagus, stomach (cardia, background, antrum) eso-gastric junction. Stains: <i>HE, modified Giemsa, trichrome, PAS, anti-gastrin, anti-somatostatin</i> . Digestive tract 2: small intestine (duodenum, jejunum, ileum), colon, appendix, rectum. Stains: <i>HE, trichrome, PAS, mucicarmine</i> . Digestive glands, liver and gallbladder, pancreas. Stains: <i>HE, trichrome, Shikata orcein method, reticulin, PAS, neuron specific enolase, anti-somatostatin</i> .		2	
11. Cardiovascular system: arteries, veins, lymph vessels, heart with excitoconductor system. Particular forms of blood vessels. Stains: <i>HE, Masson trichrome, orcein, von Willebrand factor</i> . Respiratory system: respiratory epithelium, lung. Stains: <i>HE, Masson trichrome, orcein, silver staining</i> . Urinary system: kidneys. Stains: <i>HE, trichrome, PAS, reticulin, electron microscopy</i> . Endocrine glands. Hypophysis, parathyroid. Stains: <i>HE, trichrome, anti-calcitonin, silver staining</i> . Endocrine glands: thyroid, adrenal. Stains: <i>HE, trichrome, toluidine blue, silver staining, PAS, anti-calcitonin, anti-chromogranin A</i> .		2	
12. Female genital system 1: ovary. Stains: <i>HE, trichrome</i> . Stains: <i>HE, tannin-polychrome blue, trichrome</i> . Male genital system: testis. Stains: <i>HE, trichrome, anti-prostate-specific antigen, anti-chromogranin A</i> . Skin and sense organs: Haired and hairless skin, related structures, eye, inner ear. Stains: <i>HE, trichrome, orcein, cytokeratin, vimentin</i> .		2	
13. Rehearsals and recuperation.		2	
14. Practical exam.		2	
Mandatory references: <ol style="list-style-type: none"> 1. Practical work protocols 2. PowerPoint presentations practical work. 3. A Histology Atlas for students made by students: our challenging experience: Erik Jan Dijkstra, Andreas Zoric, Andreas Salagean Optional references: <ol style="list-style-type: none"> 1. Color atlas of histology. Gartner LP, Hiatt JL, Williams and Wilkins, 2014 2. Color Atlas of Histology – Gartner LP, Hiatt JL, Williams&Wilkins, 2018. 			

9. Correlations between the discipline content and the expectations of epistemic community representatives, professional associations and representative employers from the field afferent to the program.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Methods of assessment	10.3 Percent of the final grade
10.4 Lecture	- <i>basic knowledge to obtain 5-</i> minimum 50% out of maximum score. (laboratory book + protocols) - <i>advanced knowledge to obtain a mark</i> <i>between 6 and 10</i> —between 60-100% out of maximum score. (lecture+ references)	<i>Continuous assessment:</i> <i>Final assessment:</i> Final exam with 50 multiple choice questions.	10% 50%
10.5 Practical exam	- <i>basic knowledge to obtain 5-</i> minimum 50% out of maximum score. Staining recognition, tissue/organ diagnosis criteria of microscopic recognition of minimum 2 slides - <i>advanced knowledge to obtain a</i> <i>mark between 6 and 10</i> - between 60- 100% out of maximum score. Staining recognition, tissue/organ diagnosis criteria of microscopic recognition of all 4 slides	<i>Final assessment:</i> practical exam 4 slides with attached text. Evaluation criteria 2nd Semester: staining recognition-0.25p; organ diagnosis:0.75p; criteria of diagnosis: 1.5p;	40%
10.6 Minimum performance standard			

Date 20.10.2018	Lecture holders signature Cîmpean Anca Maria , MD, PhD, Professor	Practice activity holder signature Sârb Simona , MD, PhD, Senior lecturer..... Ceașu Amalia Raluca , MD, PhD, Assoc. Prof..... Comșa Serban , MD, PhD, Senior lecturer..... Jitariu Andreea Adriana , Assist.....
Head of Discipline signature Raica Marius , MD, PhD, Professor		
Date of approval in the Department	Head of Department signature Doina Mioara Verdeș , MD, PhD, Professor	

Notă:

- 1) Domeniul de studii - *se alege una din variantele:* Licență/ Masterat/ Doctorat (se completează conform cu Nomenclatorul domeniilor și al specializărilor/ programelor de studii universitare în vigoare) ;
- 2) Ciclul de studii - *se alege una din variantele:* Licență/ Master/ Doctorat;
- 3) Regimul disciplinei (conținut) - *se alege una din variantele:* **DF** (disciplină fundamentală)/ **DD** (disciplină din domeniu)/ **DS** (disciplină de specialitate)/ **DC** (disciplină complementară) - *pentru nivelul de licență;* **DAP** (disciplină de aprofundare)/ **DSI** (disciplină de sinteză)/ **DCA** (disciplină de cunoaștere avansată) - *pentru nivelul de masterat;*
- 4) Regimul disciplinei (obligativitate) - *se alege una din variantele:* **DI** (disciplină obligatorie)/ **DO** (disciplină opțională)/ **DFac** (disciplină facultativă);
- 5) Un credit este echivalent cu 25 – 30 de ore de studiu (activități didactice și studiu individual).
- 6) Pentru specializările și/sau disciplinele a căror tematică se regăsește în bibliografia de rezidențiat, aceasta devine obligatorie.