

<b>Study program:</b> Integrated Academic Studies in Dental Medicine
<b>Course title:</b> Histology and Embryology
<b>Teacher:</b> Dušan M. Lalošević, Matilda A. Đolaj, Ivan Đ. Čapo, Bojana M. Andrejić Višnjić, Aleksandra M. Fejsa Levakov, Jelena R. Ilić Sabo, Jelena P. Amidžić, Dejan M. Miljković, Milan J. Popović
<b>Course status:</b> compulsory
<b>ECTS Credits:</b> 8
<b>Condition:</b> -
<p><b>Course aim:</b> Acquiring knowledge in cytology and tissue histology, as well as histological properties of all organ systems. Analysis of teeth structure and supporting and surrounding tissues and organs, including oral cavity, gums, periodontium, alveolar bone, temporomandibular joint, salivary glands and tonsils. Students should understand embryonic development, and acquire knowledge and skills necessary to distinguish specific phases in human embryonic and fetal development, histological structure of fetal organs with detailed knowledge on development of head and neck region of significance in dental medicine.</p>
<p><b>Expected outcome of the course:</b>  <b>Knowledge:</b> Student needs to be able to: 1. specify ultrastructural, morphological and functional properties of the cell and organelles; 2. differentiate of all basic types of tissues, their morphological characteristics, location and function 3. morphological characteristics of organs in all organ systems, 4. recognize and differentiate histological features of developing organs in head and neck region, relevant for dental medicine; 5. Interpret morphological features of pre-embryonic, embryonic and fetal human development 6. differentiate morphological features of development of teeth, face, oral cavity, tonsils and salivary glands, 7. morphological basis of disorders in development of specific organs and organ systems.  <b>Skills:</b> Student will become capable to: 1. distinguish 4 basic types and all subtypes of tissues under light microscope 2. distinguish all organs presented in theoretical and practical classes, point to their elements relevant for structure and for differentiating them from other organs 3. describe and recognize in histological slides all histological structures of placenta, umbilical cord and of developing organs including teeth and fetal jaw as seen under light microscope.</p>
<p><b>Course description</b>  <i>Theoretical education</i></p> <ol style="list-style-type: none"> <li>1. Histological characteristics of epithelial, connective, muscle and nervous tissue, subtypes, structure, function and localization in the body.</li> <li>2. Fertilization, umbilical cord and placenta, pre-embryonic development, germ layers - ectoderm, mesoderm and endoderm and their further differentiation, embryonic and fetal development of tissues, folding of the embryo and formation of the primitive gut, formation of the head and neck, development of the digestive, respiratory, circulatory system, lymph organs, development of nervous, sensory and endocrine system, reproductive system, urinary system and skeleton. Malformations in the process of development, macroscopical and microscopical characteristics.</li> <li>3. Embryonic development and histological properties of head and neck region, development of face, oral cavity, teeth with eruption process, salivary glands, tonsils and temporomandibular joint.</li> <li>4. Development and histological structure of enamel, dentin, cement, pulp and periodontium.</li> <li>5. Histological structure of organs of the circulatory and immune system, digestive system and glands of digestive system, respiratory system, urinary system, male and female reproductive system, endocrine and nervous system, sense organs, integumentary system, bone and joints.</li> </ol> <p><i>Practical education</i></p> <ol style="list-style-type: none"> <li>1. Epithelial tissue, covering, glandular and sensory epithelium, simple and stratified epithelium, connective tissues with liquid, viscous and solid matrix, muscle and nerve tissue.</li> <li>2. Histological structure of the heart, arteries, capillaries, veins, thymus, lymph nodes, spleen, tonsils, mouth, pharynx, esophagus, stomach, small and large intestine, liver, gall bladder and pancreas, trachea, lungs, kidneys and urinary pathways, ovaries, fallopian tubes, uterus, breast, testes and extra testicular pathways, glands of the male reproductive system, pituitary and pineal gland, thyroid and parathyroid glands, adrenal glands, organs of the central and peripheral nervous system, organs of sense of sight, hearing, taste and smell, skin and derivatives of skin.</li> <li>3. Histological structure of embryonic and fetal tissues and organs: umbilical cord, placenta, development of epithelial, connective, muscle and nervous tissue, development of skeleton, ossification, fetal liver, pancreas, lungs, kidneys, ovaries, testes.</li> </ol>

4. Histological structure of jaw development, jaw ossification, supporting tooth apparatus, growth and development of permanent and milk teeth, tooth emergence.

**Literature**

*Compulsory*

1. Ross M, Kaye G, Pawlina W. Histology: A Text and Atlas. 8th ed. Wolters Kluwer Health; 2019. 928p.
2. Sadler TW. Langman's Medical Embryology. 14th ed. LWW Lippincott Williams and Wilkins; 2018. 456p.

*Additional*

1. Junqueira LC, Carneiro J (edited by Mescher AL). Junqueiras Basic Histology: Text and Atlas. 15th ed. The McGraw-Hill Companies; 2018. 480p.

(For the purposes of learning histology, older editions of the aforementioned literature are also appropriate.)

<b>Number of active classes</b>	<b>Theoretical classes: 60</b>	<b>Practical classes: 45</b>
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**Teaching methods:**

Lectures and Practice

**Student activity assessment (maximally 100 points)**

Pre-exam activities	Points	Final exam	points
Lectures	10	Practical	10
Practices	20	Written	
Colloquium	5	Oral	50
Essay	5		