

<b>Study program:</b> Integrated academic studies in medicine			
<b>Type and level of the study program:</b> integrated academic studies			
<b>Course title: Histology and embryology (M1-HI/EM)</b>			
<b>Teacher:</b> Dušan M. Lalošević, Matilda A. Đolai, Ivan Đ. Čapo, Bojana M. Andrejić Višnjić, Aleksandra M. Levakov Fejsa			
<b>Course status:</b> compulsory			
<b>ECTS Credits:</b> 12			
<b>Condition:</b> -			
<b>Course aim:</b> Acquiring knowledge and skills necessary to 1. recognize and distinguish specific tissues and organs including their ultrastructural characteristics, and recognize structures deviating from normal morphological characteristics of tissues and organs, 2. distinguish specific phases in human embryonal and fetal development, describe basic disorders of particular organs and organ systems.			
<b>Expected outcome of the course:</b>			
<b>Knowledge:</b> Student needs to be able to specify 1. ultrastructural cell characteristics, morphological characteristics of organelles as well as their functions, ultrastructural characteristics of specific cell types with regard to their function 2. types of tissues, their morphological characteristics, location and function 3. morphological characteristics of all organs in particular organ systems with their basic functions 4. morphological features of preembryonal, embryonal and fetal human development 5. histological elements associated with particular developing organs relevant to assessment of fetal age 6. morphological basis of disorders in development of specific organs and organ systems			
<b>Skills:</b> Student needs to become capable to 1. recognize all cell organelles in electron microscope photographs and register changes inconsistent with normal cells 2. under light microscope distinguish 4 basic types and all subtypes of tissues and register changes inconsistent with normal tissues 3. distinguish under light microscope all organs covered in practical classes, point to their elements relevant for structure and for differentiating them from other organs and to recognize changes inconsistent with normal structure 4. describe and recognize in graphic representations and photographs specific phases of intrauterine fetal development 5. make an assessment of approximate fetal age based on histological structure of developing organs as seen under light microscope 6. recognize basic disorders in development of particular organs and organ systems when seen in graphic representations, drawings and photographs.			
<b>Course description</b>			
<i>Theoretical education</i>			
1. Ultrastructural characteristics of the cell: cell membrane, cytoplasm, nucleus, cytoskeleton, membrane bound and non membrane bound organelles, cytoplasmic inclusions, cell cycle, cell division and cell renewal, cell death, apoptosis.			
2. Histological characteristics of epithelial, connective, muscle and nervous tissue, subtypes, structure and function.			
3. 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.			
4. Fertilization, umbilical cord and placenta, preembryonal development, germ layers - ectoderm, mesoderm and endoderm and their further differentiation, embryonal 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 and importance for the survival			
<i>Practical education: exercises, other forms of education, research related activities</i>			
1. The cell and cellular organelles at the level of electron microscope – microphotographies			
2. Epithelial tissue, covering, glandular and sensory epithelia, simple, stratified and pseudostratified epithelia, connective tissues with fluid, viscous and hard matrix			
3. Histological structure of the: heart, arteries, veins, capillaries; thymus, lymph nodes, spleen, tonsils; organs of the oral cavity, pharynx, esophagus, stomach, small intestine, large intestine, salivary glands, pancreas, liver, gallbladder; respiratory and olfactory region of the nasal cavity, larynx, trachea, bronchial tree, lungs, pleura; kidneys and excretory passages of the urinary system; ovaries, oviducts, uterus, vagina, mammary glands, testes, extratesticular ducts, accessory male genital glands; pineal body, pituitary, thyroid, parathyroid and suprarenal gland; organs of the central and peripheral nervous system, organs of the sensory system-eye, ear, taste buds; the skin and derivatives of the skin, bone and joints.			
4. Histological structure of embryonal and fetal tissues and organs: umbilical cord, placenta, development of epithelial, connective, muscle and nervous tissue, development of skeleton, ossification, development of lips and teeth, fetal liver, pancreas, lungs, kidneys, ovaries, testes.			
<b>Literature</b>			
<i>Compulsory</i>			
1. Histology: A Text and Atlas 7th or older editions. Ross M, Kaye G, Pawlina W. Wolters Kluwer Health.			
2. Junqueira's Basic Histology: Text and Atlas, 14th, 13th or older editions. L. C. Junqueira and J. Carneiro - edited by Anthony L. Mescher. The McGraw-Hill Companies.			
3. Langmans Medical embryology 13th or older editions. Sadler TW. Wolters Kluwer Health			
<i>Additional</i>			
1. -			
<b>Number of active classes</b>			Other:
Lectures: 90	Practice: 60	Other types of teaching:	research related activities:
<b>Teaching methods :</b> Lectures and Practice			
<b>Student activity assessment (maximally 100 points)</b>			
<b>Pre-exam activities</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>
Lectures	10	Written	
Practices	25	Oral	45
Colloquium	15	.....	
Essay	5		