

**MINISTRY OF EDUCATION AND SCIENCE OF KYRGYZ REPUBLIC  
OSH STATE UNIVERSITY  
INTERNATIONAL MEDICAL FACULTY  
DEPARTMENT OF ANATOMY, HISTOLOGY AND NORMAL PHYSIOLOGY**

«**APPROVED**»

On the meeting of Dep \_\_\_\_\_  
Prot. № \_\_\_\_ from \_\_\_\_\_ 20\_\_ year  
Head of chair \_\_\_\_\_  
c.m.s., Assoc. Prof., Dzholdubaev S.Zh.

«**AGREED**»

Chairman of EMI IMF  
\_\_\_\_\_  
c.m.s., Assoc. Prof., \_\_\_\_\_.

**STUDENT EDUCATION PROGRAM  
(Syllabus)  
ON THE DISCIPLINE: **Human Histology 2**  
for full-time students studying  
on the specialty "**560001-General Medicine (GM)**"**

form of study: **full-time**  
total: **3 credits**  
year: **2- year**  
semester: **III semester**  
total : **90 hours**  
**Of them:**  
Classrooms: **45 hours (lecture - 18 hours; practical classes- 27 hours)**  
SIW: **45 hours**  
Number of test control (TC) **2.**  
Exam: **III semester**

Information about teacher: ***Tashmatova Nazgul Mamatumarovna,***  
**candidate of biological sciences, associate professor**  
**Department of "Anatomy, Histology and Normal Physiology",**  
**room No. 103**

Schedule: ***daily from 8 a.m. to 5.30 p.m.***  
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**Date: 2022-23 - academic year**

**1. The purpose of the discipline** "histology, cytology and embryology" is to provide students with knowledge about the microscopic functional morphology and development of human cellular, tissue and organ systems providing a basis for studying clinical disciplines and contributing to the formation of medical thinking

**2. Objectives of the discipline:**

- Study of the general and specific structural and functional properties of cells of all body tissues and the patterns of their embryonic and postembryonic development
- The study of histofunctional characteristics of the basic systems of the body, the laws of their embryonic development, as well as functional, age-related and protective-adaptive changes in organs and their structural elements;
- Study of the main histological international Latin terminology;
- The formation of students' ability to microscope histological preparations, the ability to identify organs, determines the leukocyte formula using a light microscope;
- Formation of students' understanding of methods for analyzing the results of clinical laboratory research, their interpretation;
- Formation of students' skills of independent analytical, research work;

**3. As a result of mastering the discipline, the student must:**

**Know:**

- Safety regulations and work in physical, chemical, biological laboratories with reagents, devices, animals;
- The physicochemical nature of the processes occurring in a living organism at the molecular, cellular, tissue and organ levels;
- The main patterns of development and vital functions of the body based on the structural organization of cells, tissues and organs; histofunctional features of tissue elements; research methods;
- The structure, topography and development of cells, tissues, organs and systems of the body in interaction with their function in normal and pathological conditions, especially the organismic and population levels of life organization;

**Be able to:**

- Use educational, scientific, popular science literature, the net Internet for professional activities;
- Use physical, chemical and biological equipment;
- Work with magnifying equipment (microscopes, optical and simple magnifiers);
- Give a histophysiological assessment of the state of various cellular, tissue and organ structures;
- Explain the nature of deviations during development, which can lead to the formation of variants of anomalies and defects;

**Own:**

- Medical and anatomical conceptual apparatus;
- Skills of microscopy and analysis of histological preparations and electronic microphotographs, drawings;

**4. Prerequisites:** HSE<sup>1</sup>: Latin, MEN: chemistry, biophysics, SPD: molecular biology and medical genetics, medical biology, normal anatomy

**5. Post requisites:** Normal physiology, pathological anatomy, pathological physiology and clinical disciplines.

**6. Technological map of discipline**

modules	total		lectures		Practical cl.		SIW		TC	FC	Points
	Aud	SIW	hour	points	hour	points	hour	points			
<b>I</b>	<b>45</b>	<b>45</b>	<b>18</b>	<b>60</b>	<b>27</b>	<b>60</b>	<b>45</b>	<b>60</b>	<b>60</b>		
<b>total</b>	<b>90</b>		<b>18</b>	<b>60</b>	<b>27</b>	<b>60</b>	<b>45</b>	<b>60</b>	<b>60</b>	<b>40</b>	<b>100</b>

**7. Map of points accumulation for the subject "Human Histology 2" in the context of module (3rd semester, 2022-2023 academic year, specialty: 560001-general medicine "GM")**

№	Name of groups	Average point of current TC	Lecture	SIW	CW	Total
	<b>First name/ last name of stud</b>	60 points	60 points	60 points	60 points	60 points
1.						
2.						

$$\text{Module} = \text{Average point of pr.cl.} + L + \text{SIW} + \text{TC}$$

<sup>1</sup> Humanitarian and social- economical disciplines

Technological map of the accumulation of points of the group \_\_\_\_\_  
(discipline: "Human histology 2", specialty: 560001- general medicine (GM), 3-semester, 2022-2023 academic year)

CLASS №1		Тема №1 Cardiovascular system. General characteristic. Classification. Arteries. Veins. Capillaries.						
№	I-week	Class attendance	Copybook	Album	Activity	Test	total	Date of rework
	First name/last name	10	5	10	20	15	60	
1.								
...								

**7. Thematic plan of lectures for 2<sup>nd</sup> year students the subject: HUMAN HISTOLOGY 2  
(3<sup>rd</sup> semester, 2022-2023 academic years)**

date	№ lectures	Topics	hours
1-3.09.22	1.	The cardiovascular system. Organs of hematopoiesis and immunogenesis	2
5-10.09.22	2.	The endocrine system.	2
	3.	The digestive system. Oral cavity, esophagus, stomach.	2
12-17.09.22	4.	The digestive system. Intestine. Liver. The pancreas.	2
19-24.09.22	5.	The respiratory system.	2
26.09 – 1.10.22	6.	Skin and its appendages	2
3-8.10.22	7	The urinary system.	2
10-15.10.22	8	The male reproductive system	2
17-22.10.22	9.	The female reproductive system.	2

**8. Calendar and thematic plan of practical classes for 2<sup>nd</sup> year students the subject: HUMAN HISTOLOGY 2 (3<sup>rd</sup> semester, 2022-2023 academic year)**

date	№ classes	Topics	hours
1-3.09.22	1.	The cardiovascular system. General characteristics. Classification. Arteries. Veins. Capillaries. The structure of the heart.	3h
5-10.09.22	2.	Organs of hematopoiesis and immunogenesis. Morphological characteristics. Classification. Histology of red and yellow bone marrow, thymus, spleen, lymph node.	3h
12-17.09.22	3.	The endocrine system. Classification. Histological structure of the pituitary gland, epiphysis, hypothalamic-pituitary system. Thyroid gland, adrenal glands.	3h
19-24.09.22	4	The digestive system. Histology of the oral cavity and its derivatives. The esophagus and stomach.	3h
26.09 – 1.10.22	5.	Histological structure of intestine, liver and pancreas.	3h
3-8.10.22	6.	The respiratory system. Skin and its appendages	3h
10-15.10.22	7.	The urinary system	3h
17-22.10.22	8	The male reproductive system	3h
24-29.10.22	9	The female reproductive system.	3h
<b>Total</b>	Lecture classes		18 h
	Practical exercises		27 h
	Module		1

## 9. Students individual work (SIW)

№ and name of the topic	competencies	Task for self-work	Hours	Form of control	Poi nts	Lit-re	week
1	2	3	4	5	6	7	8
<b>Модуль №1</b>							
1. Age morphology of the cardiovascular system 2. Features of the structure of the vessel wall	GC-1 SIC-1 PC-5 PC-15 PC-32	1. Compare the age characteristics of blood vessels. 2. Draw a schematic drawing of the features of the blood vessels	3	Abstract, diagram. picture	30	1,2,3, 4,5,6	1-2
3. Age involution of the thymus. 4. Sinus of the spleen. 5. Sinus of the lymph node	GC-1 SIC-1 PC-5 PC-15 PC-32	1. Compare the age features of the thymus. 2. Draw schematic drawings.	3	Abstract, diagram. picture	30	1,2,3, 4,5,6	2-3
6. Chromophobic cells of the anterior pituitary gland. 7. Posterior lobe of the pituitary gland. Axovasal synapse 8. Hypothalamo-pituitary nerve fibers. 9. Thyroid, parathyroid. 10. Thymus gland. 11. Zones of the adrenal cortex. 12. Chromaffin cells of the adrenal medulla.	GC-1 SIC-1 PC-5 PC-15 PC-32	1. Draw schematic drawings of the remedy and describe	8	Abstract, diagram. picture	30	1,2,3, 4,5,6,	3-4
13. Enamel prisms of the tooth. 14. Dentin tubules of a human tooth. 15. Basal part of the serous cell of the human submandibular gland. 16. Epithelial cell of the gastric fossa. 17. The main cell of the own gland of the stomach. 18. Additional cell of the own gland of the fundus of the stomach. 19. Parietal cell of the own gland of the stomach	GC-1 SIC-1 PC-5 PC-15 PC-32	1. Draw schematic drawings of the remedy and describe	8	Working with microscopy	30	1,2,3, 4,5,6	4-5
20. Acidophilic intestinal cell. 21. Cells of the terminal pancreas. 22. Cells of the endocrine islet of the pancreas. 23. Sinusoidal blood capillary of the liver. 24. Hepatocyte.	GC-1 SIC-1 PC-5 PC-15 PC-32	1. Draw schematic drawings of the remedy and describe	4	Working with microscopy	30	1,2,3, 4,5,6	5-6-7
25. Ciliated epithelial cells of the trachea. 26. Inter-alveolar septum of the lung. 27. Skin epidermis, dermis 28. Hair	GC-1 SIC-1 PC-5 PC-15 PC-32	1. Draw schematic drawings of the remedy and describe	6	Working with microscopy	30	1,2,3, 4,5,6	7-8-9
29. The structure of the	GC-1	1. Draw schematic drawings of	5	Working	30	1,2,3,	9-10

internal part of the glomerular capsule and blood capillary in the renal corpuscle. 30. Mesangial cell of the renal corpuscle. 31. Nephron. 32 Collecting duct.	SIC-1 PC-5 PC-15 PC-32	the remedy and describe		with microscopy		4,5,6	
33. Follicular cell (Sertoli cell). 34. Sperm.	GC-1 SIC-1 PC-5 PC-15 PC-32	1. Draw schematic drawings of the remedy and describe	4	Working with microscopy	30	1,2,3,4,5,6	10-11
35. Oocyte from ovarian follicle		1. Draw schematic drawings of the remedy and describe	4	Working with microscopy	30	1,2,3,4,5,6	11-12
Total	11		45		30		15

## 10. Educational technology

With a competency-based approach in education, the main factor in educational activity is not so much the component of knowledge acquisition as the component of the acquisition by students of various methods of activity for solving the set educational tasks. Therefore, to achieve the expected learning outcomes of the discipline, it is necessary to use various new technologies and interactive methods.

**Interactive learning** is first of all dialogue learning, during which there is an interaction between the student and the teacher, and between the students themselves. Interactive methods contribute to the formation of competencies and the achievement of certain learning outcomes - the acquisition of knowledge, the formation of skills.

lecture-visualization (LP), problem lecture (PL), mini-lecture (ML), lecture - press conference (LPC), lesson - conference (LC), brainstorming (BS), master class (MC), business and role-playing educational game (BG, REG), the method of small groups (SG), participation in scientific and practical conferences (SPC), student research and development work (SRDW), subject Olympiads (O), preparation and defense of abstracts (R) , Tests (T), situational tasks (ST), interactive whiteboard (IW), handouts (H), videos (V), slides (S), multimedia presentation (MPres ), assignments for independent work, teamwork (TW), research method (RM).

## 12. Educational-methodical and informational support of discipline

### Main:

1. Junqueira's Basic Histology/ Text and Atlas (14<sup>th</sup> ed.) p. 560.
2. Histology/ Color Atlas and textbook/ Leslie P. Gartner, James L. Hiatt (6<sup>th</sup> ed.)
3. Inderbir Singh's textbook of Human Histology/ Neelam Vasudeva, Sabita Mishra/ Color Atlas and practical guide (7<sup>th</sup> ed)

### Additional:

1. Textbook of Histology/ Leslie P. Gartner (4<sup>th</sup> ed.)
2. Histology/ textbook. Eduardo G. Gonzales, M.D. (5<sup>th</sup> ed.)
3. Human histology/ Alan Stevens, James Lowe. (3<sup>rd</sup> ed.)

## 13. The politics of pointing

The student can score points for all types of classes.

Module 1: activity at the lecture –60 b; at 1 practical lesson - 60b.

control: maximum 60 points: test - 40b; dumb preparation and dumb drawing - 20b. Implementation of the SIW - points separately according to plan. The final control is a maximum of 40b per computer test.

## 14. Questions for modules in Human histology 2

1. Cardiovascular system. Vessels of the microcirculatory bed, medium and large calibers. Heart.
2. Central organs of hematopoiesis. Red bone marrow. Thymus. Stages of embryonic hematopoiesis. Scheme of hematopoiesis. Cellular bases of immunity. Peripheral hematopoietic organs. Spleen, lymph nodes.
3. Main functional devices: dioptric, accommodative and receptor.
4. Structure and pathophysiology of rod-and cone-bearing retinal neurons.
5. Features of the structure of the Central fossa of the optic disc.
6. The retinal pigment epithelium, structure and value. Features of blood supply to the eyeball. Age change. Auxiliary organs of the eye (eyelids, lacrimal apparatus).
7. The olfactory organ. General characteristic. Structure and cellular composition of the olfactory lining: receptor, supporting and basal cells.
8. Histophysiology of the olfactory organ.

9. Age-related changes. Vomeronasal organ.
10. The organ of taste. General characteristic. Structure and cellular composition of taste buds: taste, supporting and basal cells. Innervation of the taste buds. Histophysiology of the taste organ. Age change.
11. Organs of hearing and balance. General characteristic. External ear: the structure of the external ear canal and eardrum. Middle ear: auditory bones, characteristics of the epithelium of the tympanic cavity and auditory tube.
12. Inner ear: bony and membranous labyrinths.
13. Vestibular part of the membranous labyrinth: elliptical and spherical sacs and semicircular channels. Their receptor divisions: structure and cellular composition of spots and ampullary scallops. Innervation. Histophysiology of the vestibular labyrinth.
14. the Cochlear part of the membranous labyrinth: the structure of the cochlear canal, the structure and cellular composition of the spiral organ, its innervation. Histophysiology of sound perception. Age change.
15. Cardiovascular system. Vessels of the microcirculatory bed, medium and large calibers. Heart.
16. The Central organs of hematopoiesis. Red bone marrow. Thymus. Stages of embryonic hematopoiesis. Scheme of hematopoiesis. Cellular bases of immunity. Peripheral hematopoietic organs. Spleen, lymph nodes.
17. The organs of internal secretion. Thyroid and parathyroid glands. Adrenal. Neuroendocrine link.
18. Hypothalamic-pituitary connections.
19. Three pituitary lobes, their histo- and ultrastructure. Ultrastructural structure of glandular cells of the adenohypophysis and neurohypophysis.
20. Epiphysis.
21. Anterior part of the digestive system. Oral epithelium and its derivatives (glands).
22. Anterior part of the digestive system. Organs of the oral cavity. Lip, tongue, mucosa of the oral cavity.
23. Histogenetically characteristics of the mucous membrane of the oral cavity: lip and cheek. Age change.
24. Histogenetically characteristics of the mucous membrane of the mouth: the gums, hard and soft palate. Age change.
25. Development of teeth. Diphyodont.
26. Structure of hard tooth tissues (enamel, dentin, cement).
27. Soft tissues of the tooth. Pulp: morphofunctional characteristics, reactive properties and regeneration. Denticle.
28. The structure of the periodontium: the periodontal and bone alveolus, the gums.
29. Age-related periodontal changes and their role in the implementation of pathological processes.
30. Dental alveolus: morphofunctional characteristics. Reconstruction of the dental alveoli of the upper and lower jaw when the functional load changes.
31. Language: features of the structure of the mucous membrane on the back, lower and side surfaces. Taste buds.
32. Salivary glands: parotid and submandibular and sublingual.
33. Histophysiology of large and small salivary glands. Endocrine functions and age-related changes.
34. Lymphoid apparatus of the oral cavity. Local immunity on the example of the Palatine tonsil.
35. Esophagus, the passage of the esophagus into the stomach. Stomach, fundal and pyloric divisions. Intestine. Duodenum, jejunum, and ileum. Colon.
36. The liver. Sources of liver development.
37. Structure of the classical and portal lobes of the liver.
38. Hepatocytes, hepatic beams, sinusoid capillaries, stellate cells. Disse space, its ultra-structural structure and meaning.
39. the Gallbladder and bile ducts, the structure of their walls.
40. Large glands of the digestive tract.
41. Pancreas. Sources of liver and pancreas development.
42. Exo- and endocrine part of the pancreas, cellular composition and hormones of the endocrine part. Micro - and ultramicroscopic data.
43. Digestive system. The digestive tube, its development, tissue composition and General plan of structure, and the meaning of the term "mucosa". Anterior part of the digestive system. Small and large salivary glands, their classification and ultrastructural organization of end sections.
44. Respiratory organs. Airways, respiratory parts of the lung.
45. Surfactant. Diagram of the air-blood barrier.
46. The acini of the lung. Structural components of the acinar. Alveoli. Histo- and ultrastructural structure of the alveolar wall.
47. Aerogemateski barrier, its histological and ultrastructural structure, mechanisms of gas exchange.
48. Surfactant, its morphofunctional value. Cells that produce surfactant components.
49. General principle of organization of the respiratory system. Sources of development of the respiratory system.
50. Features of the structure of external and intra-pulmonary Airways. Histological picture in the structure of the walls of the bronchi as their caliber decreases.
51. Skin and its derivatives. The skin of the finger and the scalp.
52. Excretory system. General characteristics of the excretory system.
53. Development of the genitourinary system. Kidney, primary kidney, and final kidney.
54. A nephron. Features of the structure of various departments of the nephron in connection with their function.
55. the circulatory system of the kidneys, the renal body and its components, the bladder, the ureter.
56. Ultramicroscopic structure of the nephron. Age-related changes in the kidneys.
57. Organs of the male reproductive system. The testis with the epididymis.

58. Characteristics of the spermatogenic epithelium of the testis in connection with the stages of spermatogenesis.
59. Differentiation of spermatids into spermatozoa. Ultramicroscopic characteristics of the sperm.
60. Prostate gland.
61. Organs of the female reproductive system. Female genital organs.
62. Development of the female reproductive system.
63. Structure and functions of the ovary, the structure of ovarian follicles in connection with the periods of ovogenesis.
64. Age-related changes in the female reproductive system.
65. Ovarian-menstrual cycle.