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Информация о владельце:

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MINISTRY OF SCIENCE AND HIGHER EDUCATION

RUSSIAN FEDERATION

Federal State Autonomous Educational Institution of Higher Education

NORTH-CAUCASUS FEDERAL UNIVERSITY

APPROVED

Assoc. Prof. Kubanov S.I.

PhD in Medical Sciences

Dean Faculty of Medicine and Biology

COURSE OUTLINE OF THE DISCIPLINE (MODULE)

Histology

Name of the discipline (module)

- Specialty: 31.05.01 General Medicine
- Mode of training: Full-time
- Year of commencement of studies: 2026
- Delivered in Semester 2-3

Developed by:

Associate Professor of the Department

of Anatomy and Histology

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Stavropol 2026

1. Aim and Objectives of Mastering the Discipline (Module)

- Aim of mastering the discipline is to form students' ideas about the patterns of development and vital activity of the body based on the structural organization of cells, tissues and organs; histofunctional features of tissue elements, methods of their research....
- Objectives of mastering the discipline
 - study of general and specific structural and functional properties of cells of all body tissues and patterns of their embryonic and postembryonic development;
 - study of histofunctional characteristics of the main body systems, patterns of their embryonic development, as well as functional, age-related, and protective-adaptive changes in organs and their structural elements;
 - study of the basic histological international Latin terminology;
 - formation of the ability of microscopy of histological preparations using a light microscope;
 - formation of the ability to identify organs, their tissues, cells and non-cellular structures at the microscopic level;
 - formation of an idea about the methods of analyzing the results of clinical laboratory studies and their interpretation;
 - formation of skills of independent analytical, scientific and research work;
 - formation of skills in working with scientific literature;
 - formation of skills in the organization of occupational health and safety measures;
 - formation of communication skills and interaction with society and the team.

• 2. Place of the Discipline (Module) in the Structure of the Training (educational) Program

The discipline Histology belongs to the compulsory part.

3. List of Potential Learning Outcomes for the Discipline (Module), Correlated with the Outcomes of Mastering the Educational Program

Code and definition of the competence	Code and definition of the indicator	Planned learning outcomes for the discipline (module) describing the stages of competency and indicator development
GPC-5. Capable of assessing morphofunctional, physiological states and pathological processes in the human body to solve professional tasks.	Indicator: AI-1 GPC-5 Assesses morphofunctional and physiological states and processes in the human body at individual, group, and population levels to solve professional tasks.	Learning outcomes for the discipline (module): Development of clinical thinking.
	Indicator: AI-2 GPC-5 Identifies pathological states and processes in the human body to solve professional tasks	Learning outcomes for the discipline (module): Development of clinical thinking.

4. Volume of the Academic Discipline (Module) and Control *

Volume of classes: Total: 6 ECTS credits, 216 academic hours.	Full-time type of study, in academic hours
Face-to-face work	102
Lectures / including practical training	34
Laboratory works / including practical training	68
Independent work	78
Forms of control	
Examination	36

* The discipline (module) provides for the use of e-learning and remote learning technologies (unless otherwise set by the educational standard).

5. Content of the Discipline (Module), Structured by Topics (Sections) with an Indication of the Hours and Types of Classes

#	Section (topic) of the discipline and brief content	Competencies and indicators to be developed	Full-time training			Forms of current control of academic progress
			Contact work of students with the teacher / of them practical skills training, hours			Independent work, hours
			Lectures	Practical classes	Laboratory work	

1	Introduction Brief historical information about the discipline. The subject and objectives of the discipline. The main methods used in histology. <i>Methods of microscopy of histological preparations. Methods for the study of fixed cells and tissues. Methods of studying living cells and tissues. Methods for studying the chemical composition and metabolism of cells and tissues. Methods of immunofluorescence analysis. Quantitative methods. Methods of image analysis of cellular and tissue structures</i>	AI-1 GPC-5 AI-2 GPC-5	2		2	6	Interview (discussion)
2	Tissues as systems. Epithelial tissues. Glands. <i>Tissues as system. Tissue definition. Classification of tissues and general patterns of their formation. Tissue development. Determination and commitment. The concept of divergent tissue development in phylogeny and ontogenesis, formulated by N.G.Khlopin. The theory of parallelisms by A.A.Zavarzin. Tissue homeostasis. Fundamentals of cell population kinetics. Genetic, morphological, and functional classification of epithelia. Common signs characteristic of epithelial tissues. Single-layer epithelium, its types, structural features. Multilayer epithelium, its types, structure, functional significance, origin and location in the body. Glandular epithelium, its characteristics, origin and location in the body. Phases of the secretory cycle and their characteristics. Classification of glands</i>	AI-1 GPC-5 AI-2 GPC-5	2		2	8	Interview (discussion)

3	Connective tissues. General principles of organization and classification of connective tissues. <i>Characteristics of the connective tissue proper, its classification. Fibrous connective tissues, development, structure, functions and location. Loose fibrous connective tissue. Morphological and functional characteristics of cells, fibers, and basic matter. Dense fibrous connective tissue, its development, structure, functions and location. Fibrous membranes</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	8	Interview (discussion)
4	Connective tissues with special properties. <i>General morphofunctional characteristics connective tissues with special properties. Morphology, functional significance and location of adipose tissue</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	6	Interview (discussion)
5	Skeletal tissue. <i>Cartilage tissue, development, general characteristics, cellular composition, intercellular substance. Types of cartilage tissue, structural features, regeneration. Age-related changes. Bone tissue. Bone development directly from mesenchyme (direct osteohystogenesis) and in place of cartilage (indirect osteohystogenesis). Bone cells (osteoblasts, osteocytes, osteoclasts). The structure and chemical composition of the intercellular substance. The structure of the bone as an organ. Coarse-fibrous and lamellar bone tissue. The structure of the periosteum. Bone restructuring during the development and growth of the body. Osteon – structural a unit of compact substance of a tubular bone. Factors affecting bone growth. Regeneration of bone tissue</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	8	Interview (discussion)

6	Blood and lymph. Hemocytopoiesis. Organs of hematopoiesis <i>The concept of the blood system. Blood. General information about its composition and functions. Blood plasma, its composition and significance. I.I.Mechnikov's research on phagocytosis. Shaped elements, their number, shape, size, structure, meaning. The concept of hemogram and leukocyte formula, their age-related changes. Lymph, its composition and significance. Embryonic hemocytopoiesis (the development of blood as tissue). Postembryonic hemocytopoiesis (the process of physiological regeneration of blood). Regulation of hemocytopoiesis.</i>	AI-1 GPC-5 AI-2 GPC-5	2		6	8	Interview (discussion)
7	Muscle tissue. <i>General characteristics of muscle tissue: sources of development, classification. Smooth muscle tissue, location, histogenesis, structure, features of functioning and regeneration. Skeletal muscle tissue: location, histogenesis, microscopic structure of muscle fiber. The structure of myofibrils. Features of development, structure and functions of cardiac muscle tissue. The structure of contractile and conductive cardiomyocytes. Regeneration of cardiac muscle tissue. Histophysiology of muscle contraction</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	8	Interview (discussion)

8	Nervous tissue. Neurons. Neuroglia. <i>Embryonic sources of neuronal and gliocyte development. Morphological and functional classification of neurons. Microscopic, ultramicroscopic, and histochemical characteristics of a nerve cell. Neurosecretory cells. The difference between neurons and neurosecretory cells. The structure and functions of neuroglia. Ependyma, astroglia, oligodendroglia, microglia. The relationship of neurons and neuroglia. Regeneration of nervous tissue. Processes of nerve cells: axons and dendrites. The structure of fleshy and meatless nerve fibers. Formation and structure of myelin sheaths Classification of synapses. The concept of neurotransmitters and their nature. Synapses, their microscopic and ultramicroscopic structure, histochemical characteristics, and significance. Myoneural synapses as an example of efferent nerve endings. Afferent nerve endings. Structural features of the three-neural reflex arc</i>	AI-1 GPC-5 AI-2 GPC-5	2		6	8	Interview (discussion)
	TOTAL in 2 Semester		16		32	60	
9	The nervous system. The spinal cord. The brain stem. <i>Development. Nerve trunks. Sensitive nerve nodes. The spinal cord. The medulla oblongata. The middle brain. The intermediate brain</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	2	Interview (discussion)
10	The nervous system. The cerebellum. A big brain. <i>Membranes of the spinal cord and brain. The cerebellum. A big brain. The autonomic nervous system</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	2	Interview (discussion)

11	The sensory organ. The organ of vision. The organ of hearing. Organs of smell and taste <i>The organ of vision. The development of the eye. Fibrous membrane. The dioptric apparatus of the eye. The accommodative apparatus of the eye. The vascular membrane of the eye. The iris. The retina of the eye. Auxiliary apparatus of the eye. The organ of smell The organ of hearing and balance. The outer ear. The middle ear. The inner ear. The path of the sound wave to the hair cells and the sound pulse to the cortical end of the auditory analyzer. Sensitive spots of the uterus and round sac. The mechanism of perception of linear acceleration and gravity. The pathways of nerve impulses from the vestibular apparatus. The organ of taste</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	2	Interview (discussion)
12	Vessels. Veins. Lymphatic vessels. Heart. <i>Classification of vessels. Elastic, mixed, and muscular type arteries. Microcirculatory system. Classification of capillaries. Veins of non-muscular and muscular type. Vessels of vessels. Lymphatic vessels. Age-related vascular changes. Heart. Development. The endocardium. Valve apparatus. The myocardium. The conduction system of the heart. Epicardium. Innervation of the heart. Age-related heart changes</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	2	Interview (discussion)
13	The endocrine system. <i>The nature of hormones. The mechanism of action of hormones on target cells. Classification of the endocrine system. Hypothalamus. Regulation of peripheral gland function by the hypothalamus. The pituitary gland. Classification of adenocytes. The hypothalamic-pituitary portal system and its role in regulating the functions of the adenohypophysis. The epiphysis Thyroid gland. The parathyroid glands. The adrenal glands. Diffuse endocrine system</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	2	Interview (discussion)

14	The digestive system. Digestive glands. <i>The general outline of the digestive tube structure. The oral cavity. Language. Large salivary glands. Teeth. The esophagus. Stomach. The small intestine. The large intestine. A vermiform appendage. Liver. The general plan of the building. The circulatory system of the liver. Biliary tract and gallbladder. Age-related changes. The pancreas. The exocrine part. The endocrine part</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	2	Interview (discussion)
15	Respiratory system. Urinary system. <i>Development. The nasal cavity. A sip. The larynx. The trachea. The mucous membrane. The submucosal base. Fibrous-cartilaginous membrane. The adventitious shell. Blood supply and innervation of the trachea. Lungs. Bronchi of large and medium caliber. Terminal bronchioles. Respiratory department of lungs. The alveoli. Blood supply and innervation of the lungs. Age-related changes. Kidney development. The structure of the kidney. The nephron. Classification of nephrons. Blood supply to the kidney. Juxtamedullary blood supply system. Histophysiology of nephrons or the process urinary formation. The endocrine system of the kidneys. Innervation and age-related kidney changes. Urinary tract. The bladder</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	2	Interview (discussion)
16	The male reproductive system. The female reproductive system. <i>Development. The testicle. Spermatogenesis. Endocrine function of the testes. Innervation and age-related changes of the testicles. Vas deferens. Accessory glands of the male reproductive system. The penis. The structure of the ovaries. Ovogenesis. Differences between ovogenesis and spermatogenesis. Ovulation. The yellow body. Atresia. Endocrine function of the ovaries. The fallopian tubes. Uterus. Vagina. The sexual cycle. Mammary glands</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	2	Interview (discussion)

17	Organs of hematopoiesis and immune defense. <i>Red bone marrow. Blood supply, regeneration, age-related changes in red bone marrow. Myelopoiesis. Classes of hematopoietic cells. The thymus. Development. The cortical substance. Brain matter. Age-related and temporal involution of the thymus. Lymph nodes. Development. The cortical area. The paracortical zone. Brain matter. Sinuses of the lymph nodes. The spleen. Development. White pulp. Red pulp. Palatine tonsils. Lymph nodes of the gastrointestinal tract</i>	AI-1 GPC-5 AI-2 GPC-5	2		4	2	Interview (discussion)
	TOTAL in 3 Semester		18		36	18	
	Examination					36	
	TOTAL		34		78	114	

6. Assessment Tools Fund for the Discipline (Module)

The assessment tools fund (ATF) for the discipline (module) Histology is based on the list of competencies to be mastered, indicating the stages of their formation in the process of mastering the discipline (module). The ATF provides an objective control over the achievement of the planned learning outcomes. The ATF includes:

- A description of indicators and criteria for evaluating competencies at various stages of their formation, a description of evaluation scales;
- Methodological materials determining the procedures for evaluating knowledge, skills, abilities and (or) work experience characterizing the stages of competency formation;
- Standard control tasks and other materials necessary for assessing knowledge, skills, and the level of mastery of the formed competencies in the process of mastering the discipline (module).

The ATF is an appendix to this discipline (module) program.

7. Methodological Guidelines for Students on Mastering the Discipline

When starting work, each student must take into account the following provisions.

The discipline (module) is structured on a thematic principle; each topic represents a logically completed section.

The lecture material is dedicated to the consideration of key, basic provisions of the courses and the clarification of learning tasks assigned for the independent work of students.

Practical classes are conducted with the aim of consolidating the mastered information, acquiring skills for its application in solving practical problems in the relevant subject area.

Laboratory works are aimed at gaining practical experience in the relevant subject area.

The independent work of students is aimed at the independent study of additional material, preparation for practical and laboratory classes, as well as the execution of all types of independent work.

In order to successfully master the discipline, it is important to complete all types of independent work employing the recommended sources of information.

8. Educational, Methodological, and Informational Support for the Discipline

8.1. List of Main and Additional Literature Required for Mastering the Discipline (Module)

8.1.1. List of Main Literature:

1) Ross, Michael H. Histology: a text and atlas: with correlated cell and molecular biology/Michael H. Ross, Wojciech Pawlina.—6th ed. p. ; cm Includes bibliographical references and index. ISBN 978-0-7817-7200-6 (alk. paper) 1. Histology. 2. Histology—Atlases. I. Pawlina, Wojciech. II. Title. [DNLM: 1. Histology—Atlases. QS 517 R825h 2011] QM551.R67 2011611'.018—dc22

8.1.2. List of Additional Literature:

Barsukov, N. P. Cytology, histology, embryology : a textbook / N. P. Barsukov. – 4th ed., ster. – Saint Petersburg : Lan, 2020. – 248 p. – ISBN 978-5-8114-5352-8. – Text : electronic // Lan : electronic library system. – URL: <https://e.lanbook.com/book/139250>

8.2. List of Educational and Methodological Support for the Independent Work of Students in the Discipline (Module)

1. Educational and methodical manual: Methodological guidelines for students on the organization and conduct of independent work in the discipline "Histology". Stavropol: NCFU, 2026.

2. Educational and methodical manual: Guidelines for performing laboratory work in the discipline "Histology". Stavropol: NCFU, 2026.

8.3. List of Resources of the Information and Telecommunications Network **Internet** Required for Mastering the Discipline (Module)

1. <http://rudoctor.net/> - Medical Portal

2. <http://www.e-reading.club/> - Large Online Library

3. <http://www.pubmed.com/> - database of full-text articles on medicine

4. <http://www.spravocnikpolekarstvam.ru/> - free online pharmacological reference

5. <https://dic.academic.ru/> - Dictionaries and encyclopedias

6. <https://www.rmj.ru/> - Russian Medical Journal

9. List of Information Technologies Employed through the Discipline (Module), Including a List of Software and Information Reference Systems

When delivering lectures, computer equipment and demonstrations of multimedia presentation materials are used. In seminars and practical classes, students deliver presentations prepared by them during the hours of independent work.

Information Reference Systems:

Information-reference and information-legal systems used in the study of the discipline:

1.	Electronic library system "University Library Online" - www.biblioclub.ru (Agreement No. 50-04/19 on the provision of information services from 13.05.2019)
2.	The electronic library system "IPRbooks" (LICENSE AGREEMENT No. 5168/19 dated 13.05.2019 for the provision of access to the electronic library system IPRbooks. Organization: IP Ar Media LLC)
3	"eLIBRARY.RU ": [Scientific Electronic Library]. – URL: http://elibrary.ru
4	. Information and legal portal "Garant" - http://www.garant.ru/
5	Legal reference system Russian legislation and judicial practice are freely available - http://www.pravo.ru/

Software:

1.	Alt Workstation 10
2.	Alt Workstation K
3.	Alt Server
4.	Office software package – P7-Office

10. Description of the Material and Technical Resources Required for the Educational Process for the Discipline (Module)

Lecture classes	A classroom equipped with multimedia equipment and technical training facilities.
Laboratory classes	The educational laboratory of Cytology, Histology, and Human Embryology, equipped with equipment and technical training facilities: a set of educational furniture for 14 seats, a magnetic marker board, a set of educational furniture, a projector with a wall bracket, and a computer with the necessary set of licensed software. Atlases on histology and cytology; Binocular light microscope; Trinocular light microscope; MICMED-1-wap microscope.2-20 (Biolam R-15); Microscope "MIKMED-1var.1" (BIOLAM R-11); Microscope Biolam (P); MBS 9 microscope; Sets of micro-preparations for general and private histology; Sets of micro-preparations for cytology; Set micro-preparations in embryology; Stages of human embryo development (macropreparations contained in 10% formalin solution); Premature fetus. Animal embryos.
Independent work	A room for the independent work of students, equipped with computer hardware with the capability to connect to the Internet network and provide access to the electronic information and educational environment of the university.

11. Specific Features of Mastering the Discipline (Module) by Persons with Disabilities

Students with disabilities shall be provided with special textbooks, teaching aids, and didactic materials, special technical training facilities for collective and individual use, the services of an assistant (helper) providing the necessary technical assistance to the students, as well as the services of sign language interpreters and tactile sign language interpreters.

The mastery of the discipline (module) by students with disabilities may be organized jointly with other students, as well as in separate groups.

Mastering the discipline (module) by students with disabilities is to be carried out taking into account the peculiarities of psychophysical development, individual capabilities, and health status.

In order to ensure the accessibility of higher education under the educational program for persons with disabilities, the following is provided during the mastery of the discipline (module):

- 1) for persons with visual impairments:
 - the presence of an assistant offering the student the necessary technical assistance, taking into account individual features (help taking the workplace, moving around, reading and formatting the task, including writing under dictation),
 - written tasks, as well as instructions on the procedure for their execution, are formatted in an enlarged font,
 - special textbooks, teaching aids, and didactic materials (having a large font or audio files), individual uniform lighting of at least 300 lux,
if necessary, a magnifying device is provided to the student to complete the task;
- 2) for persons with hearing impairments:
 - the presence of an assistant providing the student with the necessary technical assistance, taking into account individual characteristics (helps to take a workplace, move around, read and format the task, including writing with dictation),
 - the availability of sound-amplifying equipment for collective use is ensured; if necessary, sound-amplifying equipment for individual use is provided to the student;
 - provision with proper sound means of reproducing information is ensured;

- 3) for persons with musculoskeletal disorders (including severe motor function impairments of the upper limbs or the absence of upper limbs):
- written tasks are performed on a computer with specialized software or are dictated to an assistant;
 - at the request of the student, tasks may be performed verbally.

12. Specific Features of Implementing the Discipline with the Use of Distance Learning Technologies and E-Learning

Subject to Part 1 of Article 16 of the Federal Law of December 29, 2012, No. 273-FZ On Education in the Russian Federation, e-learning shall be viewed as the arrangement of educational activities employing information contained in databases and used in the implementation of educational programs, as well as information technologies, technical means, and information and telecommunication networks that ensure the processing and transmission of the specified information via communication lines, and the interaction of students and pedagogical workers.

Remote (distance) learning technologies are understood as educational technologies implemented mainly with the use of information and telecommunication networks during the indirect (at a distance) interaction of students and pedagogical workers.

The implementation of the discipline may be carried out with distance learning technologies and e-learning in full or in part. The components of the Educational And Methodological Complex (EMC) of the discipline (working program of the discipline, assessment and methodological materials, forms of attestation) implemented with the use of distance learning technologies and e-learning contain an indication of their use.

When arranging educational activities with distance learning technologies and e-learning, asynchronous and synchronous methods of interaction between participants in educational relations via the information and telecommunications network Internet may be offered.

When using distance learning technologies and e-learning, the schedule for the discipline shall indicate: methods of interaction among participants in educational relations via the information and telecommunications network Internet (VCC – videoconferencing, ET – electronic testing); links to the electronic information and educational environment of NCFU, to educational platforms and resources of other organizations to which open access is provided via the information and telecommunications network Internet; for synchronous learning – the time of online classes and instructors; for asynchronous learning – the authors of online courses.

When arranging intermediate attestation with distance learning technologies and e-learning, the Methodological Recommendations on the use of technical means ensuring the objective reliability of results when conducting intermediate and state final attestation for higher education educational programs – Bachelor's Degree programs, Specialist's Degree programs, and Master's Degree programs with distance learning technologies are used (Letter of the Ministry of Science and Higher Education of Russia dated December 7, 2020, # MN-19/1573-AN On sending methodological recommendations).

The implementation of the discipline with the use of e-learning and distance learning technologies is carried out using the electronic information and educational environment of NCFU, to which students are provided access via the information and telecommunications network Internet, or using the resources of other organizations, including platforms providing services for videoconferencing, online meetings, and distance learning (MTS-Link), as well as using the capabilities of social networks to carry out communication between students and instructors.

The educational and methodological support for a discipline shall be ensured with e-learning and distance learning technologies includes the working program presented in electronic form, educational and methodological manuals or a course of lectures, methodological guidelines for performing various types of educational activities of students provided for by the discipline, and other educational and methodological materials posted in the information and educational environment of NCFU.