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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

ASSESSMENT TOOLS FUND FOR THE DISCIPLINE

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

Introduction

1. Intended for carrying out current control of academic performance progress and intermediate attestation in the discipline of **Histology** for students of the specialty (majoring in) 31.05.01 General Medicine.
2. The ATF is an appendix to the program of the discipline (module) **Histology**.
3. Developer(s): Pakhomova T.A., Associate Professor of the Department of Anatomy and Histology
4. Expert examination of the ATF has been completed.

Expert group:

Chairperson: Pakhomova T.A., Chairman of the Educational and Methodological Commission
Faculty of Medicine and Biology

Committee members: Dzhandarova T.I., Professor of the Department of Anatomy and Histology
Puzanov O.I., Associate Professor of the Department of Anatomy and Histology

Employer organization representative: Vilensky I.L., Chief Physician of Independent CDL, LLC

Expert conclusion – the ATF allows evaluating the level of competency levels and is recommended to be employed in the educational process.

5. The validity period for the ATF shall be determined by the period of implementation of the educational program.

1. Description of Evaluation Criteria at Various Stages of Their Formation, Description of Evaluation Scales

Levels of formation of competence(s), indicator(s)	Descriptors			
	Minimum level not achieved (Unsatisfactory) 2 points	Minimum level (Satisfactory) 3 points	Intermediate level (Good) 4 points	High level (Excellent) 5 points
Competency GPC-5 . Capable of assessing morphofunctional, physiological states and pathological processes in the human body to solve professional tasks.				
Learning outcomes for the discipline (module): Development of clinical thinking. Indicator: ID-1 GPC-5 Assesses morphofunctional and physiological states and processes in the human body at individual, group, and population levels to solve professional tasks.	Does not assess morphofunctional and physiological states	Assesses morphofunctional and physiological states	Assesses morphofunctional and physiological states and processes in the human body at individual, group, and population levels	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: ID-2 GPC-5 Identifies pathological states and processes in the human body to solve professional tasks	Does not identify pathological states	Identifies pathological states	Identifies pathological states and processes in the human body	Identifies pathological states and processes in the human body to solve professional tasks

The evaluation of the competency formation level in the discipline is carried out on the basis of the Regulations on conducting current control of academic progress and intermediate attestation of students in higher education educational programs – Bachelor’s programs, Specialist’s programs, Master’s programs – at the Federal State Autonomous Educational

ASSESSMENT TOOLS FOR CHECKING THE LEVEL OF COMPETENCY DEVELOPMENT

Task Number	Correct Answer	Content of the Question	Competency
1	b	The definition of "A collection of cells having any feature in common with them" corresponds to the concept of: a) "tissue"; b) "cell population"; c) "clone"; d) "tissue type"; e) "cellular differon".	GPC-5
2	d	Cells make up the differon: a) stem cells only; b) stem and differentiating; c) only differentiated; d) stem, differentiating, mature; e) Differentiating and mature.	GPC-5
3	d	The mechanisms that ensure the determination and subsequent differentiation of cells are based on: a) a change in the structure of DNA molecules; b) exchange of DNA sections between chromosomes; c) a multiple increase in the amount of DNA; d) persistent changes in gene activity.	GPC-5
4	d	A tissue group is a collection of tissues: a) having a common source of development; b) capable of metaplasia; c) having similar epigenomic properties; d) characterized by similar morphofunctional features.	GPC-5
5	d	Stem cells are characterized by everything except: a) determined in accordance with the tissue development program; b) can be pluripotent and unipotent; c) resistant to damaging factors; d) capable of specific syntheses; e) are able to stay in the G0 period for a long time.	GPC-5
6	determination	Determining the path of cell development on a genetic basis is _____	GPC-5
7	differentiation	The process of functional specialization of cells, accompanied by a change in their structure and caused by the activity of certain genes, is _____	GPC-5
8	b	The polarity of cells in the epithelium is determined by: a) the presence of intercellular contacts on the lateral membrane; b) the presence of a basement membrane; c) high ability to regenerate; d) the marginal position of the tissue; e) the ability to secrete.	GPC-5

9	b	In the cells of the shiny layer of the multilayer flat keratinizing epithelium occurs: a) synthesis of glycosaminoglycans; b) formation of eleidine; c) proliferation; d) accumulation of melanin; e) keratogyalin formation.	GPC-5
10	d	The epithelium has all the signs except: a) border position; b) the basement membrane; c) the ability to form a formation; d) low ability to upgrade; e) the polarity of epitheliocytes.	GPC-5
11	e	Cambial cells in the multilayered epithelium of the trachea are: a) basally granular; b) long inserts; c) Flickering; d) goblet-shaped; e) short inserts.	GPC-5
12	d	Ciliated cells are present in the epithelium of a number of organs, except; a) bronchial tubes; b) outgrowing tubules of the testicle; c) oviducts; d) tubules of the kidney; e) the actual nasal cavity.	GPC-5
13	apocrine	Fragments of the cytoplasm of cells are found in the lumen of the terminal part of the lactating mammary gland, because the gland secretes according to the _____ type.	GPC-5
14	goblet-shaped	In the epithelium of the airways there are unicellular glands – _____ cells.	GPC-5
15	a	Granular-mesh structures in reticulocytes are: a) residues of ribonucleoproteins; b) DNA residues; c) hemoglobin granules; d) microtubules; e) microfilaments.	GPC-5
16	b	All leukocytes are characterized by everything except; a) the ability to move independently; b) participation in defensive reactions; c) functioning in tissues; d) ability to phagocytosis; e) the presence of a core.	GPC-5
17	b	Neutrophilic granulocytes are in the bloodstream for about: a) a year; b) 8-12 hours; c) months; d) 120 days; e) 1 hour.	GPC-5

18	b	Heparin and histamine are contained in granules of: a) neutrophils; b) basophils; c) eosinophils; d) monocytes; e) platelets.	GPC-5
19	e	Eosinophilic granulocyte granules contain all of the above except: a) histaminases; b) basic protein; c) peroxidases; d) hydrolytic enzymes; e) histamine.	GPC-5
20	monocytes	All free and fixed macrophages of the body develop from _____	GPC-5
21	c	Connective tissues develop from: a) endoderm; b) splanchnotoma; c) mesenchyma; d) ectoderm; e) segmental legs.	GPC-5
22	e	The transport and trophic function of connective tissue is provided by: a) collagen fibers; b) adipocytes; c) elastic fibers; d) plasmocytes; e) an amorphous component of the intercellular substance.	GPC-5
23	d	Blood monocytes form: a) plasmocytes; b) adipocytes; c) fibroblasts; d) macrophages; e) labrocytes.	GPC-5
24	e	The following tissues are actively involved in heat production in newborns: a) white adipose tissue; b) reticular; c) pigmented; d) the mucous membrane; e) brown adipose tissue.	GPC-5
25	a	Gelatinous connective tissue is a part of: a) umbilical cords; b) chorion; c) the amnion; d) the yolk bladder; e) allantois	GPC-5
26	melanocytes	A more intense skin color of the scrotum and breast nipple is determined by	GPC-5
27	collagen	Transverse striation has _____ fibers of connective tissue.	GPC-5

28	e	Structural and functional unit of fine-fibrous bone tissue: a) osteon; b) collagen fiber; c) osteocyte; d) osteoblast; e) bone plate.	GPC-5
29	d	The differentiation of bone tissue mechanocytes includes all of the listed cells, except: a) stem osteogenic; b) semi-stemmed stromal; c) osteoblasts; d) osteoclasts; e) osteocytes.	GPC-5
30	c	Bone growth in length is provided by: a) periostomy; b) endostome; c) epiphyseal plate; d) the epiphysis; e) diaphysis	GPC-5
31	b	Reticulofibrous bone tissue in an adult can be found: a) in the epiphyses of tubular bones; b) in place of cranial sutures; c) in the intervertebral discs; d) on articular surfaces; e) in the diaphyses of the tubular bones.	GPC-5
32	d	Direct osteogenesis begins with: a) osseomucoid formations; b) the formation of bone beams; c) the development of periosteum; d) osteogenic islet formation; e) formation of bone plates.	GPC-5
33	osteonic	The compact bone substance consists of morphofunctional units _____.	GPC-5
34	plate - shaped	In the process of direct osteogenesis, reticulofibrous bone tissue is replaced by _____.	GPC-5
35	CO ₂	In the process of bone resorption, osteoclasts are released into the environment.	GPC-5
36	d	Striated skeletal muscle tissue is characterized by all the features except: a) the presence of connective tissue layers between the muscle bundles; b) the ability to reduce; c) the presence of motor plaques; d) cellular structure; e) the presence of satellite cells.	GPC-5
37	d	Z-bands of sarcomeres provide: a) the connection of myosin filaments of one sarcomere; b) the connection of myosin filaments of neighboring sarcomeres; c) the connection of actin filaments of one sarcomere;	GPC-5

		d) the connection of actin filaments of neighboring sarcomeres; e) the connection between actin and myosin filaments of the same sarcomere.	
38	d	Cardiac muscle tissue shows similarities to skeletal muscle tissue in all features except: a) the presence of connective-woven interlayers between the bundles; b) excessive vascularization; c) striated striation; d) cellular structure; e) Sarcoplasmic oxyphilia	GPC-5
39	c	The main morphofunctional property of smooth muscle tissue is: a) a variety of cellular forms; b) well-developed intercellular substance; c) the ability to contract for a long time (without noticeable fatigue); d) the presence of satellite cells; e) the ability to carry out metabolic reactions and maintain homeostasis.	GPC-5
40	d	Smooth muscle tissue is characterized by everything except: a) cellular structure; b) ability to synthesize glycosaminoglycans, collagen, elastin; c) the presence of a large number of nexuses; d) the presence of motor end plates (motor plaques); e) the ability for reparative regeneration.	GPC-5
41	Ca	The sarcoplasmic reticulum is deposited, which is necessary for the contraction of myofibrils_____	GPC-5
42	chaste	Cardiac muscle tissue refers to_____ histogenetic type.	GPC-5
43	sarcomere	The _____ is the area of the myofibril between the telophragmas	GPC-5
44	a	A sign of the beginning specialization of nerve cells should be considered: a) the appearance of bundles of neurofilaments and neurotubules in the cytoplasm; b) the development of lysosomes; c) the development of the granular cytoplasmic reticulum; d) the appearance of a lamellar complex in the cytoplasm; e) the appearance of mitochondria.	GPC-5
45	d	The main role in the processes of degeneration and regeneration of nerve fibers belongs to: a) ependymocytes; b) fibrous astrocytes; c) protoplasmic astrocytes; d) neurolemmocytes; e) microglia.	GPC-5

46	b	The neuroglia lining the vascular plexuses of the gastric brain and the spinal canal are formed by: a) protoplasmic astrocytes; b) ependymocytes; c) fibrous astrocytes; d) oligodendrogliaocytes; e) microglia.	GPC-5
47	d	The unilateral conduction of a nerve impulse in the synapse area is determined by: a) a system of neurofibrils and neurotubules; b) the presence of mitochondria; c) axoplasmic flow of substances; d) the presence of a receptor protein on the postsynaptic membrane; e) the presence of glial cells	GPC-5
48	b	All the signs are characteristic of myelin nerve fibers, except: a) one axial cylinder; b) multiple axial cylinders; c) nodal intercepts; d) neurofilaments; e) lemmocytes.	GPC-5
49	myelin	The rate of conduction of a nerve impulse is higher in _____ fibers	GPC-5
50	saltatory	The myelin nerve fiber is characterized by _____ conducting arousal.	GPC-5

Exam questions

Introduction. Research methods in histology

1. The subject and methods of histology. The main stages of the formation of histology. The history of Russian histology. Prospects of development and tasks of modern histology.
2. Methods of studying living cells and tissues.
3. Examination of fixed (dead) cells and tissues.
4. Study of the chemical composition and metabolism of cells and tissues.
5. Methods of microscopy of histological preparations.

General principles of tissue organization

6. Tissue as a system. Tissue definition. Classification of tissues and general patterns of their formation.
7. 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.
8. Tissue homeostasis. Fundamentals of cell population kinetics

Epithelial tissues

9. Epithelial tissues. Genetic, morphological, and functional classification of epithelia. Common signs characteristic of epithelial tissues.
10. Single-layered epithelium, its types, structural features.
11. Multilayer flat non-corneating epithelium, its structure, functional significance, origin and location in the body.
12. Multilayer flat keratinizing epithelium, its structure, functional significance, origin and location in the body. Factors that cause keratinization.
13. Glandular epithelium, its characteristics, origin and location in the body. Phases of the secretory cycle and their characteristics. Classification of glands.

Blood and lymph. Hematopoiesis

14. The concept of the blood system. Blood and lymph, as varieties of mesenchymal tissues, form the internal environment of the body.
15. Blood. General information about its composition and functions. Blood plasma, its composition and significance. I. I. Mechnikov's research on phagocytosis.
16. Red blood cells, their number, shape, size, structure, meaning. Blood platelets, their number, structure, meaning.
17. Leukocytes (quantity, classification, structure and functional significance of each type).
18. The concept of hemogram and leukocyte formula, their age-related changes. Lymph, its composition and significance.
19. Embryonic hemocytopoiesis (development of blood as tissue).
20. Postembryonic hemocytopoiesis (the process of physiological regeneration of blood).
21. Regulation of hemocytopoiesis.

Connective tissues

22. Characteristics of the connective tissue proper, its classification. Fibrous connective tissues, development, structure, functions and location.
23. Loose fibrous connective tissue. Morphological and functional characteristics of cells, fibers, and basic matter.
24. Dense fibrous connective tissue, its development, structure, functions and location. Fibrous membranes.
25. General morphofunctional characteristics of connective tissues with special properties. Morphology, functional significance and location of adipose tissue.
26. Skeletal tissues. Cartilage tissue, development, general characteristics. Types of cartilage tissue, structural features, regeneration. Age-related changes.
27. Bone tissue. General characteristics. Classification. Bone structure and changes under the influence of external and internal environmental factors. Bone development directly from mesenchyme (direct osteohystogenesis), bone development in place of cartilage (indirect osteohystogenesis).
28. Coarse-fibrous and lamellar bone tissues. Osteon is a structural unit of a compact substance the tubular bone. The structure of the periosteum. Bone restructuring during the development and growth of the body. Factors affecting bone growth. Regeneration of bone tissue.
29. Bone tissue. Bone cells (osteoblasts, osteocytes, osteoclasts). The structure and chemical composition of the intercellular substance. The structure of the bone as an organ.

Muscle tissue

30. General characteristics of muscle tissue: sources of development, classification, general features of structure and function. Smooth muscle tissue, location, histogenesis, structure, features of functioning and regeneration.
31. Skeletal muscle tissue: location, histogenesis, microscopic structure of muscle fiber. The structure of myofibrils.
32. Histophysiology of muscle contraction.
33. Features of development, structure and functions of cardiac muscle tissue. The structure of contractile and conductive cardiomyocytes. Regeneration of cardiac muscle tissue.

Nervous tissue

34. Embryonic sources of neuronal and gliocyte development. Regeneration of nervous tissue. Morphological and functional classification of neurons.
35. Microscopic, ultramicroscopic and histochemical characteristics of nerve cells.
36. Neurosecretory cells. The difference between neurons and neurosecretory cells.
37. Processes of nerve cells: axons and dendrites. The structure of fleshy and meatless nerve fibers. Formation and structure of myelin sheaths.
38. Afferent nerve endings of the skin. Free nerve endings: tactile, menisci. Encapsulated nerve endings: lamellar corpuscles, tactile corpuscles, terminal flasks, genital corpuscles.

39. Afferent nerve endings: neuromuscular spindles are receptors of smooth muscle tissue. Efferent nerve endings: myoneural synapses are motor plaques.

40. Structure and functions of neuroglia. Ependyma, astroglia, oligodendroglia, microglia. The relationship of neurons and neuroglia.

41. Classification of synapses. The concept of neurotransmitters and their nature.

42. Synapses, their microscopic and ultramicroscopic structure, histochemical characteristics, meaning. Myoneural synapses are motor plaques.

The nervous system

43. The nerve. Structure, tissue composition. Reaction to damage, regeneration.

44. Sensitive nerve nodes (spinal and cranial). Structure, tissue composition. Characteristics of neurons and neuroglia.

45. The spinal cord. General characteristics of the structure. The structure of gray matter: types of neurons and their involvement in the formation of reflex arcs, types of gliocytes.

46. Nuclei of gray matter. The structure of the white matter. The central canal of the spinal cord and cerebrospinal fluid.

47. The cerebellum. The structure and neural composition of the cerebellar cortex. The cerebral cortex. Embryonic and postembryonic histogenesis.

48. The brain stem. Structure and neural composition.

49. Cytoarchitectonics of the layers (plates) of the cerebral cortex. Neural composition, characteristics of pyramidal neurons. An idea of the modular organization of the cortex.

Sensory systems (Sensory organs).

50. The organ of vision. Sources of embryonic development and histogenesis. The general outline of the eyeball structure. Shells, their divisions and derivatives, and tissue composition

51. The structure of the cornea, lens, vitreous body, iris, retina.

52. Auxiliary organs of the eye (eyelids, lacrimal apparatus).

53. The organ of smell. General characteristics. Embryonic development. The structure and cellular composition of the olfactory lining: receptor, supportive, and basal cells. The vomeronasal organ.

54. The organ of taste. General characteristics. Embryonic development. The structure and cellular composition of taste buds are gustatory, supportive, and basal cells. Innervation of taste buds

55. Organs of hearing and balance. General characteristics. Embryonic development.

56. The outer ear. The structure of the external auditory canal and eardrum.

57. Middle ear: auditory ossicles, characteristics of the epithelium of the tympanic cavity and the auditory tube.

58. Inner ear: bony and membranous labyrinths.

59. Vestibular part of the membranous labyrinth: elliptical and spherical sacs and semicircular channels. Their receptor divisions: the structure and cellular composition of the spot and ampullary scallops.

60. The cochlear part of the membranous labyrinth: the structure of the cochlear canal, the structure and cellular composition of the spiral organ, its innervation.

The cardiovascular system.

61. Structure and embryonic development of the cardiovascular system.

62. Blood vessels. General principles of structure, tissue composition.

63. Classification of vessels. The concept of the microcirculatory bed, Vascular vascularization (vascular vessels).

64. Arterial Classification. Features of the structure and function of arteries of various types: muscular, musculoskeletal and elastic. Organ features of the arteries.

65. Arterioles, their types and role in blood circulation. Building. The importance of endotheliomyocyte contacts in the histophysiology of arterioles.

66. Hemocapillaries. Classification, function and structure Morphological foundations of capillary permeability and regulation of their functions. Organ features of capillaries.

67. Venules. Their types, functional significance, and structure.
68. Veins. The structure of the vein wall in connection with hemodynamic conditions. Classification. Features of the structure of veins of various types (muscular and non-muscular). The structure of venous valves. Organ features of veins.
69. Lymphatic vessels. Structure and classification. The structure of lymphatic capillaries and various types of lymphatic vessels.
70. The heart. Embryonic development. The structure of the heart wall, its membranes, and their tissue composition. Endocardium and heart valves.
71. Myocardium, working, conducting and secretory cardiomyocytes. Features of blood supply and regeneration.
72. The conduction system of the heart, its morphofunctional characteristics. Epicardium and pericardium.

The endocrine system.

72. General characteristics and classification of the endocrine system.
73. Hypothalamic-pituitary neurosecretory system.
74. Hypothalamus. Neuroendocrine neurons of the large-cell and small-cell nuclei of the hypothalamus.
75. The pituitary gland. Embryonic development. Structure and functions of the adenohypophysis. The middle (intermediate) lobe of the pituitary gland and its features in humans. The structure and function of the neurohypophysis, its connection with the hypothalamus.
76. Epiphysis of the brain Structure, cellular composition, function. Age-related changes.
77. The thyroid gland. Sources of development. Building. Follicles as morphofunctional units, wall structure and colloid composition of follicles. Folliculogenesis. Vascularization and innervation the thyroid gland.
78. Parathyroid glands. Sources of development. Structure and cellular composition. Vascularization, innervation, and mechanisms of regulation of the parathyroid glands.
79. The adrenal glands. Sources of development. Fetal and definitive adrenal cortex. Cortical zones and their cellular composition.
80. The adrenal medulla. Structure, cellular composition, hormones, and the role of brain endocrinocytes.
81. Endocrine islets of the pancreas.
82. The concept of the diffuse endocrine system (DES), localization of elements, and their cellular composition. Neuroendocrine cells. Ideas about the APUD system.

The immune system

83. General characteristics of the immune system. The concept of immunity, antigens, and antibodies capable of binding to the corresponding antigens.
84. Characteristics of immunocompetent cells. Antigen-independent and antigen-dependent proliferation and differentiation of T and B lymphocytes.
85. Mechanisms of integration of elements of the immune system.
86. The involvement of tissue basophils and eosinophils in immune reactions, mechanisms of integration of elements of the immune system.
87. The role of macrophages in natural and acquired immunity.

The digestive system.

88. General characteristics of the digestive system. The main sources of development of digestive system tissues in embryogenesis.
89. The general principle of the structure of the wall of the digestive canal is the mucous membrane, submucosa, muscle membrane, outer membrane (serous or adventitious), their tissue and cellular composition.
90. Oral cavity The structure of the mucous membrane in connection with the function and peculiarities of digestion in the oral cavity. The structure of the lips, cheeks, hard and soft palate, tongue, gums, tonsils.

91. Large salivary glands. Classification, sources of development, structure and functions. The structure of secretory departments, excretory ducts. Endocrine function.

92. Language. Building. Features of the structure of the mucous membrane on the upper and lower surfaces of the organ. Papillae of the tongue, their types, structure, functions.

93. Teeth. Building. Enamel, dentin, and cement – structure, function, and chemical composition. Tooth pulp – structure and meaning. Periodontal structure and significance of blood supply and innervation of the tooth. Development and replacement of teeth. Age-related changes.

94. Pharynx and esophagus. The structure and tissue composition of the pharyngeal wall and esophagus in its various departments. Glands of the esophagus, their histophysiology.

95. The stomach. The structure of the mucous membrane in various parts of the organ. Cytophysiological characteristics of the integumentary epithelium. Regeneration of the integumentary epithelium and epithelium of the gastric glands.

96. Small intestine Characteristics of various parts of the small intestine. The structure of the wall, its tissue composition. The crypta-villus system as a structural and functional unit. Regeneration of the epithelium of the small intestine.

97. The large intestine. Characteristics of different departments. The structure of the wall, its tissue composition. Types of epitheliocytes and endocrinocytes, their cytophysiology. Lymphoid formations in the wall.

98. The pancreas. The structure of the exocrine and endocrine departments. Cytophysiological characteristics of acinar cells. Blood supply. Innervation. Regeneration.

99. The liver. Features of blood supply. The structure of the "classical lobule as a structural and functional" unit of the liver. Ideas about the portal lobule and acinus.

100. The gallbladder and biliary tract. Structure and function.

Respiratory system.

101. General characteristics of the respiratory system. Airways and respiratory department. Development. Age-related features. Regeneration.

102. Structural features of the walls of the airways: nasal cavity, larynx, trachea and main bronchi. Tissue composition and histofunctional characteristics of their membranes. Cellular composition of the epithelium of the mucous membrane.

103. Lungs. Intrapulmonary airways: bronchi and bronchioles, the structure of their walls depending on their caliber. Acinus as a morphofunctional unit of the lung.

104. Structural and chemical organization and function of the surfactant-alveolar complex. The structure of the interalveolar septa. Aerogematic barrier and its significance in gas exchange.

105. Pleura. Morphofunctional characteristics

Skin and its derivatives.

106. Skin. General characteristics: Tissue composition, development. Regeneration.

107. Epidermis The main cell differons in the epidermis.

108. Structural features of the epidermis of "thick" and "thin" skin The concept of the keratinization process, its meaning

109. The dermis. Papillary and mesh layers, their tissue composition. Features of the structure of the dermis in the skin of various parts of the body - the feet of the palms, the face of the joints, etc. Histofunctional characteristics of the immune system in the dermis Skin vascularization Hypoderma

110. The glands of the skin. Sebaceous and sweat glands (mero- and apocrine), their development, structure. Appendages of the skin. Hair. Development, structure, growth, hair color, innervation. Nails. Development of the structure and growth of nails.

The system of organs of urination and urinary excretion.

111. General characteristics of the urinary organ system. Development.

112. Kidneys. The cortical and cerebral substance of the kidney.

113. The nephron is a morphofunctional unit of the kidney, its structure, types of nephrons, and their topography in the cortex and medulla.

114. Renal corpuscles, their main components. The structure of vascular glomeruli. Histophysiology of tubules of nephrons and collecting tubules in connection with their participation in the formation of final urine. Kidney stroma, its histofunctional characteristics

115. Urinary tract. The structure of the walls of the renal cups and pelvis. The structure of the ureters. The structure of the bladder. Features of the structure of the male and female urethra.

Reproductive systems.

116. Male genitalia. The testicle. Building. Convoluted seminal tubules, wall structure. The endocrine function of the testicle, male sex hormones and their synthesizing glandulocytes (cells Leydig's disease), their cytochemical features, and their involvement in the regulation of spermatogenesis.

117. Vas deferens. The appendage of the testicle. The vas deferens. Seminal glands. The ejaculatory canal. Bulbo-urethral glands. The prostate gland. Their structure and functions. Age-related changes. The penis. Building.

118. Female genitalia. The ovary. Development. General characteristics of the structure. Features structures of the cortical and cerebral matter.

119. The structure and development of follicles. Ovulation. The concept of the ovarian cycle and its regulation. Development, structure and functions of the corpus luteum during the ovarian cycle and during pregnancy. Follicular atresia. Age-related features

120. The uterus. Development. The structure of the uterine wall in its various departments. Reconstruction of the uterus during pregnancy and after childbirth. Vascularization and innervation of the uterus. Age-related changes

121. Fallopian tubes. Development of structure and function. Vagina. Development. The structure of its walls. A change due to the menstrual cycle

122. The mammary (breast) gland. Origin. Development. Building. Postnatal changes. Functional morphology of lactating and non-lactating (non-functioning and post -lactation) mammary glands. Neuroendocrine regulation of the functions of the urinary glands. Breast changes during the ovarian-menstrual cycle and during pregnancy.

2. Description of the Evaluation Scale

Within the framework of the rating system, students' academic progress in each discipline is evaluated during current control and intermediate attestation. The rating system for assessing students' knowledge is based on the use of a combination of control activities to check the covered material (checkpoints), optimally located throughout the entire time interval of studying the discipline. The principles of the rating system for assessing students' knowledge are based on the requirements described in the Regulations on the organization of the educational process based on the rating system for assessing students' knowledge at NCFU.

3. Criteria for Evaluating Competencies

The grade **Excellent** shall be awarded to a student if the theoretical content of the course has been mastered completely, without gaps; the material is presented exhaustively, consistently, clearly, and logically; the student freely copes with tasks, questions, and other types of knowledge application; uses additional material in the answer; all tasks provided for by the program are completed, and the quality of their execution is evaluated by a number of points close to the maximum; analyzes the obtained results; demonstrates independence when performing tasks.

The grade **Good** is to be awarded to a student if the theoretical content of the course is mastered completely, the necessary practical competencies are mainly formed, all educational tasks provided for by the training program are completed, and the quality of their execution is sufficiently high. The student firmly knows the material, presents it competently and strictly on the merits of the matter, without allowing significant inaccuracies in answering the question.

The grade **Satisfactory** is awarded to a student in case the theoretical content of the course has been mastered in part only, but the gaps are not of a significant nature, most of the tasks provided for by the program are completed, but contain errors, the student allows inaccuracies and

insufficiently correct wording when answering the question, and violations of logical sequence are observed in the presentation of the program material.

The grade **Unsatisfactory** is awarded to a student if they do not know a significant part of the program material, allow significant errors, perform practical works with great difficulty and uncertainty, the necessary practical competencies are not formed, most of the educational tasks provided for by the training program are not completed, and the quality of their execution is evaluated by a number of points close to the minimum.