

SYLLABUS

1. General information on the course

Full course name	Human Anatomy
Full official name of a higher education institution	Sumy State University
Full name of a structural unit	Academic and Research Medical Institute. Кафедра морфології
Author(s)	Yarmolenko Olha Serhiivna, Bumeister Valentyna Ivanivna
Cycle/higher education level	The Second Level Of Higher Education, National Qualifications Framework Of Ukraine – The 7th Level, QF-LLL – The 7th Level, FQ-EHEA – The Second Cycle
Duration	three semesters
Workload	14 ECTS, 420 hours. For full-time course 302 hours are working hours with the lecturer (16 hours of lectures, 286 hours of seminars), 118 hours of the individual study.
Language(s)	English

2. Place in the study programme

Relation to curriculum	Compulsory course available for study programme "Medicine"
Prerequisites	Biology, General Chemistry, Mathematics, General Physics , English Language
Additional requirements	There are no specific requirements
Restrictions	There are no specific restrictions

3. Aims of the course

The aim of the discipline is for students to acquire a system of special knowledge in the field of human morphology, systematic and functional human anatomy, to instill moral and ethical principles of attitude to the physical body, as well as to achieve a modern level of fundamental and clinical thinking.

4. Contents

Module 1. Content module 1. "Osteology"
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Topic 1 Anatomical nomenclature. Axes and planes of the body.

Subject and tasks of anatomy. Research methods in anatomy. The main modern directions of anatomy development. The main stages of development of anatomy. Formation and development of Ukrainian anatomical schools. Levels of structural organization of the human body. The initial stages of human embryogenesis. Embryonic leaves and their derivatives. International anatomical nomenclature. Anatomical planes and axes of the human body, their characteristics, use to describe bones and their parts. Bone as an organ. Classification of bones and their development in embryogenesis.

Topic 2 The bones of the trunk and limbs

The principle of segmentation in the structure of the axial skeleton. Brief data on phylogeny and ontogenesis of the vertebral column. General plan of the structure of the vertebrae. Structural features of the cervical, thoracic, and lumbar vertebrae. The structure of the sacrum and coccyx. Age and sex structural features of the vertebrae. The influence of social and environmental factors on the structure of vertebrae. Vertebral malformations. Development of ribs and sternum in phylo- and ontogenesis. Classification of ribs. The structure of ribs and sternum. Forms of variability of ribs and sternum, variants and anomalies of development. Age and sex features of a sternum. The influence of social and environmental factors on the structure of ribs and sternum. Upper limb: its parts. Upper limb bones: upper limb girdle, free part of the upper limb. Lower limb: its parts. Lower limb bones: lower limb girdle and free lower limb. Terms of the upper and lower limbs bones ossification. Development of the upper and lower limbs bones in ontogenesis. Variants and anomalies of the upper and lower limbs bones development. Homology of the upper and lower limbs bones. Age and sex features of upper and lower limbs bones structure. Specific features of upper and lower limbs bones structure due to the processes of anthropogenesis. Influence of sports, work, social factors and environmental factors on the upper and lower limbs bones structure.

Topic 3 Skull bones. The skull as a whole

Skull development in phylo- and ontogenesis. The neurocranium and visceral (facial) parts of the skull. The structure of bones that make up the neurocranium: frontal, occipital, parietal, sphenoid, and ethmoid bone. The structure of the temporal bone. Canals of a temporal bone: inlets, outlets, and contents of an each canal. The structure of bones that make up a facial skull: mandible, maxilla, zygomatic, nasal, palatine, lacrimal, hyoid bones, vomer, inferior nasal concha. The calvaria. The outer and inner bases of the skull. Anterior, middle and posterior cranial fossae, temporal and infratemporal fossae. The orbit: walls, communications. Age and sex features of the skull structure. Variants and anomalies of skull bones development. X-ray anatomy of the skull. Bone nasal cavity: walls, communications, bone nasal septum. Pterygopalatine fossa: walls, communications.

Module 1. Content module 2. "Artrosyndesmology"

Topic 4 General arthrosyndesmology. Articulations of bones of a trunk and a skull. The skull of a newborn

Development of bone articulations in phylo- and ontogenesis. Classification of bone articulations. Types of synarthroses: syndesmoses; synchondrosis; synostosis. Diarthroses (synovial articulations, joints): definition, main features, their characteristics. Accessory structures of joints. Classification of joints by structure, shape of joint surfaces, function. Simple, compound, complex and combined joints. Types of movements and their analysis (axes of movements, planes of movements). Uniaxial, biaxial and multiaxial joints, their types, characteristics of movements in each type of joint. Skull articulations: classification. Skull syndesmoses: sutures, their types and characteristics. Skull synchondroses: their types, characteristics, age features. Skull joints: temporomandibular joint, atlanto-occipital joint. Age features of a skull bones articulations: the fontanelles, their types, structure, timing of ossification. Classification of articulations of a vertebral column. Syndesmoses of a vertebral column: their characteristics and structure. Synchondroses of a vertebral column: their characteristics and structure. Joints of a vertebral column: middle atlanto-axial joint, lateral atlanto-axial joint, zygoapophysial joints, lumbosacral joint, sacrococcygeal joint. The vertebral column as a whole. Age and sex characteristics of a spine as a whole. Influence of sports, work, social factors and environmental factors on a spine.

Topic 5 Articulations of upper and lower limbs bones

Articulations of a pectoral girdle: syndesmoses and joints of an upper limb girdle (acromioclavicular joint and sternoclavicular joint). Articulations of a free upper limb: shoulder joint, elbow joint, forearm bone articulations, radiocarpal joint, joints of the hand. Articulations of a pelvic girdle: syndesmoses, pubic symphysis, sacroiliac joint. The pelvis as a whole: its structure, the basic sizes. Age, sex, individual features of the pelvis. Articulations of a free lower limb: hip joint, knee joint. Articulations of shin bones, ankle joint, foot joints. Surgical joints of a foot. An arches of a foot. X-ray anatomy of upper and lower limbs bones articulations. Influence of sports, work, social factors and environmental factors on the structure of upper and lower limbs bones articulations.

Module 1. Content module 3. "Muscular System"

Topic 6 The muscles and fascia of the trunk, head and neck.

Muscle as an organ: definition, tendons, aponeurosis. Auxiliary apparatus of muscles: fasciae, synovial vaginae, synovial sacs, sesamoid bones, tendon arch, muscle block. Anatomical and physiological diameters of muscles: basic data on muscle strength and function; the concept of levers. Origin and insertion of muscles: their functional characteristics. Muscle classification: by development, topography, shape, size, direction of muscle fibers, function, etc. Muscle development in phylo- and ontogenesis. Sources of development of a trunk, head, neck, limbs muscles. Classification of the trunk muscles by topography, development and shape. Segmental structure of the trunk muscles. The muscles of the back, their characteristics. Thoracolumbar fascia. The muscles of the chest, their characteristics. Thoracic fascia, endothoracic fascia. The diaphragm: definition, parts, openings and their contents, triangles. The muscles of the abdomen, their characteristics. The fasciae of abdomen. The linea alba. The umbilical ring. The abdominal press. The topography of the anterior abdominal wall. The inguinal canal. The rectus sheath. The muscles of the head: classification. The masticatory muscles, their characteristics. The fascia of the head. The muscles of the neck: their classification and characteristic. The fascia of the neck: anatomical and anatomo-topographical classification. The topography of the neck: areas, triangles, spaces.

Topic 7 Muscles and fasciae of the upper and lower limbs. Topography of the upper and lower limbs.

Upper limb muscles classification. Muscles and fascia of the girdle and free upper limb: classification, characteristics. Axillary fossa, axillary cavity, triangles, quadrilateral and triangular openings. Radial canal. Grooves on the anterior surface of the upper arm. The cubital fossa. Grooves on the anterior surface of the forearm. Osteofibrous canals, flexor and extensor retinacula. The carpal canal, synovial sheaths of flexor tendons. The synovial bursae. The muscles and fasciae of the girdle and free lower limb: classification, characteristics. Muscular and vascular spaces, their topography and contents. Femoral triangle. Grooves on the anterior surface of the thigh. The adductor canal. The popliteal fossa. The canals of the leg: cruropopliteal, superior and inferior musculo-peroneal ones. Grooves of the sole. The saphenus opening. The femoral canal. Extensor, flexor, and peroneal muscles retinacula. Synovial bursae and synovial vaginas of the lower limb muscles. Arch of the foot support: passive (ligaments) and active (muscles) ties of the foot. Analysis of the basic positions and movements of the human body (standing, walking, running, jumping). Distinctive features of the musculoskeletal system structure of man, acquired in connection with walking upright. Age, sex and individual characteristics of skeletal muscles. Influence of sports, work, social and environmental factors on the trunk and limbs muscles structure.

Module 1. Content module 4. "Digestive system"

Topic 8 Digestive System

Classification of the internal organs. General plan of the tubular organs wall structure. Glands: their classification, general principles of structure, functions. Digestive system: organs, functions. Development of the digestive tract, liver and pancreas. Primary and secondary body cavities. Development of the peritoneum. Structural mechanisms of the digestive system malformations. Anomalies and options for the digestive system development. Oral cavity: its parts, and communications. Teeth. Periodontum, paradontum. Gums. Dental formula, characteristics of each type of teeth. Terms of permanent and deciduous teeth eruption. X-ray anatomy of teeth. Occlusions. Palate. Tonsils. Tongue: parts, features of the mucous membrane structures, muscles. Large and small salivary glands: topography, characteristics, structure. Pharynx, its topography, parts, communications, wall structure. Esophagus: topography, parts, wall structure, constrictions. The principle of division of the anterior abdominal wall into areas. Stomach: topography, parts, wall structure. Small and large intestine: parts, macroscopic differences in their structure, relation to the peritoneum. Liver: topography, external and internal structure. Pancreas. Peritoneum. Abdominal cavity, its contents. Peritoneal cavity, its contents. Options for the internal organs relations to the peritoneum. Peritoneal derivatives: mesenteries, omentums, ligaments.

Module 2. Content module 5. "Splanchnology"

Topic 9 Respiratory System

Respiratory system: organs, functions. Upper and lower respiratory tract. Development of the respiratory system organs in phylo- and ontogenesis. Variants and anomalies in the respiratory system development. Nose: parts, structure. Nasal cavity: dorsum, nasal meatuses, paranasal sinuses. Functional parts of the nasal cavity. Nasal part of the pharynx. Age features of the nasal cavity. Larynx. Topography. The structure of the larynx: cartilages, ligaments, joints, muscles. Elastic cone, quadrangular membrane. Laryngeal cavity: parts, their boundaries. Vocal folds, vestibular folds. Glottis. Mechanisms of voice formation. X-ray anatomy of the larynx, laryngoscopy. Age features of the larynx. Trachea: parts, topography, wall structure. Main bronchi: topography, wall structure. Age features of the trachea and main bronchi. Lungs: external structure. Hilum of the lungs. Root of lung and its components. Bronchial tree. Lobes, segments, lobulae of the lung. Alveolar tree. Acinus. The circulatory system of the lungs. X-ray anatomy of the trachea, bronchi, lungs. Age features of the lungs. Pleura. Parietal pleura and its topographic parts. Visceral pleura. Pleural cavity: contents, recesses, their functional value. Projection of lungs and pleural sacs on the walls of the thoracic cavity. The mediastinum: definition, boundaries. Organs of the anterior mediastinum. Organs of the posterior mediastinum.

Topic 10 Urinary System

Urinary system: organs, functions. Development of urinary system organs in phylo- and ontogenesis. Variants and anomalies in the development of the urinary system: kidneys, ureters, urinary bladder and urethra. Kidney: topography of the right and left kidney. The external structure of the kidney. The relation of the kidney to the peritoneum. Kidney tunics. Kidney's support. Topography of the elements of the renal stalk. The internal structure of the kidney. Kidney segments. The nephron is a structural and functional unit of the kidney. The structure of the circulatory system of the kidney. Urinary tract. Minor renal calyces, major renal calyces, renal pelvis, wall structure, functions. X-ray anatomy of the kidney. Age features of topography and structure of a kidney. Ureter: parts, topography, wall structure, functions. Relation to the peritoneum. Constrictions of the ureter. Urinary bladder: shape, external structure, parts. Features of topography in men and women. The structure of the urinary bladder wall: features of the mucous and muscular membrane structure. Relation to the peritoneum (depending on the functional state). Female urethra. X-ray anatomy of the urinary tract (ureters, bladder, urethra). Age features of the urinary bladder.

Topic 11 Reproductive Systems. Perineum

Male reproductive system: organs, functions. Classification of the male reproductive system. External male genitalia. Internal male genitalia. Testes: topography, structure. Epididymes. The process of lowering the testes into the scrotum. The tunics of the testes. Ductus deferens: parts, topography, wall structure. The spermatic cord, its components. Seminal vesicle: topography, structure, functions. Ejaculatory duct. Prostate: topography, parts, structure, functions. Bulbo-urethral gland. Scrotum. Penis, its structure. Male urethra: parts, their topography, wall structure. Embryogenesis of male and female reproductive systems. Female reproductive system: organs, functions. Classification of the female reproductive system. Internal female genitalia. External female genitalia. Development of male and female reproductive systems in phylo- and ontogenesis. Variants and anomalies of development of male and female genitalia. Perineum: definition, topography. Urogenital and pelvic diaphragms: boundaries, muscles, fascia, sex differences. Ischioanal fossa: boundaries, contents.

Module 2. Content module 6. "Cardiovascular System"

Topic 12 Anatomy of the heart

General principles of structure and function of the cardiovascular system. Components of the vascular part of the cardiovascular system: arteries, veins, vessels of the hemomicrocirculatory network. Lymphatic vessels, principles of their structure, functions. Greater and lesser circuits. Shape, position of the heart. The external structure of the heart. Chambers of the heart: their structure. Heart valves. The structure of the heart wall: endocardium, myocardium, epicardium. Conducting system of the heart. Arteries and veins of the heart. Pericardium, its structure, pericardial cavity, contents, sinuses. Projection of the cardiac boundaries and valves on the anterior wall of the thoracic cavity. Age anatomy of the heart. Development of the heart in phylogeny. Stages of the heart development in human embryogenesis. Variants and anomalies of heart development. Structural mechanisms of development of heart anomalies.

Topic 13 Arterial system.

Anatomical classification of arteries. Classification of arteries by wall structure. Types of arterial branching. Basic patterns of distribution of arteries in the human body. Arterial inter- and intrasystemic anastomoses. Sources and mechanisms of arterial development. Arterial arches and their derivatives. Variants and anomalies of main arteries development. Vessels of a hemomicrocirculatory network. Organ specificity of the hemomicrocirculatory network vessels. The concept of collateral (bypass) blood flow. Age features of arteries. X-ray anatomy of arteries. Aorta, parts of the aorta, branches, areas of blood supply. Common carotid artery: topography, branches. Internal carotid artery: parts, topography, branches, areas of blood supply. External carotid artery: topography, classification of branches, areas of blood supply. Subclavian artery: topography, branches, areas of blood supply. Axillary artery: topography, parts, branches, areas of blood supply. Arteries of the free upper limb: topography, branches, areas of blood supply. Common iliac artery: formation, topography, branches. Internal and external iliac arteries: topography, classification of branches, areas of blood supply. Arteries of the free lower limb: topography, branches, areas of blood supply. Intrasystemic and intersystemic arterial anastomoses.

Topic 14 Venous system

Anatomical classification of veins. Classification of veins by wall structure. Venous networks, venous plexuses. Variants and anomalies of main veins development. Age features of veins. X-ray anatomy of veins. Superior vena cava: roots, tributaries, topography. Internal jugular vein: formation, topography, classification of tributaries. Anastomoses between intracranial and extracranial tributaries of the internal jugular vein. External jugular vein: formation, topography, tributaries. Anterior jugular vein: formation, topography, tributaries. Brachiocephalic vein: formation (roots), topography, tributaries. Azygos vein: formation, topography, classification of tributaries, areas of venous blood collection. Hemiazygos vein: formation, topography, classification of tributaries, areas of venous blood collection. Veins of the vertebral column. Veins of the upper limb: classification, their characteristics, patterns of topography and structure. Inferior vena cava: roots, topography, classification of tributaries, areas of venous blood collection. Common iliac vein: roots, topography. Internal iliac vein: topography, tributaries. Venous plexuses of the pelvic organs. Lower limb veins: classification, their characteristics. Portal hepatic vein: roots, topography, tributaries. Venous intersystemic anastomoses: cava-caval and porto-caval. Clinical significance of the venous anastomoses. Fetal circulation.

Topic 15 Lymphatic and immune systems.

Classification of lymphatic vessels. Lymphatic capillaries: wall structure and function. Lymphatic postcapillaries: wall structure and functions. Lymphatic vessels (intra- and extraorganic): wall structure and function. Superficial and deep lymphatic vessels. Lymphatic trunks: jugular, subclavian, broncho-mediastinal, lumbar, intestinal, their formation, topography, functions. Lymphatic ducts: thoracic duct, right lymphatic duct. Embryogenesis of the lymphatic vessels. Variants and anatomy of lymphatic duct development. Age features of the structure of lymphatic vessels. Thoracic duct: roots, topography, tributaries, site of confluence with the venous system. Right lymphatic duct: roots, topography, site of confluence with the venous system. Jugular trunks: formation, topography, areas of lymph collection, confluence with the lymphatic ducts. Lymph nodes of the head: classification, topography, areas of lymph collection, lymph outflow tracts. Lymph nodes of the neck: classification, topography, areas of lymph collection, lymph outflow tracts. Chest lymph nodes: classification. Ways of lymph outflow from the lungs, heart, esophagus. Abdominal lymph nodes: classification. Pelvic lymph nodes. Lymphatic vessels and regional lymph nodes of the stomach, small intestine, colon, liver, kidneys, uterus, ovaries. Superficial and deep lymphatic vessels of the upper and lower limbs. Lymph nodes of the upper and lower limbs: classification.

Module 2. Content module 7. "Central Nervous System"

Topic 16 General neurology. Spinal cord.

The leading role of the nervous system in the body; its importance for the integration of organs, organ systems into a single whole organism, in establishing the relations of the organism with the external environment. Classification of the nervous system according to topographic and morpho-functional principles. General principle of neuron structure. Morphological and functional classification of neurons. Receptors, their classification. General plan of synapse structure. Reflex arcs. Gray matter of the CNS. Neuroglia. Principles of spatial organization of gray matter of the CNS. Neural ganglia. White matter of the CNS. Nerve fibers, nerve bundles, roots. Stages of development of the nervous system in phylo- and ontogenesis. Embryogenesis of the spinal cord. Embryogenesis of the brain: stages of three and five cerebral vesicles, their derivatives. Anomalies of the spinal cord and brain development. Topography of the spinal cord, its boundaries. External structure of the spinal cord (surfaces, grooves, funiculi, enlargements). Segmental structure of the spinal cord (Shipo's rule). Internal structure of the spinal cord: central canal, gray and white matter. The structure of the posterior, lateral and anterior horns. White matter: classification. The composition of the spinal cord funiculi. Proter segmental apparatus of the spinal cord. Sensory ganglion of the spinal nerve. Anterior and posterior roots.

Topic 17 Embryogenesis of the brain. The brain stem.

Brain. Parts of the brain: cerebrum, cerebellum, brain stem. Classification of parts of the brain by development. Derivatives of the rhombencephalon: medulla oblongata and hindbrain (pons and cerebellum). Cerebellum: boundaries, external structure. Internal structure: gray and white matter. Pons: external structure. Internal structure: gray and white matter. Cerebellum: topography, external structure. Internal structure: gray and white matter. The composition of the cerebellar peduncles. Rhomboid fossa: formation, boundaries, relief. Projection of cranial nerves nuclei on the surface of a rhomboid fossa. Fourth ventricle: walls, communications. The midbrain, its parts. Tectal plate: external structure, internal structure, gray and white matter. Cerebral peduncles, their parts, internal structure, gray and white matter. Cerebral aqueduct. The isthmus of the rhombencephalon. Diencephalon: parts. Thalamus: external structure. Internal structure: nuclei and their functions. Epithalamus: parts. The pineal gland and its functions. Metalamus: parts and their functions. Hypothalamus: its components. Pituitary. Hypothalamic nuclei, their functions. Hypothalamo-hypophyseal system. Third ventricle: walls, communications.

Topic 18 The telencephalon

The telencephalon: the cerebral hemispheres. Rhinencephalon: parts. Components of the peripheral and central parts of the rhinencephalon. Basal ganglia: topography, parts, functions. Internal capsule: parts, topography of the conducting pathways in each part. Lateral ventricles: parts, their topography, walls, communications. Corpus callosum: parts, function. Fornix: parts, function. Cerebral cortex: cyto- and myeloarchitectonics of the cortex. Works by V.O. Betz. Relief of the cerebral hemispheres: grooves and gyri. Morphological basement of dynamic localization of functions in the cortex of the cerebral hemispheres. Age features of the brain structure. Conducting pathways - definition. Morpho-functional classification of the conducting pathways of the CNS: associative (short and long), commissural, projection (ascending and descending). Descending (efferent) conductive pathways: pyramidal, extrapyramidal, cortico-pontine. Pyramid motor system (centers, conducting pathways). Extrapyramidal system (centers, conducting pathways). Ascending (afferent) conducting pathways: exteroceptive, proprioceptive, interoceptive. Meninges. Features of the brain dura mater structure. Processes and sinuses of the dura mater, their topography. Intermeningeal spaces of the brain and their contents. Formation of the cerebrospinal fluid and its circulation. The main sources of blood supply to the brain. Arterial circle of the brain. Brain veins.

Module 3. Content module 8. "Peripheral Nervous System"

Topic 19 Peripheral nervous system. Cranial nerves

General characteristics of cranial nerves. Common features and differences in the structure of cranial and spinal nerves. Classification of cranial nerves (CN) by function and origin. Development of CN in connection with the sense organs (I, II, VIII pairs), myotomes of the main somites (III, IV, VI, XII pairs), gill arches (V, VII, IX, X, XI pairs). Differences in the structure of CN derived from the brain (I, II pairs) from other CN. General plan of the motor, sensory and mixed CN structure. General plan of the structure of the vegetative ganglia of the head: roots and branches. CN V: intracranial part - nuclei, trigeminal ganglion, sensory and motor roots. Branches of CN V: fiber composition, exit from the skull, areas of innervation, connections with the autonomic ganglia of the head. Valleix points. CN VII and intermediate nerve: nuclei, topography, branches, composition of their fibers, areas of innervation. Connections of the branches of the intermediate nerve with the pterygopalatine, mandibular, and sublingual ganglia. CN IX: nuclei, nerve exit from the brain, from the skull, branches, the composition of their fibers, areas of innervation, connection with the otic ganglion. CN X: nuclei, sensory nodes, nerve output from the brain, from the skull, branches, areas of innervation. Connection with intramural parasympathetic ganglia. CN XI and XII: nuclei, nerve exit from the brain, from the skull, areas of innervation.

Topic 20 Peripheral nervous system. Spinal nerves.

General principles of the structure of the spinal nerves. Posterior branches of the spinal nerves, areas of innervation. Formation of the cervical plexus. Classification of branches, areas of innervation. Topography and formation of the brachial plexus. Classification of branches. Short branches, areas of innervation. Long branches of the brachial plexus: topography, areas of innervation. Intercostal nerves, their route, areas of innervation. Topography and formation of the lumbar plexus. Classification of branches, areas of innervation. Topography and formation of the sacral plexus. Classification of branches. Short branches, areas of innervation. Long branches, route, branching, areas of innervation.

Topic 21 Autonomic nervous system.

General information about the autonomic nervous system. Features of its structure. Classification. Differences between somatic and autonomic nervous systems. Classification of ANS. Differences between sympathetic and parasympathetic parts of the ANS. Centers and peripheral part of the parasympathetic system. Parasympathetic ganglia. Centers and peripheral part of the sympathetic nervous system. Sympathetic trunk. Autonomic plexuses of the abdominal cavity and cavity of the lesser pelvis.

Topic 22 Organs of the endocrine system

General principles of the structure of endocrine organs. Structural definition of "endocrine function". Structural mechanisms of realization of action of hormones. Classification of endocrine organs. Development of endocrine organs in embryogenesis. Features of functional activity of endocrine organs in the prenatal period of human ontogenesis. Options and defects in the development of endocrine organs. Thyroid gland: topography, structure, functions. Parathyroid gland: topography, structure, functions. Adrenal gland: structure, functions. Topography of the right and left adrenal glands. Endocrine part of the pancreas: structure, functions. Pituitary gland: topography, parts, structure, functions. Pineal gland: topography, structure, functions.

Module 3. Content module 9. "Sense Organs"

<p>Topic 23 The organ of vision</p> <p>Morpho-functional characteristics of the sense organs. Peripheral receivers, conductors and cortical centers of analyzers, their functional unity. Philo- and ontogenesis of the eye. Anomalies and variants of eye development. Topography, structure, functions. Eyeball. The structure of the eyeball tunics: fibrous, vascular, internal (retina). Chambers of the eyeball: anterior, posterior, their walls. Vitreous body, lens. Aqueous humor: site of secretion, ways of outflow. Accommodation apparatus of the eye. Additional structures of the eye: eyelids, eyebrows, conjunctiva, external muscles of the eyeball, fascia of the orbit. The lacrimal apparatus and its components. The conducting pathway of the visual analyzer. The conducting pathway of the pupillary reflex. CN II, III, IV and VI: nuclei, exit from the brain and skull, areas of innervation.</p>
<p>Topic 24 Organ of hearing and equilibrium</p> <p>Ear. Philo- and ontogenesis. Anomalies of ear development. Parts of the ear: outer, middle and inner ear. Outer ear: parts, their structure. Middle ear: parts. Tympanic cavity: walls, contents. Auditory ossicles: their structure, joints, ligaments and muscles of the auditory ossicles. Communications of the tympanic cavity. Auditory tube: parts, structure. Inner ear, parts, topography. Bony labyrinth: vestibule, semicircular canals, cochlea, their structure. Membranous labyrinth: vestibular labyrinth, semicircular ducts, spiral duct, their structure. The mechanism of the sound perception and its conduction pathway. Conducting pathways of hearing and balance.</p>
<p>Topic 25 The structure of the skin. Mammary gland. The organ of smell and taste.</p> <p>The sense of smell. Olfactory part of the nasal mucosa. Conducting pathways of the olfactory analyzer. Skin: functions. Varieties of skin sensitivity. Mammary gland. The organ of taste. Taste papillae of the tongue, their topography. Conducting pathways of the taste analyzer.</p>
<p>Topic 26 Practically oriented exam</p> <p>It is conducted in accordance with regulations</p>

5. Intended learning outcomes of the course

After successful study of the course, the student will be able to:

LO1	To show knowledge of the structure, basic functions, variants and anomalies of the development of organs and organ systems of the human body
LO2	To describe and explain the features of the structure, position and relation between organs in different parts of the human body, interpret the images of organs obtained using modern methods of biomedical imaging in the main projections
LO3	To apply knowledge of topography and structure of organs and systems of organs of the human body in clinical practice, research and teaching
LO4	To analyze modern information about the features of the structure and functions of organs, organ systems and the human body as a whole, to make reasoned conclusions, to test the relevant hypotheses
LO5	To evaluate and substantiate morphological aspects of physiological processes in the human body based on the structural criteria
LO6	To improve their own system of knowledge of human anatomy and create new ideas in the context of a wide range of morphological issues

6. Role of the course in the achievement of programme learning outcomes

Programme learning outcomes achieved by the course.

For 222 Medicine:

PO2	To understand and know basic and clinical biomedical sciences, at a level sufficient for solving professional problems in the field of healthcare.
PO11	To determine an appropriate approach, plan, and management of physiological pregnancy, physiological delivery, and postpartum period by making a reasonable decision according to existing algorithms and standard procedures.
PO12	To assess the general condition of a newborn child by making an informed decision according to existing algorithms and standard schemes and adhering to the relevant ethical and legal norms.
PO17	To perform medical procedures (according to List 5) at a medical facility, at home or at work on the basis of a provisional clinical diagnosis and/or health parameters through making an informed decision and adhering to the relevant ethical and legal norms.
PO21	To search for the necessary information in the professional literature and databases; to analyze, evaluate, and apply this information.
PO25	To communicate one's knowledge, conclusions, and arguments on health issues and related concerns clearly and unambiguously to professionals and non-specialists.

7. Soft Skills

For 222 Medicine:

PC2	Ability to learn, master modern knowledge.
PC4	Knowledge and understanding of the subject area and professional activity comprehension
PC10	Ability to use information and communication technologies.
PC11	Ability to search, process, and analyze information from various sources.

8. Teaching and learning activities

Topic 1. Anatomical nomenclature. Axes and planes of the body.
lect.1 "Anatomy of the passive part of the supporting and locomotor apparatus" (full-time course) Levels of structural organization of the human body. The initial stages of human embryogenesis. Bone as an organ. Classification of bones and their development in embryogenesis. Classification of joints: synarthroses, hemiarthroses, diarthroses (main features of the joint, their characteristics, additional components of the joints). Classification of joints by structure, shape of joint surfaces, function. Types of movements and their analysis. Teaching is conducted in the form of multimedia lectures (in the case of quarantine - online).

pr.tr.1 "Anatomical nomenclature. Axes and planes of the human body" (full-time course)

International anatomical nomenclature. Anatomical planes and axes of the human body, their characteristics, use to describe bones and their parts. The study of this topic involves theoretical work in the classroom, the use of multimedia equipment, demonstration of presentation and video.

Topic 2. The bones of the trunk and limbs

pr.tr.2 "The structure of the cervical, thoracic and lumbar vertebrae" (full-time course)

General characteristics of the vertebral column. General plan of the structure of the vertebrae. Features of the cervical and thoracic vertebrae structure. The study of this topic involves the use of the skeleton, bone preparations of individual vertebrae to work out practical skills to determine the affiliation of individual vertebrae to a particular section of the spine.

pr.tr.3 "The lumbar vertebrae, sacrum, and coccyx" (full-time course)

Features of the lumbar vertebrae structure. The structure of the sacrum and coccyx. The study of this topic involves the use of the skeleton, bone preparations of the lumbar vertebrae and sacrum to work out practical skills to determine the affiliation of individual vertebrae to a particular section of the spine.

pr.tr.4 "Sternum and ribs. The structure of the clavicle." (full-time course)

Classification of the ribs. The structure of the ribs and sternum. Classification of bones of the upper limb. The structure of the bones of the shoulder girdle. The study of this topic involves the use of the skeleton, bone preparations: sternum, ribs, and clavicle to work out practical skills in determining the correct anatomical position of bones, their belonging to the right or left side, the correct description of bone formations using anatomical nomenclature.

pr.tr.5 "The structure of the scapula and humerus" (full-time course)

Features of the scapula. Bones of the free upper limb: classification. The structure of the humerus. The skeleton and bones of the upper limb are used to master the topic and acquire practical skills in class. During the study of this topic, teamwork with a set of bones is provided in order to determine the correct position of the scapula and humerus of the right and left upper extremity.

pr.tr.6 "Bones of the forearm and hand" (full-time course)

Bones of the forearm and hand: anatomical position and structure. The skeleton and bones of the upper limb are used to master the topic and acquire practical skills in class. During the study of this topic, teamwork with a set of bones is provided in order to determine the correct position of all bones of the right and left upper extremity.

pr.tr.7 "Bones of the lower limb: the hip bone and femur" (full-time course)

Classification of lower limb bones. The structure of the hip bone and femur. Skeleton, hip bone, and femur are used in the class to master the topic and acquire practical skills.

<p>pr.tr.8 "Bones of the lower limb: bones of the leg and foot" (full-time course)</p> <p>The structure of the tibia and fibula. Foot bones: classification, structure. The skeleton and bones of the lower extremity are used to master the topic and acquire practical skills in class. During the study of this topic, teamwork with a set of bones is provided in order to determine the correct position of all bones of the right and left lower extremity.</p>
<p>Topic 3. Skull bones. The skull as a whole</p>
<p>pr.tr.9 "The frontal, parietal, and occipital bones" (full-time course)</p> <p>Structure of bones of the neurocranium: frontal, parietal, and occipital bones. The skull and individual bones of the skull, such as the frontal, parietal and occipital, are used to master the topic and acquire practical skills.</p>
<p>pr.tr.10 "Sphenoid and ethmoid bones" (full-time course)</p> <p>Structure of the sphenoid and ethmoid bones. The skull, sphenoid and ethmoid bones are used to master the topic and acquire practical skills.</p>
<p>pr.tr.11 "The temporal bone" (full-time course)</p> <p>The temporal bone structure: parts. In class, students demonstrate and describe the structures of the temporal bone, determine their topographic and anatomical relations.</p>
<p>pr.tr.12 "Canals of the temporal bone" (full-time course)</p> <p>Topography of the canals and tubules of the temporal bone. Discussion of the clinical significance of the localization and content of the canals in neurosurgical, neurological and otolaryngological practice. Repeating the structure of the temporal bone using a preparation of the temporal bone and skull</p>
<p>pr.tr.13 "Bones of the visceral skull. The hyoid bone" (full-time course)</p> <p>The structure of the bones of the visceral skull. The structure of the hyoid bone. In this lesson, students determine the structure of the skull and individual bones of the facial skull, as well as their topographic and anatomical relations on the skull.</p>
<p>pr.tr.14 "The external and internal base of the skull." (full-time course)</p> <p>The external and internal base of the skull (cranial fossae). This lesson assesses the topographic and anatomical relations and conditionality of the structure, function and shape of the bones of the skull and skull as a whole.</p>
<p>pr.tr.15 "Temporal and infratemporal fossae. Pterygopalatine fossa" (full-time course)</p> <p>Temporal, infratemporal, and pterygopalatine fossae: walls, connections. Studying the topic involves solving clinical problems related to the spread of inflammatory processes to different areas through the connection of the fossae using skull preparations.</p>
<p>pr.tr.16 "Bony nasal cavity. The orbit." (full-time course)</p> <p>Bony nasal cavity: walls, nasal septum, nasal meatuses, connections. The orbit: walls, connections. In this lesson, students understand the practical importance of the paranasal sinuses, they use the skull to demonstrate the walls and connections of the nasal cavity and the orbit.</p>

pr.tr.17 "The content module "Osteology"" (full-time course)

Students describe and demonstrate anatomical structures on bone preparations and the skeleton, determine their topographic and anatomical relationships. In addition, they evaluate age, gender, and individual characteristics of the skull.

Topic 4. General arthrosyndesmology. Articulations of bones of a trunk and a skull. The skull of a newborn

pr.tr.18 "General arthrosyndesmology." (full-time course)

To study the classification of bone articulations, their characteristics and features. To demonstrate different types of articulations on anatomical preparations. To characterize articulation of vertebrae and skull bones. describe the features of the newborn's skull.

pr.tr.19 "Articulations of vertebrae and skull. The skull of a newborn" (full-time course)

Types of the articulations between bones of the skull and connections of the vertebral column with the skull according to the classification. Features of the skull of a newborn. Types of movements in the atlanto-occipital joint. Temporomandibular joint: features of structure and function. The study of the topic involves the use of preparations of the skull, the first cervical vertebra, the temporal bone, the mandible and the preparation of the temporomandibular joint.

pr.tr.20 "The vertebral column. Articulations of ribs with a sternum and vertebrae. The thorax as a whole" (full-time course)

The vertebral column as a whole: lordoses, kyphoses. Articulations between bones of a trunk. The thorax as a whole: shapes, intercostal spaces, superior and inferior apertures. Students should analyze the practical significance of the curves of the vertebral spine, assess their age and individual characteristics, as well as demonstrate all the structures on the skeleton, and individual preparations of the joints.

Topic 5. Articulations of upper and lower limbs bones

pr.tr.21 "Articulations of bones of the shoulder girdle. The shoulder and elbow joints" (full-time course)

Characteristics of articulations of a shoulder girdle bones: joints, own ligaments of a scapula. The structure of the shoulder and elbow joints, types of movements in them, ligaments that strengthen them. Determination of topographic and anatomical relations of the corresponding types of articulations between bones of the upper extremity on a skeleton. The study of the topic involves the use of preparations of individual bones of the shoulder girdle, shoulder, and forearm, as well as preparations of the sternoclavicular, sterno-acromial, shoulder, and elbow joints to practice skills regarding the relationships between the bones of the shoulder girdle, shoulder, and forearm.

pr.tr.22 "The articulations of bones of the forearm and hand" (full-time course)

Demonstrate and characterize the types of articulations of the bones of the forearm and hand. To practice skills, it is planned to use preparations of the radius, ulna, hand preparation, as well as a preparation of the radiocarpal joint.

pr.tr.23 "The articulations of the bones of the pelvis. The pelvis as a whole. Hip joint." (full-time course)

Characteristics and demonstration of pelvic bone articulations on the skeleton and pelvis as a whole: diarthroses, syndesmoses. Solving the issue of gender differences in the pelvis, features of the female pelvis. Determining the dimensions of the pelvis. Discussion of the practical significance of this knowledge for practical medicine. Characteristics of the hip joint, demonstration of types of movements.

pr.tr.24 "Knee joint. Ankle joint" (full-time course)

Characteristics of the knee joint, demonstration of movements in it. Determining the practical significance of the articular bursae. Description of continuous and discontinuous articulations between bones of a leg.

pr.tr.25 "Articulations of the bones of the foot. Surgical joints of the foot. The arch of the foot" (full-time course)

Articulations of the foot bones. Surgical joints of the foot, their practical significance. Discussion of the adaptation of the human foot to walking. Arches of the foot: longitudinal, transverse; fixing apparatus of the arches of the foot; practical significance.

pr.tr.26 "The content module "Artrosyndesmology"" (full-time course)

Describe and demonstrate anatomical structures on joint and skeletal preparations, determine their topographic-anatomical relations.

Topic 6. The muscles and fascia of the trunk, head and neck.

pr.tr.27 "Muscles and fasciae of the back" (full-time course)

Classification of the muscles of the back. Determining their layered location, origin, insertion, actions. Describe the fascia of the back. The study of this topic involves the use of the physical body, drawings, models to demonstrate the muscles of the back.

pr.tr.28 "Muscles and fasciae of the chest. Diaphragm" (full-time course)

Classification of the muscles of the chest, origin, insertion, action. Fascia of the chest. Diaphragm: parts, openings, action. Discussion of the clinical significance of "weak spots" of the diaphragm. The study of this topic involves the use of the physical body, drawings, models for demonstration of the chest muscles and diaphragm.

pr.tr.29 "Muscles and fasciae of the abdomen. Topography of the anterior abdominal wall. Linea alba. Umbilical ring." (full-time course)

Classification of muscles of the abdomen, origin, insertion, action. The role of muscles of the abdomen in the formation of the abdominal press. Fasciae of the abdomen. Topography of the anterior abdominal wall: linea alba, umbilical ring. Definition of the clinical importance of "weak" spots of the anterior abdominal wall in the formation of herniae. Study of this topics involves the use of the physical body, drawings, models to demonstrate muscles of the abdomen and topographic formations of the anterior abdominal wall.

<p>pr.tr.30 "Inguinal canal. Rectus sheath." (full-time course)</p> <p>Formation of the inguinal canal, its content. Walls of the inguinal canal. Variants of the exit of the inguinal herniae. The sequence of the location of the aponeuroses that form the rectus sheath. Discussion on the relevance of the topic in surgical practice. Studying the topic involves the use of a virtual anatomical table.</p>
<p>pr.tr.31 "Muscles and fasciae of the head." (full-time course)</p> <p>Classification, origin, insertion, actions of the muscles of the head. Describe the features of facial muscles, their differences from other skeletal muscles. Fasciae of the head. The study of this topic involves the use of the physical body, drawings, models to demonstrate the muscles of the head.</p>
<p>pr.tr.32 "Muscles of the neck" (full-time course)</p> <p>Muscles of the neck: classification, origin, insertion, actions. The study of this topic involves the use of the physical body, drawings, models to demonstrate the muscles of the neck</p>
<p>pr.tr.33 "Topography and fascia of the neck" (full-time course)</p> <p>Describe the fascia of the neck according to the international classification. Addressing the localization of areas, triangles of the neck, interfascial spaces and their clinical significance. Mastering this topic involves the use of the physical body, models, drawings, infographics.</p>
<p>Topic 7. Muscles and fasciae of the upper and lower limbs. Topography of the upper and lower limbs.</p>
<p>pr.tr.34 "Muscles and fascia of the shoulder girdle and upper arm" (full-time course)</p> <p>Describe the muscles and fasciae of the shoulder girdle and arm: origin, insertion, action. The study of this topic involves the use of the physical body, drawings, models to acquire practical skills in determining the location of the muscles of the shoulder girdle and arm.</p>
<p>pr.tr.35 "Muscles and fasciae of the forearm and hand" (full-time course)</p> <p>Describe the muscles and fasciae of the forearm and hand: origin, insertion, action. The study of this topic involves the use of the physical body, drawings, models to acquire practical skills in determining the location of the muscles of the forearm and hand.</p>
<p>pr.tr.36 "Topography of the upper limb" (full-time course)</p> <p>Addressing the localization and clinical significance of topographic formations of the upper extremity. Describe the axillary cavity, grooves, canals, synovial vaginae. The study of this topic involves the use of the physical body, drawings, models to acquire the practical skills.</p>
<p>pr.tr.37 "Muscles and fasciae of the pelvis and thigh" (full-time course)</p> <p>Muscles of the lower limb: classification. Muscles of the pelvic girdle: classification, characteristics. Muscles of the thigh: classification, their characteristics. Fasciae of the lower limb and thigh. The study of this topic involves the use of the physical body, drawings, models for mastering the practical skills in the location of the muscles of the pelvis and thigh.</p>

<p>pr.tr.38 "Muscles and fasciae of the leg and foot" (full-time course)</p> <p>Muscles of the leg and foot: classification, origin, insertion, action. Fasciae of the leg and foot. The study of this topic involves the use of the physical body, drawings, models for mastering the practical skills in the location of the muscles of the leg and foot.</p>
<p>pr.tr.39 "Topography of the pelvic region and thigh" (full-time course)</p> <p>Addressing the localization and clinical significance of topographic formations of the pelvic girdle and thigh. Femoral triangle, adductor canal. Clinical significance of the femoral canal formation. Studying this topic involves the use of the virtual anatomical table, drawings, and dummies.</p>
<p>pr.tr.40 "Topography of the leg and foot." (full-time course)</p> <p>Popliteal fossa: boundaries, contents. Cruro-popliteal canal: walls, openings. Retinaculae, synovial sheaths. Studying the topic involves the use of a virtual anatomical table and diagrams.</p>
<p>pr.tr.41 "The content module "Myology"" (full-time course)</p> <p>Oral interview with demonstration of structures on anatomical preparations. Describe and demonstrate anatomical structures on the physical body, models and drawings, determine their topographic and anatomical relations. Evaluate age, gender and individual features of muscles.</p>
<p>Topic 8. Digestive System</p>
<p>lect.2 "General splanchnology. Functional anatomy of the digestive and respiratory systems" (full-time course)</p> <p>Classification of internal organs: tubular and parenchymal organs. General plan of the wall structure of tubular organs. Serous membrane: options for the relations of organs to the peritoneum. General patterns of structure of parenchymal organs. Glands: their classification, general principles of structure, functions. Digestive and respiratory systems: organs, functions, development. Anomalies and options for the development of the digestive and respiratory systems. Teaching is conducted in the form of multimedia lectures (in the case of quarantine - online).</p>
<p>pr.tr.42 "Anatomy of the oral cavity. The palate." (full-time course)</p> <p>Description of structures that form the walls of the oral cavity, and topographo-anatomical relations of the oral cavity. Parts of the palate. Muscles of the soft palate. The study of the topic involves the use of wet anatomical preparations and skull.</p>
<p>pr.tr.43 "Structure of the teeth, tongue, and large salivary glands" (full-time course)</p> <p>Classification of teeth, their structure, dental formula. The structure of the tongue: parts, skeletal and proper muscles. Describe the large salivary glands, determine their topography. Studying the topic involves the use of wet anatomical preparations to master practical skills. Moreover, it involves watching videos to visualize the location of the muscles of the palate and the course of the excretory ducts of the large salivary glands.</p>

pr.tr.44 "Pharynx" (full-time course)

Describe the topography of the pharynx, its parts, communications, wall structure. The study of the topic involves the use of wet anatomical preparations and the physical body to mastering the practical skills.

pr.tr.45 "Esophagus.Stomach. General information about the peritoneum. Areas of the anterior abdominal wall." (full-time course)

Esophagus: topography, parts, wall structure, anatomical and physiological constrictions. Describe the topography of the stomach, its parts and the structure of the wall. Peritoneum: definition, general information. Solving the question of the practical significance of the division of the anterior abdominal wall. The study of the topic involves the use of wet organ complexes and the physical body for mastering the practical skills.

pr.tr.46 "Small intestine. Large intestine. Anal canal" (full-time course)

Small intestine: parts, features of a wall structure. Large intestine: parts, wall structure, relation to the peritoneum. Rectum: parts, flexures, topography, relation to the peritoneum. Anal canal: topography, features of the mucousal and muscular layers structure. Macroscopic differences in the structure of the small and large intestine. The study of the topic involves the use of wet organ complexes and the physical body, drawings for mastering the practical skills.

pr.tr.47 "The structure of the liver" (full-time course)

Liver: localization, external structure, liver connections, relation to the peritoneum, relationships with neighboring organs and vessels. Studying the topic involves mastering practical skills in determining the boundaries of the liver, as well as the use of wet preparations and tables.

pr.tr.48 "Morpho-functional unit of the liver. Pathways of bile excretion. Gallbladder. Pancreas" (full-time course)

Internal structure of the liver, liver vessels, liver functions. Paths of bile outflow. Gallbladder: topography, parts, wall structure, functions. Pancreas: parts, topography, structure, functions. The study of the topic involves the use of wet organ complexes and the physical body, drawings for mastering the practical skills.

pr.tr.49 "Peritoneum: parts, derivatives, relation of organs to the peritoneum" (full-time course)

Abdominal cavity, its contents. Peritoneal cavity, its contents. Parietal peritoneum, visceral peritoneum: their characteristics. Options for the relations of internal organs to the peritoneum. Peritoneal derivatives: mesentery, omentums, ligaments, their structure and functions. The use of the physical body, diagrams, drawings, watching videos is provided for mastering the topic. In addition, there will be a discussion on the clinical significance of the peritoneum and its derivatives.

pr.tr.50 "Divisions of the peritoneal cavity." (full-time course)

Derivatives of the peritoneal cavity: bursae, sinuses, canals, recesses, fossae, pouches. Topography of the peritoneum in the pelvic cavity: sexual characteristics. Topography of the parietal peritoneum on the anterior and posterior walls of the abdominal cavity. Studying the topic involves the use of a virtual anatomical table, diagrams, and drawings.

<p>pr.tr.51 "The content module "Digestive System"" (full-time course)</p> <p>Describe and demonstrate the anatomical structures of the digestive system organs on wet preparations and models, determine their topographic and anatomical relationships. Evaluate the age, gender and individual characteristics of the digestive system organs.</p>
<p>pr.tr.52 "Repetition of the supporting and locomotor apparatus. Krok" (full-time course)</p> <p>Mastering practical skills using the skeleton, skull, bone and joint preparations as well as a virtual anatomical table. Repetition of anatomical terminology, types of articulations, mechanisms of multidirectional movements formation. Studying the topic involves repeating the material with an emphasis on solving clinical problems from the Krok-1 database with computer testing at the end of the lesson.</p>
<p>pr.tr.53 "The final module "Anatomy of the supporting and locomotor apparatus"" (full-time course)</p> <p>Test computer control according to the regulations.</p>
<p>Topic 9. Respiratory System</p>
<p>pr.tr.54 "External nose. Nasal cavity." (full-time course)</p> <p>Respiratory system: organs, functions. Upper and lower respiratory tract. Nose: parts, structure. Nasal cavity: dorsum, nasal meatuses, paranasal sinuses. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills.</p>
<p>pr.tr.55 "Larynx" (full-time course)</p> <p>The structure of the larynx: cartilages, ligaments, joints, muscles. Laryngeal cavity: parts, their boundaries. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills.</p>
<p>pr.tr.56 "Trachea and principal bronchi. The macroscopic structure of the lungs." (full-time course)</p> <p>Trachea: parts, topography, wall structure. Main bronchi: topography, wall structure. Lungs: external structure. Hilum of the lungs. Root of the lung and its components. The study of the topic involves the use of wet anatomical preparations and drawings to mastering the practical skills.</p>
<p>pr.tr.57 "Bronchial and alveolar tree. Topography of the lungs" (full-time course)</p> <p>Topography of the lungs. Bronchial tree. Alveolar tree. Acinus. The circulatory system of the lungs. The study of the topic involves the use of wet anatomical preparations and drawings to mastering the practical skills.</p>
<p>pr.tr.58 "Pleura. Topography of the pleura. Mediastinum." (full-time course)</p> <p>Pleura: parietal pleura and visceral pleura. Pleural cavity: contents, recesses, their functional value. Projection of the pleural sacs on the walls of the thoracic cavity. Mediastinum: definitions, boundaries, organs of the mediastinum. The study of the topic involves the use of the virtual anatomical table and skeleton to mastering the practical skills.</p>
<p>Topic 10. Urinary System</p>

<p>pr.tr.59 "Structure and topography of the kidneys" (full-time course)</p> <p>Kidney: topography, external structure of the kidney. The relation of the kidney to the peritoneum. Kidney coatings. Support of the kidney. The internal structure of the kidney. The nephron is a structural and functional unit of the kidney. The structure of the circulatory system of the kidney. Solving the mechanisms of urine secretion and excretion. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills.</p>
<p>pr.tr.60 "Ureters. Urinary bladder. Female urethra" (full-time course)</p> <p>Urinary tract. Ureter: parts, topography, wall structure, function. Relation to the peritoneum. Constrictions of the ureter. Urinary bladder: shape, external structure, parts. Features of topography in men and women. The structure of the bladder wall, relation to the peritoneum (depending on the functional state). Female urethra. The study of the topic involves the use of wet and plastic anatomical preparations as well as the physical body to mastering the practical skills.</p>
<p>Topic 11. Reproductive Systems. Perineum</p>
<p>pr.tr.61 "Male reproductive system. Male urethra." (full-time course)</p> <p>Male reproductive system: organs, functions. Classification of the male reproductive system. Internal and external male genitalia. Male urethra: parts, constrictions, dilations. The study of the topic involves the use of wet anatomical preparations to mastering the practical skills.</p>
<p>pr.tr.62 "Female reproductive system." (full-time course)</p> <p>Female reproductive system: organs, functions. Classification of the female reproductive system: internal and external female genitalia. Solving the question of the location of the ovaries, uterine tubes, uterus, their relations to the peritoneum, fixation, options for anatomical and physiological position of the uterus. The study of the topic involves the use of wet anatomical preparations to mastering the practical skills.</p>
<p>pr.tr.63 "Perineum" (full-time course)</p> <p>Perineum: definition, topography. Urogenital and pelvic diaphragms: boundaries, muscles, fasciae, sex differences. Ischio-anal fossa: boundaries, contents. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills.</p>
<p>pr.tr.64 "Review lesson "Splanchnology"" (full-time course)</p> <p>Review of material from the "Splanchnology" module using wet specimens and the virtual anatomical table. Review of anatomical terminology.</p>
<p>pr.tr.65 "Content module "Splanchnology"" (full-time course)</p> <p>Oral interview with demonstration of structures on anatomical preparations. Describe and demonstrate anatomical structures on the physical body, models and wet anatomical preparations, determine their topographic and anatomical relations.</p>
<p>Topic 12. Anatomy of the heart</p>

lect.3 "Functional anatomy of the heart" (full-time course)

Shape, position of the heart. The external structure of the heart. Heart chambers, heart valves. The structure of the heart wall. Conducting system of the heart. Arteries and veins of the heart. Pericardium. Stages of heart development in human embryogenesis. Variants and anomalies of heart development. Innervation of the heart. Teaching is conducted in the form of multimedia lectures (in the case of quarantine - online).

pr.tr.66 "The external structure of the heart. Greater and lesser circulations." (full-time course)

Shape, position of the heart. External structure of the heart: surfaces, grooves. The study of the topic involves the use of wet and plastic anatomical preparations of the heart, as well as schemes of greater and lesser circulation.

pr.tr.67 "The structure of the chambers of the heart. The structure of the cardiac wall. Cardiac valves" (full-time course)

The chambers of the heart, cardiac valves. The structure of the cardiac wall. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills. In addition, the study of the topic involves watching videos to visualize the structure and activity of the cardiac valves.

pr.tr.68 "Blood supply and innervation of the heart. Stimulatory complex of the heart." (full-time course)

Determination of the conducting system of the heart. The decision of a question of blood supply of the heart. Topography of the cardiac arteries and veins. Anastomoses. Nerves of the heart. The study of the topic involves the use of wet anatomical preparations, the physical body and the skeleton to acquire practical skills.

pr.tr.69 "Topography of the heart. Pericardium." (full-time course)

The pericardium, its structure, the pericardial cavity, contents, sinuses. Projection of the boundaries of the heart and valves on the anterior wall of the thoracic cavity. The study of the topic involves the use of wet anatomical preparations, the physical body and the skeleton to acquire practical skills.

Topic 13. Arterial system.

pr.tr.70 "Topography of the aorta. Branches of the aortic arch. Brachiocephalic trunk" (full-time course)

Aorta, parts of the aorta. The aortic arch and its branches. Topography of the brachiocephalic trunk, its terminal branches. The study of the topic involves the use of the physical body.

pr.tr.71 "Common and internal carotid arteries." (full-time course)

Common carotid artery: topography, branches. Features of the right and left common carotid arteries. Internal carotid artery: parts, topography. Branches of the internal carotid artery: topography, areas of blood supply. The study of the topic involves the use of the virtual anatomical table.

pr.tr.72 "External carotid artery: anterior, posterior and medial branches." (full-time course)

External carotid artery: topography, classification of branches. Anterior, posterior and medial branches of the external carotid artery: topography, areas of blood supply. The study of the topic involves the use of the physical body.

pr.tr.73 "External carotid artery: terminal branches." (full-time course)

Terminal branches of the external carotid artery: superficial temporal and maxillary arteries. Segments of the maxillary artery. Topography, areas of blood supply. Discussion of the blood supply to the head. The study of the topic involves the use of the physical body.

pr.tr.74 "Subclavian artery." (full-time course)

Subclavian artery: parts, their topography. Features of the right and left subclavian arteries. Branches of the subclavian artery: topography, areas of blood supply. Discussion of the blood supply to the brain. The study of the topic involves the use of the physical body.

pr.tr.75 "Axillary and brachial arteries." (full-time course)

Axillary artery: topography, parts, branches, areas of blood supply. Arteries of the upper limb. Brachial artery: topography, branches, areas of blood supply. Addressing the formation of anastomoses around the shoulder joint, as well as the blood supply to the muscles of the shoulder girdle, back and chest. The study of the topic involves the use of the physical body.

pr.tr.76 "Arteries of the forearm and hand" (full-time course)

Radial and ulnar arteries: topography, branches, areas of blood supply. Cubital arterial network: sources of its formation. Dorsal and palmar carpal networks: topography, sources of formation, branches, areas of blood supply. Superficial and deep palmar arches: topography, sources of formation, areas of blood supply. Arterial anastomoses of the upper limb. Addressing the blood supply to the muscles of the forearm and hand. The study of the topic involves the use of the physical body.

pr.tr.77 "Thoracic aorta. Parietal and paired visceral branches of the abdominal aorta." (full-time course)

Thoracic aorta: topography, classification of branches. Branches of the thoracic aorta and areas of blood supply. Intrasytemic and intersystemic arterial anastomoses. Abdominal aorta: topography, classification of branches. Parietal branches of the abdominal aorta: topography, areas of blood supply. Paired visceral branches of the abdominal aorta: topography and areas of blood supply. The study of the topic involves the use of the physical body.

pr.tr.78 "Unpaired visceral branches of the abdominal aorta." (full-time course)

Unpaired visceral branches of the abdominal aorta: topography and areas of blood supply. Intrasytemic arterial anastomoses between branches of an abdominal aorta. Blood supply to the abdominal organs. The study of the topic involves the use of the physical body.

pr.tr.79 "Arteries of the pelvis and thigh." (full-time course)

Common iliac artery: formation, topography, branches. Internal iliac artery: topography, classification of branches. Parietal and visceral branches of the internal iliac artery: topography, areas of blood supply, intrasystemic and intersystemic arterial anastomoses. Addressing the blood supply to the pelvic organs. External iliac artery: topography, branches, areas of blood supply. Femoral artery: topography, branches, areas of blood supply. The study of the topic involves the use of the physical body.

pr.tr.80 "Arteries of the leg and foot." (full-time course)

Popliteal artery: topography, branches, areas of blood supply. Anterior and posterior tibial arteries: topography, branches, areas of blood supply. Arterial network of the knee: sources of formation. Malleolar arterial networks: topography, sources of formation, areas of blood supply. Arteries of the foot: their topography, branches, areas of blood supply. Arterial anastomoses of the lower limb. Addressing the blood supply to the lower limb. The study of the topic involves the use of the physical body.

Topic 14. Venous system

pr.tr.81 "Superior vena cava system. Veins of the head and neck." (full-time course)

Superior vena cava: roots, tributaries, topography. Internal jugular vein: formation, topography, classification of tributaries. Intracranial tributaries, extracranial tributaries of the internal jugular vein. Anastomoses between intracranial and extracranial tributaries of the internal jugular vein. External jugular vein: formation, topography, tributaries. Anterior jugular vein: formation, topography, tributaries. Brachiocephalic vein: formation (roots), topography, tributaries. The study of the topic involves the use of the physical body.

pr.tr.82 "Superior vena cava system. Veins of the thoracic cavity and upper limbs." (full-time course)

Azygos vein and hemiazygos vein: formation, topography, classification of tributaries, areas of venous blood collection. Veins of the vertebral column. Upper limb veins: classification. Superficial and deep veins of the upper limb: their characteristics, patterns of topography and structure. Axillary vein: topography, tributaries. The study of the topic involves the use of the physical body.

pr.tr.83 "Inferior vena cava system. Veins of the lower extremities" (full-time course)

Superior vena cava: roots, topography, classification of tributaries. Parietal and visceral tributaries of the inferior vena cava, areas of venous blood collection. Common iliac vein: roots, topography. Internal iliac vein: topography, tributaries. Venous plexuses of the pelvic organs. Lower limb veins: classification. Superficial and deep veins of the lower limb: their characteristics, patterns of topography and structure. The study of the topic involves the use of the virtual anatomical table..

pr.tr.84 "Portal hepatic vein system. Fetal circulation" (full-time course)

Portal hepatic vein: roots, topography, tributaries. Branching of the portal hepatic vein in the liver. Features of the fetal circulation, postnatal transformations. The study of the topic involves the use of the virtual anatomical table and diagrams of the fetal circulation.

<p>pr.tr.85 "Porta-caval and cava-caval anastomoses." (full-time course)</p> <p>Venous intrasystem anastomoses. Venous intersystem anastomoses: cava-caval anastomoses, porto-caval anastomoses and porto-cava-caval anastomoses. Clinical significance of venous anastomoses. The study of the topic involves the use of the virtual anatomical table and drawings.</p>
<p>Topic 15. Lymphatic and immune systems.</p>
<p>pr.tr.85 "General lymphology: capillaries, vessels, trunks, and ducts" (full-time course)</p> <p>Structures of the lymphatic system: capillaries, postcapillaries, vessels (intraorgan and extraorgan), trunks, ducts. Thoracic duct, right lymphatic duct. Organs of the immune system: central and peripheral. The study of the topic involves the use of the physical body, drawings and diagrams, as well as multimedia presentations.</p>
<p>pr.tr.87 "Regional lymphatic nodes. Lymph outflow from organs and tissues of the human body." (full-time course)</p> <p>Regional lymph nodes. Solving the issue of lymph drainage from organs and tissues of the human body. Studying the topic involves the use of a virtual anatomical table, drawings and diagrams, as well as multimedia presentations.</p>
<p>pr.tr.88 "Immune system. Spleen. Tonsils" (full-time course)</p> <p>Organs of the immune system: central and peripheral. Structure, topography, sources of blood supply. Studying the topic involves the use of wet preparations, a virtual anatomical table, dummies, tables, as well as watching educational videos.</p>
<p>pr.tr.89 "Blood supply to organs and muscles" (full-time course)</p> <p>Solving the issue of blood supply to internal organs and muscles. Studying the topic involves the use of a virtual anatomical table and independent formation of tables in order to systematize the educational material.</p>
<p>pr.tr.90 "Repetition of "Cardiovascular system"" (full-time course)</p> <p>Repetition of material from the module "Cardiovascular system". Mastering practical skills using the physical body, wet and plastic preparations, schemes, and drawings. Repetition of anatomical terminology.</p>
<p>pr.tr.91 "The content module "Cardio-vascular system"" (full-time course)</p> <p>Oral interview with demonstration the anatomical structures on wet preparations, physical body and drawings, determine their topographo-anatomical relations. Assess the age and individual characteristics of the heart, blood vessels and immune organs.</p>
<p>Topic 16. General neurology. Spinal cord.</p>
<p>pr.tr.92 "General neurology." (full-time course)</p> <p>Classification of the nervous system according to topographic and morpho-functional principles. Classification of neurons and receptors. Reflex arcs. Studying the topic involves the use of training tables</p>

pr.tr.93 "Macroscopic structure of the spinal cord." (full-time course)

Topography of the spinal cord, its boundaries. External structure of the spinal cord (surfaces, grooves, funiculi, enlargements). Segmental structure of the spinal cord. The relations between the vertebrae and segments of the spinal cord (Shipo rule). The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills.

pr.tr.94 "The structure of the white and gray matter of the spinal cord." (full-time course)

Internal structure of the spinal cord: central canal, gray and white matter. The structure of the posterior, lateral and anterior horns of the spinal cord. White matter: classification. The composition of the anterior, lateral and posterior funiculi of the spinal cord. Proper segmental apparatus of the spinal cord. The study of the topic involves the use of multimedia presentations, diagrams and drawings.

Topic 17. Embryogenesis of the brain. The brain stem.

pr.tr.95 "Embryogenesis of the brain. General overview of the ventral and medial surface of the brain." (full-time course)

Brain development in embryogenesis: stages of three and five cerebral vesicles and their derivatives. The ventral surface of the brain: structures, the output of the roots of the cranial nerves. Structures of the medial surface of the cerebral hemispheres. The study of the topic involves the use of wet and plastic anatomical preparations of the brain to mastering the practical skills.

pr.tr.96 "General overview of the base of the brain. Exit of the 12 pairs of cranial nerves to the base of the brain and from the skull." (full-time course)

Describe the structural formations on the ventral surface of the brain. Name and show the exit points of the cranial nerves from the brain and skull. The study of the topic involves the use of native and plastic preparations of the brain, as well as the skull.

pr.tr.97 "Medulla oblongata." (full-time course)

Medulla oblongata: boundaries, external structure. Internal structure: gray and white matter. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills as well as drawings to determine the internal structure of parts of the brain.

pr.tr.98 "Pons. Cerebellum" (full-time course)

Medulla oblongata: boundaries, external structure. Internal structure: gray and white matter. Cerebellum: topography, external structure, internal structure, composition of the cerebellar peduncles. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills as well as drawings to determine the internal structure of parts of the brain.

pr.tr.99 "Rhomboid fossa. IV ventricle" (full-time course)

Rhomboid fossa: formation, boundaries, relief. Projection of nuclei of cranial nerves on the surface of a rhomboid fossa. Fourth ventricle: walls, communications. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills as well as drawings to determine the localization of the rhomboid fossa nuclei.

<p>pr.tr.100 "Midbrain. Cerebral aqueduct. Isthmus of the rhombencephalon" (full-time course)</p> <p>The midbrain, its parts. Tectal plate: external structure, internal structure. Cerebral peduncles, their parts, internal structure. Cerebral aqueduct. The isthmus of the rhombencephalon. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills as well as drawings to determine the internal structure of parts of the brain.</p>
<p>pr.tr.101 "Diencephalon. III ventricle" (full-time course)</p> <p>Diencephalon: parts. Thalamus: external structure. Internal structure: nuclei and their functions. Epithalamus: parts. The pineal gland and its functions. Metalamus: parts and their functions. Hypothalamus: its components. Pituitary. Hypothalamic nuclei, their functions. Hypothalamo-hypophysial system. Third ventricle: walls, communications. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills as well as drawings to determine the internal structure of parts of the brain.</p>
<p>Topic 18. The telencephalon</p>
<p>pr.tr.102 "Rhinnencephalon. Limbic system. Basal nuclei." (full-time course)</p> <p>Rhinnencephalon: parts, components of the peripheral and central parts of the rhinnencephalon. Basal nuclei: topography, parts, functions. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills as well as drawings to determine the internal structure of parts of the brain.</p>
<p>pr.tr.103 "Corpus callosum. Fornix. Internal capsule." (full-time course)</p> <p>Corpus callosum; parts, function. Fornix: parts, function. Internal capsule: parts, topography of the conducting pathways in each part. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills as well as drawings and multimedia presentations.</p>
<p>pr.tr.104 "Lateral ventricles, septum pellucidum" (full-time course)</p> <p>Lateral ventricles: parts, their topography, walls, communications. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills as well as drawings and multimedia presentations.</p>
<p>pr.tr.105 "The relief of the cerebral cortex." (full-time course)</p> <p>Cerebral hemispheres: surfaces, edges, lobes, poles. The cerebral cortex. Relief of the cerebral hemispheres: grooves and gyri. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills.</p>
<p>pr.tr.106 "Localization of functions in the cerebral cortex" (full-time course)</p> <p>Morphological basis of dynamic localization of functions in the cerebral cortex. Associative and projection cortical centers. The study of the topic involves the use of wet and plastic anatomical preparations to mastering the practical skills.</p>
<p>pr.tr.107 "Associative, commissural conducting pathways." (full-time course)</p> <p>Conductng pathways: associative pathways (short and long), commissural pathways, projection pathways (ascending and descending). The study of the topic involves the use of schemes of the conducting pathways.</p>

<p>pr.tr.108 "Ascending projection pathways of the brain and spinal cord." (full-time course)</p> <p>Ascending (afferent) conducting pathways: exteroceptive, proprioceptive, interoceptive. The study of the topic involves the use of schemes of the conducting pathways.</p>
<p>pr.tr.109 "Descending projection conduction pathways of the brain and spinal cord" (full-time course)</p> <p>Descending pathways: pyramidal, extrapyramidal, cortico-nuclei. Pyramidal motor system and extrapyramidal system. The study of the topic involves the use of schemes of the conducting pathways.</p>
<p>pr.tr.110 "Meninges of the brain and spinal cord" (full-time course)</p> <p>Meninges of the brain. Processes and sinuses of the dura mater of the brain, their topography. Intermeningeal spaces of the brain and their contents. The study involves the use of the skull, wet and plastic anatomical preparations of the brain, as well as watching videos.</p>
<p>pr.tr.111 "Blood supply to the brain. Circulation of the cerebrospinal fluid." (full-time course)</p> <p>Secretion and circulation of cerebrospinal fluid. The main sources of blood supply to the brain. The study involves the use of the skull, wet and plastic anatomical preparations of the brain, as well as watching videos.</p>
<p>pr.tr.112 "Repetition of "CNS" (full-time course)</p> <p>Repetition of material from the module "Central nervous system". Mastering practical skills using the wet and plastic preparations, schemes, drawings. Repetition of anatomical terminology.</p>
<p>pr.tr.113 "The content module "Central nervous system"" (full-time course)</p> <p>Oral interview with demonstration of structures on anatomical preparations. Describe and demonstrate anatomical structures on wet and plastic preparations of the spinal cord and brain, determine their topographic and anatomical relationships. Describe the features of the conducting pathways of the brain and spinal cord.</p>
<p>pr.tr.114 "Krok" (full-time course)</p> <p>Discussion of clinical tasks on topics studied in the second semester, computer testing at the end of the class.</p>
<p>pr.tr.115 "Review lesson on topics of the second semester" (full-time course)</p> <p>Review of material from the modules "Splanchnology", "Cardiovascular System", "Central Nervous System". Mastering of the practical skills using wet and plastic specimens and a virtual anatomical table. Review of anatomical terminology.</p>
<p>pr.tr.116 "Semester module "Splanchnology. Central nervous system. Cardiovascular system." (full-time course)</p> <p>Test computer control</p>
<p>Topic 19. Peripheral nervous system. Cranial nerves</p>

lect.4 "Functional anatomy of the peripheral nervous system." (full-time course)

General characteristics of the spinal and cranial nerves. Common features and differences in the structure of cranial and spinal nerves. Spinal nerves: the formation of a branch. Somatic nerve plexuses. Classification of cranial nerves by function and origin. General plan of the structure of the vegetative ganglia of the head: roots and branches. Teaching is conducted in the form of multimedia lectures (in the case of quarantine - online).

pr.tr.117 "Peripheral nervous system. Cranial nerves" (full-time course)

General characteristics of the peripheral nervous system. Classification of cranial nerves by function and origin. Development of cranial nerves in connection with the sense organs (I, II, VIII pairs), myotomes of the main somites (III, IV, VI, XII pairs), gill arches (V, VII, IX, X, XI pairs). Differences in the structure of cranial nerves derived from the brain (I, II pairs) from other cranial nerves. General plan of the structure of motor, sensory and mixed cranial nerves. The study of the topic involves the use of wet and plastic anatomical preparations of the brain, skull, as well as multimedia presentations.

pr.tr.118 "The first branch of the trigeminal nerve. Ciliary ganglion." (full-time course)

V pair of cranial nerves: intracranial part - nuclei, trigeminal ganglion, sensory and motor roots. Branches of the V pair of cranial nerves: fiber composition, exit from the skull. I branch of the trigeminal nerve - optic nerve: topography, branches, areas of innervation. Connection with the ciliary ganglion. The study of the topic involves the use of the scheme of the first branch of the trigeminal nerve, skull and wet preparations of the head.

pr.tr.119 "The second branch of the trigeminal nerve. Pterygopalatine ganglion" (full-time course)

II branch of the trigeminal nerve - maxillary nerve: topography, branches, areas of innervation. Connection with the pterygopalatine ganglion. The study of the topic involves the use of the scheme of the second branch of the trigeminal nerve, skull and wet preparations of the head.

pr.tr.120 "The third branch of the trigeminal nerve. Otic, submandibular and sublingual ganglia" (full-time course)

III branch of the trigeminal nerve - mandibular nerve: topography, branches, areas of innervation. Connection with the otic, submandibular and sublingual ganglia. Valleix points. The study of the topic involves the use of the scheme of the third branch of the trigeminal nerve, skull and wet preparations of the head.

pr.tr.121 "Facial and glossopharyngeal cranial nerves" (full-time course)

VII pair of cranial nerves and intermediate nerve: nuclei, topography, branches, composition of their fibers, areas of innervation. IX pair of cranial nerves: nuclei, nerve output from the brain, skull, branches, the composition of their fibers, areas of innervation. Pterygopalatine, submandibular, sublingual and otic vegetative ganglia of the head. The study of the topic involves the use of the scheme of the fascial and glossopharyngeal nerves, skull and wet preparations of the head.

<p>pr.tr.122 "Vagus and accessory cranial nerves" (full-time course)</p> <p>X pair of cranial nerves: nuclei, sensory ganglia, nerve output from the brain, from the skull, branches, areas of innervation. Connection with intramural parasympathetic ganglia. XI pair of cranial nerves: nuclei, nerve exit from the brain, from the skull, areas of innervation. The study of the topic involves use of the physical body.</p>
<p>Topic 20. Peripheral nervous system. Spinal nerves.</p>
<p>lect.5 "Spinal nerves" (full-time course)</p> <p>Formation of spinal nerves. Structure, branches. The term "dermatome". Posterior branches: innervation zones. Anterior branches: the principle of plexus formation. Topography of nerve plexuses, innervation zones, functional significance. Teaching is conducted in the form of multimedia lectures online.</p>
<p>pr.tr.123 "Hypoglossal cranial nerve. Posterior branches of the spinal nerves. Cervical plexus" (full-time course)</p> <p>XII pair of cranial nerves: nucleus, nerve exit from the brain, from the skull, areas of innervation. General principles of the structure of the spinal nerves. Posterior branches of the spinal nerves, areas of innervation. Formation of the cervical plexus. Classification of branches, areas of innervation. The study of the topic involves use of the physical body.</p>
<p>pr.tr.124 "Short branches of the brachial plexus" (full-time course)</p> <p>Brachial plexus: topography and formation, classification of branches. Short branches, areas of innervation. Addressing the innervation of the muscles of the shoulder girdle, chest and back. The study of the topic involves use of the physical body.</p>
<p>pr.tr.125 "Long branches of the brachial plexus." (full-time course)</p> <p>Long branches of the brachial plexus: topography, areas of innervation. Addressing the innervation of the upper limb. The study of the topic involves use of the physical body.</p>
<p>pr.tr.126 "Anterior branches of the thoracic spinal nerves. Lumbar plexus." (full-time course)</p> <p>Intercostal nerves, their direction, areas of innervation. Lumbar plexus: topography and formation, classification of branches, areas of innervation. The study of the topic involves use of the physical body.</p>
<p>pr.tr.127 "Sacral plexus" (full-time course)</p> <p>Sacral plexus: topography and formation, classification of branches. Short branches, areas of innervation. Long branches, course, branching, areas of innervation. Addressing the innervation of the lower limb. The study of the topic involves use of the physical body.</p>
<p>Topic 21. Autonomic nervous system.</p>
<p>lect.6 "Anatomy of the vegetative (autonomic) nervous system." (full-time course)</p> <p>General information about the autonomic nervous system. Differences between somatic and autonomic nervous systems. Classification of ANS. Differences between sympathetic and parasympathetic parts of the ANS. Teaching is conducted in the form of multimedia lectures (in the case of quarantine - online).</p>

<p>pr.tr.128 "Parasympathetic division of the autonomic nervous system." (full-time course)</p> <p>Centers and peripheral part of the parasympathetic system. Parasympathetic ganglia: terminal and intramural. Solving the issue of parasympathetic innervation of internal organs. The study of the topic involves the use of multimedia presentations, diagrams, and drawings.</p>
<p>pr.tr.129 "Sympathetic division of the autonomic nervous system. Sympathetic trunk" (full-time course)</p> <p>Sympathetic division of the autonomic nervous system. Centers and peripheral part of the sympathetic nervous system. Sympathetic trunk. The study of the topic involves the use of multimedia presentations, diagrams, and drawings.</p>
<p>pr.tr.130 "Autonomic plexuses of the abdominal cavity. Innervation of internal organs" (full-time course)</p> <p>Vegetative plexuses of the abdominal cavity and lesser pelvis. Solving the issue of autonomic innervation of internal organs. Studying the topic involves using diagrams and forming your own tables to systematize the material.</p>
<p>Topic 22. Organs of the endocrine system</p>
<p>pr.tr.131 "Organs of the endocrine system." (full-time course)</p> <p>General principles of the structure of endocrine organs. Structural definition of "endocrine function". Structural mechanisms of realization of action of hormones. Classification of endocrine organs. The study of the topic involves the use of the physical body and multimedia presentations.</p>
<p>pr.tr.132 "Content module "PNS. Endocrine system" (full-time course)</p> <p>Oral interview with demonstration of structures on anatomical preparations. Describe and demonstrate the anatomical structures on wet preparations, physical body and drawings, determine their topographic and anatomical relations. Assess the age, sex and individual characteristics of the endocrine system.</p>
<p>Topic 23. The organ of vision</p>
<p>lect.7 "Functional anatomy of the organs of vision, hearing and equilibrium." (full-time course)</p> <p>Morpho-functional characteristics of sensory organs. Peripheral receivers, conductors and cortical centers of analyzers, their functional unity. Philo- and ontogenesis of the eye. Anomalies and variants of eye development. Topography, structure, functions of the organs of vision, hearing and equilibrium. Conducting pathways of visual and auditory analyzers. Teaching is conducted in the form of multimedia lectures (in the case of quarantine - online).</p>
<p>pr.tr.133 "The structure of the eyeball." (full-time course)</p> <p>Eyeball: topography, structure, functions. The structure of the layers of the eyeball capsule. Eyeball chambers, their walls. Vitreous body, lens. Aqueous humor: secretion, outflow paths. Accommodation apparatus of the eye. The study of the topic involves the use of wet and plastic preparations of the eye.</p>

pr.tr.134 "Accessory apparatus of the organ of vision." (full-time course)

Additional structures of the eye: eyelids, eyebrows, conjunctiva, external muscles of the eyeball, fascia of the orbit. The lacrimal apparatus and its components. The study of the topic involves the use of wet and plastic eye preparations.

pr.tr.135 "II, III, IV and VI pairs of cranial nerves. Conducting pathways of the visual analyzer." (full-time course)

The conducting pathways of the visual analyzer. The conducting pathways of the pupillary reflex. II, III, IV and VI pairs of cranial nerves: nuclei, exit from the brain and skull, areas of innervation. The study of the topic involves the use of the skull, wet and plastic preparations of the brain, as well as diagrams and drawings.

Topic 24. Organ of hearing and equilibrium

pr.tr.136 "The structure of the external and middle ear." (full-time course)

Parts of the ear: external, middle and inner ear. External ear: parts, their structure. Middle ear: parts. Tympanic cavity: walls, contents. The auditory ossicles: their structure, joints, ligaments and muscles of the auditory ossicles. Communications of the tympanic cavity. Auditory tube: parts, structure. The study of the topic involves the use of skull, plastic preparations of the ear, and multimedia presentations.

pr.tr.137 "The structure of the inner ear. VIII pair of cranial nerves. Conducting pathways of auditory and vestibular analyzers." (full-time course)

Inner ear, parts, topography. Bony labyrinth: vestibule, semicircular canals, cochlea, their structure. Membranous labyrinth: vestibular labyrinth, semicircular ducts, spiral duct, their structure. Mechanism of perception and ways of sound conduction. Conducting pathways of hearing and equilibrium. The study of the topic involves the use of skull, plastic preparations of the ear, multimedia presentations, schemes, and drawings.

Topic 25. The structure of the skin. Mammary gland. The organ of smell and taste.

lect.8 "Blood supply and innervation of organs and muscles" (full-time course)

Sources of blood supply and innervation of internal organs. The lecture also provides pre-examination preparation for repeating the structure of organs, localization of muscles. During the lecture, brainstorming is conducted on the blood supply and innervation of individual areas of the human body. Teaching is conducted in the form of multimedia lectures in online mode.

pr.tr.138 "The structure of the skin. Mammary gland. The sense of smell. I pair of cranial nerves. The conducting pathway of the olfactory analyzer. The organ of taste. The conducting pathway of the taste analyzer." (full-time course)

The sense of smell. Olfactory part of the nasal mucosa. Conducting pathways of the olfactory analyzer. Skin: functions. Varieties of skin sensitivity. Mammary gland. The organ of taste. Taste papillae of the tongue, their topography. Conducting pathways of the taste analyzer. The study of the topic involves the use of skull, wet preparations of the head, multimedia presentations, and drawings.

pr.tr.139 "Content module "Sense organs" (full-time course) Oral interview with demonstration of structures on anatomical preparations. Describe and demonstrate the anatomical structures of the sense organs on wet preparations, models and drawings, determine their topographic and anatomical relations. Assess the age, gender and individual characteristics of the senses.
pr.tr.140 "Innervation of internal organs and muscles." (full-time course) Addressing the innervation of internal organs and muscles. The study of the topic involves the use of the physical body.
pr.tr.141 "Semester module "Peripheral nervous system. Organs of the endocrine system. Sense organs "." (full-time course) Test computer control
pr.tr.142 "Computer testing from the database "Step-1"." (full-time course) Testing on questions from the "Step-1" database.
pr.tr.143 "Final lesson of the course "Human Anatomy"" (full-time course) Consultative lesson on the discipline. Preparation for the exam.
Topic 26. Practically oriented exam
assessm.1 "Practically oriented exam" (full-time course) It is conducted in accordance with regulations

9. Teaching methods

9.1 Teaching methods

Course involves learning through:

TM1	Interactive lectures
TM2	Practical training
TM3	Team Based Learning
TM4	Research Based Learning
TM5	Self-study
TM6	Electronic learning
TM7	Case-based learning

Lectures provide students with theoretical materials on human anatomy, which is the basis of self-learning for higher education seekers in the specialty "Medicine" (LO1). Practical classes are the main method of teaching human anatomy, which gives students the opportunity to study human anatomy directly on natural objects and models (LO1-LO6). Modular learning promotes the integration of knowledge, skills and abilities acquired by students in the study of partitive and content modules (LO1-LO6). Practical-oriented training provides an opportunity for students to apply the gained knowledge of human anatomy and acquired skills of using real objects and models

in professional activities (LO1-LO6). During the preparation of multimedia presentations, students will develop skills of self-study, critical thinking, analysis and synthesis.

Students acquire soft skills throughout the entire period of studying the discipline. The ability to analytical and critical thinking, teamwork, perseverance is formed during team-based learning (TBL), case-based learning (CBL). Knowledge and understanding of the subject area is acquired during lectures and during self-study. E-learning stimulates the ability to use information technologies. Research-based learning (RBL) encourages the development of certainty and perseverance in relation to the tasks set and the responsibilities assumed.

9.2 Learning activities

LA1	Preparation for practical classes
LA2	Dissection
LA3	Work with textbooks and relevant information sources
LA4	E-learning in the MIX.sumdu.edu.ua system
LA5	Preparing for Step-1.
LA6	Preparation for the current, final tests and exam
LA7	Individual research project (student research paper, article, abstract, etc.)
LA8	Preparation of mental maps
LA9	Interactive lectures

10. Methods and criteria for assessment

10.1. Assessment criteria

Definition	National scale	Rating scale
Outstanding performance without errors	5 (Excellent)	$170 \leq RD \leq 200$
Above the average standard but with minor errors	4 (Good)	$164 \leq RD < 169$
	4 (Good)	$140 \leq RD < 163$
Fair but with significant shortcomings	3 (Satisfactory)	$127 \leq RD < 139$
	3 (Satisfactory)	$120 \leq RD < 126$
Fail – some more work required before the credit can be awarded	2 (Fail)	$70 \leq RD < 119$
	2 (Fail)	$0 \leq RD < 69$

10.2 Formative assessment

	Description	Deadline, weeks	Feedback
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FA1 Peer assessment	Interaction aimed at improving the results of educational activities by comparing one's current level of success with previous indicators. It provides the opportunity to analyze one's own educational activities.	Throughout the entire period of studying the discipline	Peer correction of learning approaches based on assessment results
FA2 Survey and oral comments of the teacher on the results of the survey	Helps to identify the level of acquired experience of educational activities in accordance with the set goal. To find out the causes of complications and adjust the educational process, to track the dynamics of learning outcomes and predict their course.	Throughout the entire period of studying the discipline	На основі аналізу отриманих результатів навчання попонується виставити оцінку, як показник досягнень навчальної діяльності викладачів
FA3 Teacher's instructions in the process of practical tasks	The guidelines reveal methods of pedagogical control over the acquisition of skills in dissection on animal specimens in order to study the structure of organs, the location of blood vessels and nerves. Effectiveness is determined by compliance with all stages of the dissection process.	Throughout the entire period of studying the discipline	Advising students at all stages of preparation. Direct and indirect observation of work.
FA4 Tests (automated tests) to monitor the academic achievements of applicants	The method of effective testing of knowledge acquisition that allows you to check learning outcomes for each topic of the academic discipline.	Throughout the entire period of studying the discipline	The student must provide 60% of correct answers to receive a positive grade.
FA5 Intermediate assessment of the performance of an individual research task (preparation, presentation, defense)	Involving students in scientific research activities contributes to the formation of their scientific worldview, work capacity, initiative, etc.	Throughout the entire period of studying the discipline	Teacher's oral comments. The student is given additional incentive points (from 3 to 10), depending on the type of research project

FA6 Focus group discussions	It allows all participants to get involved in the process of discussion and justification of their own opinions through versatile communication, develop the ability to conduct professional discussions, develop respect for colleagues and the ability to generate alternative ideas and proposals.	Throughout the entire period of studying the discipline	Assessment of the student's ability to work in a team, the ability to justify their decisions, and the determination of the level of theoretical training, which is reflected in the corresponding assessment.
FA7 The matrix of memorization	It provides an opportunity to form own methods of memorizing theoretical material and to develop logical thinking	Throughout the entire period of studying the discipline	The quality of execution and presentation of the mind map is assessed
FA8 Solving situational tasks from Step-1	It develops critical thinking, allows to assess the level of theoretical training acquired during the period of studying the discipline.	The penultimate lesson in the discipline.	To be admitted to the exam, a student must get at least 80% of correct answers.

10.3 Summative assessment

	Description	Deadline, weeks	Feedback
SA1 Final control: exam	The exam is conducted in the form of computer testing. Students who have attended all practical classes and have 72 points for their current performance are allowed to take the exam.	According to schedule	An applicant can get 80 points maximum and 48 points minimum.
SA2 Intermediate module control in the form of an oral interview	An effective method of assessing a student's level of knowledge on individual topics. It allows the student to demonstrate the acquired knowledge, develops logical thinking and the ability to systematize the material being studied.	According to the calendar - thematic plan	The received points are a component of the semester grade
SA3 Current assessment of the level of theoretical training	It includes oral and computer-based testing. Students have the opportunity to demonstrate their acquired knowledge on a specific topic of the discipline.	Throughout the entire period of studying the discipline	It is conducted at each lesson, the result of the LA affects the comprehensive assessment for the practical lesson

SA4 Final module control in the form of testing	It provides an opportunity to objectively assess the student's level of preparation throughout the semester. The student learns to integrate the acquired knowledge and make decisions.	The last lesson of the semester	The received grade is a component of the semester grade
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Form of assessment:

	Points	Можливість перескладання з метою підвищення оцінки
The first semester of teaching	200 scores	
SA2. Intermediate module control in the form of an oral interview	92	
4x23	92	No
SA3. Current assessment of the level of theoretical training	58	
Oral interview (23x2)	46	No
Current testing (12x1)	12	No
SA4. Final module control in the form of testing	50	
	50	No
The second semester of teaching	200 scores	
SA2. Intermediate module control in the form of an oral interview	90	
3x30	90	No
SA3. Current assessment of the level of theoretical training	60	
Current testing (12x1)	12	No
Oral interview (48x1)	48	No
SA4. Final module control in the form of testing	50	
	50	No
The third semester of teaching	200 scores	
SA1. Final control: exam	80	
	80	No
SA2. Intermediate module control in the form of an oral interview	30	
2x15	30	No
SA3. Current assessment of the level of theoretical training	60	
Oral interview (24x2)	48	No

	Current testing (12x1)	12	No
SA4. Final module control in the form of testing		30	
		30	No

During the semester, assessment is carried out by methods of intermediate and final modular controls in the form of testing, surveys and practical tests. When mastering the materials of the module, the student is assigned a maximum of 5 points for each practical lesson (the grade is given according to the traditional 4-point grading system). At the end of the semester, the arithmetic mean of the student's performance is calculated (oral interviewing and testing). In the first semester, the maximum number of points a student can get in practical classes is 58 (oral questioning and testing), content modules (intermediate module control) - 92 points, final semester control - 50 points. The maximum number of points a student can get in practical classes in the second semester is 60, content modules - 90 points, final semester control - 50 points. The maximum number of points that a student can get for practical classes during the third semester - 120 points (60 points for practical classes, 30 points - for content modules, 30 points - semester control). The student is allowed to the exam provided that the requirements of the curriculum are met and if he has scored at least 72 points for the current academic activity. The exam is held according to the schedule at the end of the third semester. The human anatomy exam is conducted by computer testing (80 questions for 80 minutes). The exam is credited to the student if he scored at least 48 out of 80 points. A student who scores less than 48 points receives 0 points for the exam.

11. Learning resources

11.1 Material and technical support

MTS1	Macro-preparations of organs and organ complexes.
MTS2	Models of organs and parts of the human body.
MTS3	Virtual anatomical table
MTS4	Images of organs and parts of the human body obtained by biomedical visualisation..
MTS5	Training tables
MTS6	Information and communication systems.
MTS7	Multimedia, video, audio, and projection equipment (video cameras, projectors, screens, smart boards, etc.)
MTS8	Computers, computer systems and networks, software (for distance learning support).

11.2 Information and methodical support

Essential Reading	
1	Human anatomy: textbook: in 3 volumes / ed. by VG Koveshnikov. - 2nd ed., corrected. and edited. - Lviv: Magnolia, 2021.

2	Human anatomy [Текст] = Анатомія людини : textbook / V. G. Cherkasov, I. Ye Herasymiuk, A. S. Holovatskyi etc. — 3th ed. — Vinnytsia : Nova Knyha, 2020. — 472 p.
3	Supporting and Locomotor Apparatus [Текст] : study guide / V. I. Bumeister, O. S. Yarmolenko, O. O. Prykhodko etc. ; Ed. by V. I. Bumeister. — Sumy : Sumy State University, 2022. — 207 p.
Supplemental Reading	
1	Imaging Atlas of Human Anatomy / J. D. Spratt, M. L. . Turmezei T. Salkowski, J. W. P. H.Abrahams. — 5-th ed. — Missouri : Book aid International, 2017. — 263 p.
2	Human Anatomy Lab Manual [Electronic resource] / M. Wilk-Blaszczak, K. Alford, A. Campo-Velez and other. — Arlington : Mavs Open Press, 2018. — 187 p.
3	Peripheral Nervous System: study guide / V.I. Bumeister, O.S. Yarmolenko, L.G. Sulim et al. Sumy: Sumy State University, 2019. 183 p.
4	Central nervous system. Sense organs: study guide / V.I. Bumeister, O.S. Yarmolenko, O.O. Prykhodko et al. Sumy: Sumy State University, 2017. 172 p.
5	USMLE Step 1: Anatomy [Текст] : Lecture Notes / Editors J. White, D. Seiden. — New York : Kaplan, 2019. — 386 p.
6	Moore, K.L. Clinically Oriented Anatomy [Текст] : textbook / K. L. Moore, A. F. Dalley, A. M. R. Agur. — eighth edition. — Philadelphia : Wolters Kluwer, 2018. — 1153 p.
7	Grant's Atlas of Anatomy / A. M. R. Agur, A. F. Dalley. — 14-th edition. — Philadelphia :Wolters Kluwer, 2017. — 867 p.
8	Yarmolenko O., Bumeister V., Demikhova N., Prykhodko O., Gordienko O., Khotyeev Ye. The effect of alloxan-induced hyperglycemia on myocardium of experimental animals. Romanian Journal of Diabetes, Nutrition and Metabolic Diseases. 2020. 27 (2). C. 80-84. DOI: https://doi.org/10.46389/rjd-2020-1014 .
9	Yarmolenko O., Bumeister V., Polak S., Gordienko O., Prykhodko O., Demikhova N., Shkatula Y., Demikhov A. The effect of the experimental chronic hyperglycemia on the kidney and myocardium Вплив експериментальної хронічної гіперглікемії на нирки та міокард. Ukrainian Journal of Nephrology and Dialysis. 2021. C. 3-10. DOI: 10.31450/ukrjnd.3(71).2021.01.
Web-based and electronic resources	
1	https://www.gfmer.ch/Medical_journals/Anatomy_histology.htm
2	https://onlinelibrary.wiley.com/journal/14697580
3	https://www.journals.elsevier.com/annals-of-anatomy
4	https://www.hindawi.com/journals/ari/contents/
5	https://www.pulsus.com/international-journal-anatomical-variations.html
6	http://www.intjmorphol.com/international-journal-of-morphology/
7	http://ispub.com/IJHA