

MINISTRY OF HEALTH OF UKRAINE
ODESA NATIONAL MEDICAL UNIVERSITY
Department of Human Anatomy

APPROVED

Vice-Rector of Scientific and Pedagogical Work


Eduard BURIACHKIVSKYI

01 September 2023

WORK PROGRAM OF THE ACADEMIC DISCIPLINE
«Human Anatomy»

Level of higher education: second (master's)

Field of knowledge: 22 "Health care"

Specialty: 221 "Dentistry"


Educational and professional program: Dentistry

The program is based on the educational-professional program "Dentistry", training of specialists of the second (master's) level of higher education in the specialty 221 "Dentistry" in the field of knowledge 22 "Healthcare", approved by the Academic Council of ONMedU (protocol №8 dated June 29, 2023).

Developers:

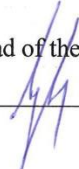
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The work program was approved at a meeting of the Department of Normal and Pathological
Clinical Anatomy
Protocol №1 dated August 29, 2023

Head of the Department  Olena APPELHANS

Agreed with the guarantor of the EPP  Anatoliy GULYUK

Approved by the Subject Cyclic Methodical Commission on Medical-Biological Disciplines of
ONMedU
Protocol No. 1 dated August 29, 2023

Head of the Subject Cycle Methodical Commission on Medical and Biological Disciplines
 Leonid GODLEVSKY

Reviewed and approved at a meeting of the Department _____
Protocol No. ___ dated "___" _____ 20__

Head of the Department of _____
(Signature) (First Name, Last Name)

Reviewed and approved at a meeting of the Department _____
Protocol No. ___ dated "___" _____ 20__

Head of the Department of _____
(Signature) (First Name, Last Name)

1. Description of the discipline

Name of indicators	Field of knowledge, specialty, specialization, level of higher education	Characteristics of the discipline
Total: Credits of ECNS: 6 Hours: 180 Content Modules: 5	Field of knowledge 22 "Public Health" Speciality 221 "Dentistry" Level of higher education Second (Master's)	Full-time (day) of study
		Required discipline
		Year of study 1
		Semester I, II
		Lectures: 34 hours.
		Seminars: 0 hours.
		Practical classes: 86 hours.
		Laboratory classes: 0 hours.
		Independent work: 60 hours.
		incl. individual tasks 0 hours.
Form of final control: exam		

2. The purpose and objectives of the discipline, competencies, program learning outcomes.

Objective. To acquire the knowledge of anatomy in the world of natural science ideas about the structure and functions of the human body as a whole, the ability to use the acquired knowledge in the further study of other fundamental sciences of medicine, and in the individual practice of a doctor. The main task of studying the discipline is a systematic approach to the description of the form, structure of organs, position (topography) of parts and organs of the body in unity with the functions performed, taking into account age, sexual and individual characteristics of a person.

The process of studying the discipline is aimed at forming elements of the following **competencies**:

Integral competence (IC): The ability to solve typical and complex specialized tasks and problems in the field of health care in the specialty "Dentistry", in professional activities or in the process of study, which involves research and/or innovation and is characterized by complexity and uncertainty of conditions and requirements.

General Competencies (GC):

GC2. Knowledge and understanding of the subject area and understanding of professional activities.

GC3. Ability to apply knowledge in practice.

Special (professional, subject) (SC):

SK2. Ability to interpret the result of laboratory and instrumental tests.

SC3. Ability to diagnose: determine preliminary, clinical, definitive, concomitant diagnosis, emergencies.

Programmatic Learning Outcomes (PRN):

PRN1. Identify and highlight leading clinical symptoms and syndromes (according to list 1); according to standard methods, using the preliminary data of the patient's anamnesis, the patient's

examination data, knowledge about the person, his organs and systems, to establish a probable nosological or syndromic preliminary clinical diagnosis of dental disease (according to list 2). PRN2. Collect information about the general condition of the patient, assess the psychomotor and physical development of the patient, the condition of the maxillofacial organs, evaluate the information on the diagnosis based on the results of laboratory and instrumental studies (according to list 5).

As a result of studying the discipline, the higher education applicant must:

Know:

a) the form and structure of the organs integrated into systems:

- the shape and structure of the bones (systema skeletale);
- bone joints (systema articulare);
- muscles (systema musculare);
- viscera (systema digestorium, respiratorium, urinarium, genitalia);
- central and peripheral nervous system (including the autonomic division of the peripheral nervous system (systema nervorum);
- organs of endocrine secretion (glandulae endocrinae);
- organs and formations of the immune system;
- lymphoid system (systema lymphoideum);
- sensory organs (systema sensuum);
- general integumentum (integumentum commune);
- cardiovascular (systema cardiovascularis);

b) mutual placement of organs, blood vessels, nerves in different parts of the body, which is of great importance for surgery;

c) age and sex aspects of anatomical features of individual human development at different stages of ontogeny;

d) patterns of prenatal and early postnatal development of human organs, variants of organ variability, malformations.

Be able to:

- demonstrate and describe the anatomical structure of human organs, organ systems;
- to determine the topographic and anatomical relationships of human organs and organ systems on anatomical specimens;
- be able to assess the age, sex and individual characteristics of the structure of human organs;
- be able to assess the impact of social conditions and work on the development and structure of the human body;
- be able to apply Latin anatomical terms and their Ukrainian equivalents in accordance with the requirements of international anatomical nomenclature (São Paulo, 1997; Kyiv, 2001
- Be able to: identify the organs of the human body, parts of the skeleton and bones of the skull on radiographs, the topography of individual bones and formations of the skull and skeleton of a living person, find the locations of the main groups of regional lymph nodes of the head, neck and extremities.

3. The content of the discipline

Content module 1. Anatomy of the bones of the skeleton.

Topic 1. Organizational issues. Acquaintance with the subject, department, internal regulations. International Anatomical Nomenclature. Axes and planes of the human body, their practical significance. Bone structure and formation

Human anatomy is the science of the form and structure, origin and development of the human body, organs and organ systems. Anatomy involves a systematic description of the shape, structure, condition and topographic relationships of parts and organs of the human body, taking into account their age, sex and individual characteristics.

The main modern trends in the development of anatomy are age anatomy, comparative anatomy, plastic anatomy, anthropology, environmental anatomy and virtual 3D modeling "Anatontage" table.

The main methods of research in anatomy are visual examination, anthropometric studies, preparation, macro-microscopic studies, microscopic studies. Modern research methods in anatomy: X-ray anatomical methods, computed tomography, magnetic resonance imaging (MRI), ultrasound (ultrasound), endoscopy, etc.

The development of anatomy in ancient times, in the Renaissance, in the fifteenth and nineteenth centuries. The significance of the works of Hippocrates, Aristotle, Galen, Avicenna, Andrew Vesalius, Leonardo da Vinci, W. Harvey, M. Malpighi, M. I. Pirogov, and others. Formation and development of Ukrainian anatomical schools. Initial stages of human embryogenesis. Germ layers: ectoderm, endoderm, mesoderm, their derivatives.

General data on the human skeleton, its functions and divisions. Bone development (in phylogeny and ontogeny). Primary and secondary bones. Classification of bones. Bone as an organ. Compact and spongy bone substances, their structure. Chemical composition, physical and mechanical properties of bone. Structure of the tubular bone: its parts. Features of the bone structure in childhood, adolescence, adulthood, old age. Periosteum. Bones in an X-ray image. The influence of sports and work on the structure and development of bones. The influence of social factors and ecology on the development and structure of skeletal bones.

The concept of the International Anatomical Nomenclature, its importance for the study of anatomy and the unification of knowledge in natural and clinical disciplines. Basic anatomical terms that reveal the topography of anatomical objects, and their main characteristics. Anatomical planes (sagittal, frontal, horizontal) and axes (sagittal, frontal, horizontal), their characteristics, use to describe bones and their parts.

Topic 2. *Structure of the vertebrae. Spinal column. Sternum. Ribs.*

Skeletal bones: vertebrae, ribs, sternum. The principle of segmentarity of the structure of the axial skeleton. Brief data on the phylo- and ontogeny of the spinal column. General characteristics of the spinal column. General plan of the structure of the vertebrae. Features of the structure of the cervical, thoracic, lumbar vertebrae, sacrum, coccygeal bone. Age and sex features of the structure of the vertebrae. The influence of social and environmental factors on the structure of the vertebrae. Malformations of the vertebrae.

Development of ribs and sternum in phylo- and ontogeny. Classification of ribs. The structure of the ribs and sternum. Forms of variability of the ribs and sternum, variants and developmental abnormalities. Age and sex features of the structure of the sternum. The influence of social and environmental factors on the structure of the ribs and sternum.

Topic 3. *Scapula and clavicle. Humerus. Bones of the forearm and hand.*

Bones of the upper limb: divisions. Girdle of the upper limb: clavicle, scapula; their structure. The free part of the upper limb: humerus, bones of the forearm and hand, sesamoid bones; their structure. Terms of ossification of the bones of the upper limb. Development of the bones of the upper limb in ontogeny. Variants and abnormalities in the development of the bones of the upper limb.

Topic 4. *Hip bone and femur. Lower leg and foot bones.*

Bones of the lower limb: divisions. Lower limb girdle: hip bone; its structure. Parts of the hip bone, their structure. Free part of the lower limb: femur, shin bones, feet; their structure. Terms of ossification of the bones of the lower limb. Variants and abnormalities in the development of the bones of the lower limb. Homology of the bones of the upper and lower extremities. Age, sex features of the structure of the bones of the limbs. Specific structural features of the bones of the upper and lower extremities are due to the processes of anthropogenesis. The influence of sports, work, social factors and environmental factors on the structure of the bones of the upper and lower extremities.

Topic 5. *General information about the skull. Frontal, parietal and occipital bones.*

Development of the skull in phylo- and ontogeny. Cerebral and facial parts of the skull. The structure of the bones that form the cerebral skull: frontal, occipital, parietal.

Topic 6. Sphenoid bone. Ethmoid bone. Temporal bone, canals.

The structure of the bones that form the cerebral skull: sphenoid, ethmoid. The openings and cranial nerves that pass through them. The structure of the bones that make up the cerebral skull: temporal. Canals of the temporal bone. Walls of the tympanic cavity.

Topic 7. Bones of the facial skull. Nasal cavity. Orbital cavity. Palate.

The structure of the bones that form the facial skull: mandible, upper jaw, zygomatic, nasal, palatine, lacrimal, hyoid bone, vomer, inferior nasal concha. Nasal cavity: walls (bones and parts of the bones that form them), nasal passages, connections, paranasal sinuses and their connection to the nasal cavity. Orbit: walls (bones and parts of the bones that form them), holes, connections. Bony palate.

Topic 8. The skull as a whole. Outer and inner surfaces. 12 pairs of cranial nerves – exit points.

The skull as a whole. Cranial vault. The outer surface, the bones that form it. Inner base of the skull: cranial fossa, borders, bones and parts of the bones that form them.

The 12 pairs of cranial nerves: name and openings at the base of the skull, which are the exit points of these nerves and their branches. Temporal, infratemporal and pterygopalatine fossa. Age features. Temporal, infratemporal, pterygopalatine fossa: walls, holes, connections, contents.

Topic 9. Description of anatomical specimens from skeletal bones.

Algorithm for describing bones:

1. The name of the bone is in Ukrainian and Latin.
2. What kind of bone is it in terms of classification, in terms of development, to which part of the skeleton does it belong and its topography in the human body.
3. Bone structure: parts, surfaces, edges, apophyses (name and demonstrate).

Bones to be washed describe: vertebrae (cervical, thoracic, lumbar), sacrum, coccyx, ribs, sternum, bones of the girdle of the upper limb (clavicle, scapula), humerus, bones of the forearm (ulna, radius), bones of the wrist, metacarpus, phalanges of the fingers, hip bone, femur, tibia bones (tibia, fibula), metatarsus, phalanges of the fingers, bones of the skull (occipital, frontal, ethmoid bone, sphenoid, temporal, upper jaw, lower jaw, palatine, nasal, lacrimal, vomer, zygomatic, inferior nasal concha, hyoid bone).

Content module 2. Joining the bones. Myology.**Topic 10. Classification of bone connections. Connection of the vertebrae to each other.*****Junction of the ribs with the vertebrae and sternum.***

Development of connections between bones in phylo- and ontogeny. Classification of joints between bones. Types of synarthroses: connection with connective tissue (syndesmosis) - membranes, ligaments, sutures, fontanelles; connections with the help of cartilaginous tissue (synchondrosis) - permanent, temporary, hyaline, fibrous; connection with the help of bone tissue (synostosis). Semi-continuous connections- symphysis. Diarthroses (synovial joints, joints): definition, main features of the joint, their characteristics. Additional components of the joints. Classification of joints by structure, the shape of the articular surfaces, according to function. Simple, complex, complex and combined joints: their characteristics. 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.

Classification of spinal column joints. Syndesmoses of the spinal column: their characteristics and structure. Synchondrosis of the spinal column: their characteristics and structure. Joints of the spinal column: median atlanto-axial joint, lateral atlanto-axial joint, arcuate joints, lumbosacral joint, sacrococcygeal joint: their structure. Chest connections: syndesmoses, synchondrosis, and joints (costo-vertebral joints, costotransverse joints, sternocostal joints): their characteristics and structure. The chest as a whole, its structure. The influence of sports, work, social factors and environmental factors on the structure of the chest as a whole.

Topic 11. The connection of the bones of the skull with each other and the I-, 2-m cervical vertebra. Temporomandibular joint.

Skull connection: classification. Syndesmosis of the skull: sutures, their types and characteristics. Synchondrosis of the skull: their types, characteristics, age characteristics. Skull joints: temporomandibular joint and atlanto-occipital joint: their structure. Age-related features of the skull connection: fontanelle, their types, structure, timing of ossification. Median atlanto-axial joint, lateral atlanto-axial joint: structure, ligaments, movements.

Topic 12. *Connection of the scapula and clavicle. Shoulder joint. Elbow joint. Connection of the bones of the forearm and hand.*

Connection between the bones of the upper limb. Connections of the shoulder girdle: syndesmoses of the girdle of the upper limb and joints of the girdle of the upper limb (acromioclavicular joint and sternoclavicular joint), their structure, movements. Connections between the bones of the free upper limb: shoulder joint, elbow joint, wrist joint, hand joints. Features of the structure, movements. Connection between the bones of the forearm.

Topic 13. *Connection of the pelvic bones. The pelvis as a whole. Hip joint. Knee joint. Connection of the bones of the lower leg and foot.*

Connection between the bones of the lower limb. Connections of the pelvic girdle: syndesmoses, synostoses, pubic symphysis, sacroiliac joint. The pelvis as a whole: its structure, basic dimensions. Age, sex, individual characteristics of the pelvis. The connection between the bones of the free lower limb: the hip joint. Knee joint, shin bone joint, ankle joint, foot joints. Arch of the foot. X-ray anatomy of the joints of the bones of the upper and lower extremities. The influence of sports, work, social factors and environmental factors on the structure of the joints of the bones of the upper and lower extremities.

Topic 14. *General myology. Muscles and fascia of the back.*

Muscle as an organ – definition. Tendons, aponeuroses. Accessory muscles: fascia, synovial sheath, synovial bags, sesamoid bones, tendon arch, muscle block. Anatomical and physiological cross-sections of muscles: basic data on muscle strength and function; the concept of leverage. Origin and attachment of muscles: their functional characteristics.

Classification of muscles: according to development, topography, shape, size, direction of muscle fibers, function, among others. Muscle development in phylo- and ontogeny. Sources of muscle development of the trunk, head, neck, upper and lower extremities. Classification of trunk muscles according to topography, development and shape. Segmental structure of the trunk muscles. Back muscles: superficial and deep, their characteristics. Thoracolumbar fascia.

Topic 15. *Fascial muscles. Masticatory muscles. Mechanism of the act of chewing. Fascia of the head. Interfascial spaces. Muscles and fascia of the neck. Topography: neck triangles.*

Muscles of the head: classification. Masticatory muscles, their characteristics. Facial muscles, structural features, function. The act of chewing: stages. Fascia of the head: buccal-pharyngeal fascia, masticatory fascia, parotid fascia, temporal fascia. Areas of the head: borders, contents. Interfascial spaces: walls, contents.

Neck muscles: classification. Superficial and middle neck muscles, their characteristics. Deep neck muscles, their characteristics. Fascia of the neck: anatomical classification and anatomical-topographic classification. Topography of the neck: areas, triangles, interfascial spaces: their contents, connections.

Topic 16. *Muscles, fascia and triangles of the chest. Diaphragm. Muscles, fascia, abdominal lines. Areas, inguinal canal.*

Chest muscles: superficial and deep, their characteristics. Thoracic fascia, intrathoracic fascia. Diaphragm – definition. Parts of the diaphragm, holes, their contents, triangles. Chest triangles: borders, contents. Abdominal muscles: muscles of the anterior, lateral and posterior walls of the abdomen, their characteristics. Fascia of the abdomen. White line. Vagina of the rectus abdominis muscle. Umbilical ring. Abdominals. Topography of areas of the abdomen. Inguinal canal: walls, contents in women and men. Weaknesses of the anterior abdominal wall.

Topic 17. *Muscles, fascia, and topography of the shoulder girdle and shoulder. Muscles, fascia, and topography of the forearm and hand.*

Muscles of the upper limb: classification. Muscles of the girdle of the upper limb, their characteristics. Shoulder muscles: classification, their characteristics. Fascia of the shoulder girdle and shoulder. Forearm muscles: classification, their characteristics. Fascia of the forearm. Relation to joints. Muscles of the hand: classification, their characteristics. Fascia of the hand. Relation to joints. Palmar aponeurosis. The axillary fossa, the axillary cavity, its topography, triangles, quadrilateral and trilateral openings. Brachio-muscular canal. Furrows on the anterior surface of the shoulder. Ulnar fossa. Furrows on the anterior surface of the forearm. Hand-fibrous canals, flexor muscle holders, extensor muscle holders. Carpal canals, synovial sheaths of flexor tendons. Synovial bags.

Topic 18. *Muscles, fascia, and topography of the pelvis, perineum, and thigh. Muscles, fascia, and topography of the lower leg and foot.*

Muscles of the lower limb: classification. Muscles of the girdle of the lower limb: classification, their characteristics. Perineal muscles and fascia. Muscles of the thigh: classification, their characteristics. Fascia of the thigh. Relation to joints. Lower limb muscles: classification, their characteristics. Foot muscles: classification, their characteristics. Fascia of the lower limb.

Muscular and vascular bays, their topography and contents. Femoral triangle. Furrows on the front surface of the thigh. Drive channel. Popliteal fossa. Tibial canals: ankle-popliteal canal, superior and inferior tibial musculoskeletal canals. Furrows of the sole of the foot. Subcutaneous solution. Femoral canal. Extensor Muscle Holders, Flexor Muscle Holders, Peroneal Muscle Holders. Synovial bags and synovial sheath of the muscles of the lower limb. Mechanisms that support the arch of the foot: puffs of the foot, passive (ligaments) and active (muscles).

Topic 19. *Description of anatomical preparations for topics in arthrosyndesmology and myology.*

Algorithm for describing the joint:

1. The name of the joint is in English and Latin.
2. The articular surfaces of the bones that make up the joint.
3. Features of the structure of the capsule and its attachment.
4. Type of joint (simple, complex, combined, complex).
5. Classification according to the shape of the articular surfaces.
6. Classification according to the number of axes of movement.
7. Function.
8. Fixing device.
9. Auxiliary elements.

Algorithm for describing the muscle:

1. The name of the muscle is in English and Latin.
2. Classification features (topography, origin, shape, direction of muscle fibers, relation to joints).
3. Place of attachment.
4. Function.

Joints: temporomandibular joint, junction of the bones of the skull, fontanelle, junction between the vertebrae, connection of the ribs with the vertebrae and sternum, sternoclavicular joint, shoulder joint, elbow joint, radial carpal joint, sacroiliac joint, pubic symphysis, hip joint, knee joint, ankle joint, surgical joints of the foot.

Muscles: latissimus dorsi muscle, trapezius muscle, rhomboid major muscle, scapula levator muscle, spine erector muscle, pectoralis major muscle, pectoralis minor muscle, subclavian muscle, serratus anterior muscle, external intercostal muscles, internal intercostal muscles, transverse thoracic muscle, diaphragm, masticatory muscles, supracranial muscle, gordian muscle, orbicularis oculi muscle, buccal muscle, orbicularis muscle, subcutaneous neck muscle, sternocleidomastoid muscle, suprahyoid muscles, hyoid muscles, ladder muscles, long head and neck muscles, quadratus lumbar muscle, rectus abdominis muscle, external oblique abdominis muscle, internal oblique abdominis muscle, transverse abdominis muscle, shoulder girdle muscles, shoulder muscles, forearm muscles, hand muscles, perineal muscles, internal pelvic muscles, external pelvic muscles, thigh muscles, lower leg muscles, foot muscles.

Content module 3. Splanchnology.

Topic 20. *Oral cavity. Lips. Cheeks. Palate. Glands of the oral cavity. Tongue: structure, function, muscles. Pharynx. Pirogov's lymphatic ring.*

Classification of internal organs: hollow and parenchymal. General plan of the structure of the wall of tubular organs: mucous membrane, muscular membrane, outer membrane. Characteristics of each shell. Organ-specific features of the structure of the mucous membrane depending on the function of the organ. Serous membrane: variants of the relationship of organs to the peritoneum. General patterns of the structure of parenchymal organs. Glands: their classification, general principles of structure, functions.

Digestive system: organs, functions. Development of the oral cavity and its derivatives. Development of the organs of the alimentary canal. Oral cavity: its parts. The walls of the vestibule of the mouth and the oral cavity, their connection. Palate: hard palate, soft palate, their structure. Oral glands: classification, their development. Small salivary glands: classification, topography, structure. Large salivary glands: topography, characteristics, structure, classification.

Tongue: topography, parts. Functions of the tongue. Features of the structure of the mucous membrane of the tongue. Muscles of the tongue: skeletal and proprietary, function, movements.

The pharynx, its topography, parts, connections. The throat, its limits. Lymphatic (lymphoid) ring of the pharynx. Structure of the pharyngeal wall: mucous membrane, pharyngeal-main fascia, pharyngeal muscles, outer membrane.

Topic 21. *Teeth: formula, structure, bite, change of teeth.*

Teeth: classification. Parts of the tooth. Crown surfaces. The general structure of the tooth. Periodontium, periodontium. Gums. Dental organ. Dentoalveolar segment. Permanent teeth: their formula, characteristics of each type of teeth. The timing of the eruption of permanent teeth. Milk teeth: formula, structural features, timing of eruption. X-ray anatomy of teeth. Bites. Tooth development. Anomalies and variants of tooth development.

Topic 22. *Anatomy of the digestive system: esophagus, stomach, small intestine, colon, liver, pancreas. Peritoneum.*

Esophagus: topography, parts, wall structure. Narrowing of the esophagus. X-ray anatomy of the esophagus. Stomach: topography, parts of the stomach. The structure of the stomach wall: structural features of the mucous membrane (relief, glands), muscular membrane and serous membrane. The relationship of the stomach to the peritoneum. Gastric ligaments. Variants of the shape of the stomach: anatomical (on a cadaver) and radiological (in a living person). The shape of the stomach depending on the types of body structure. Age-related features of the topography and structure of the stomach.

Small intestine, its sections. Duodenum: parts, topography, variants of its shape and position. Topography of the mesenteric part of the small intestine: jejuna and iliac. Structure of the wall of the small intestine. Structure of the mucous membrane: intestinal villi, glands, folds, lymphatic (lymphoid) nodules. Features of the structure of the mucous membrane of the small intestine in its different sections. The structure of the muscular sheath. Relation to the peritoneum of each section of the small intestine. Age-related features of the structure of the small intestine.

Colon: divisions. Structure of the colon wall: mucous membrane (glands, folds, lymphatic (lymphoid) nodules), muscular membrane, serous membrane. Relation to the peritoneum of each section of the colon. Cecum and vermiform appendix: topography, structural features. Variants of the position of the vermiform appendix and its projection on the anterior abdominal wall. Colon: parts, folds, their topography, structural features of the mucous membrane and muscular membrane. Relation to the peritoneum. Rectum: parts, folds, topography. Features of the topography of the rectum depending on gender. Features of the structure of the mucous membrane and muscular membrane. Relation to the peritoneum.

Liver. Topography. External structure: edges, surfaces and their relief. Ligaments of the liver. Relation to the peritoneum. Internal structure of the liver: lobes, segments, lobules. Vessels of the liver. Liver function. Ways of bile excretion. Gallbladder: topography, parts, wall structure, functions.

Common bile duct: formation, topography. Age-related features of topography and structure of the liver. Age-related features of the structure of the gallbladder. Pancreas: parts, topography, structure, functions. Pancreatic ducts. Pancreatic islets. Age-related features of the topography and structure of the pancreas. Development of the liver and pancreas.

Peritoneum. Abdominal cavity, its contents. The peritoneal cavity, its contents. Parietal peritoneum, visceral peritoneum: their characteristics. Variants of the relationship of internal organs to the peritoneum. Derivatives of the peritoneum: mesentery, caps, ligaments, their structure and functions. Derivatives of the peritoneal cavity: bags (hepatic, pregastric, cap - their walls, connections), sinuses, canals, nooks, pits, recesses. Topography of the peritoneum in the pelvic cavity: sexual characteristics. Topography of the parietal peritoneum on the anterior, posterior walls of the abdominal cavity.

Topic 23. External nose. Nasal cavity. Larynx: muscles, junctions, laryngeal cavities. Trachea, bronchi, lungs. Pleura. Mediastinum.

Respiratory System: Classification, Organs, Functions. Upper and lower respiratory tract. Development of the organs of the respiratory system in phylo- and ontogeny. Variants and anomalies in the development of the respiratory system. External nose: parts, structure. Nasal cavity: nasal vestibule, nasal passages, paranasal sinuses. Functional parts of the nasal cavity. The nasal part of the pharynx. Age-related features of the nasal cavity. Larynx. Topography. Structure of the larynx: cartilage, ligaments, joints, muscles. Elastic cone, quadrangular membrane. Laryngeal cavity: parts, their boundaries. Vocal folds, vestibule folds. Glottis. Mechanisms of voice formation. X-ray anatomy of the larynx, laryngoscopy. Age-related features of the larynx.

Trachea: parts, topography, wall structure. Main bronchi: topography, wall structure. Bronchial tree. Age-related features of the trachea and main bronchi. Lungs: topography, external structure. Pulmonary hilum. The root of the lung and its components. Lobes, segments, lobules of the lung. The structural and functional unit of the lungs is the acinus. Circulatory system of the lungs. X-ray anatomy of the trachea, bronchi, lungs. Age-related features of the lungs. Pleura. Parietal pleura and its topographic parts. Internal pleura. Pleural cavity: contents, nooks and crannies, their functional importance. Projection of the pleural sacs onto the chest wall. Mediastinum: definition, classification, boundaries, contents of each department.

Topic 24. Kidneys: topography, structure, function. Ureters. Bladder. Urethra. Organs of the immune and endocrine systems.

Urinary system: organs, functions. Development of the organs of the urinary system in phylo- and ontogeny. Variants and abnormalities in the development of the organs of the urinary system: kidneys, ureters, bladder and urethra.

Kidney: topography. External structure of the kidney. The relationship of the kidney to the peritoneum. Membranes of the kidney. Kidney fixation apparatus. Renal peduncle: topography, pedicle elements. Internal structure of the kidney. Segments of the kidney. The structural and functional unit of the kidney is the nephron. The structure of the circulatory system of the kidney (magnificent arterial network). Intrarenal urinary tract. Small renal calyces, large renal calyces, renal pelvis, wall structure, functions. Age-related features of the topography and structure of the kidney. Ureter: parts, topography, wall structure, function. Relation to the peritoneum. Narrowing of the ureter. Bladder: shape, external structure, parts. Features of topography in men and women. The structure of the bladder wall: features of the structure of the mucous membrane, muscular membrane. Relation to the peritoneum (depending on the functional state). Female urethra. Male urethra. Extrarenal urinary tract.

Immune system: functions. Classification of the organs of the immune (lymphatic or lymphoid) system according to function. Central organs of the immune system (primary lymphatic or lymphoid organs): bone marrow, sternal gland (thymus) – structural regularities of their functions.

General principles of the structure of endocrine organs. Structural definition of the concept of "endocrine function". Structural mechanisms of hormone action. Classification of endocrine organs. Development of endocrine organs in embryogenesis. Features of functional activity of endocrine

organs in the prenatal period of human ontogeny. Variants and malformations 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.

Topic 25. Male genitalia. Female genitals.

Male reproductive system: organs, functions. Classification of the organs of the male reproductive system. Internal male genitalia. External male genitalia. Development of the organs of the male reproductive system in phylo- and ontogeny. Variants and abnormalities in the development of the internal male genital organs: testicle, epitesticle, vas deferens, seminal vesicle, prostate gland. Variants and anomalies in the development of the external male genital organs. Hermaphroditism. Internal male genitalia. Testicle: topography, structure. Testicle. The process of lowering the testicle. Testicular membranes. Vas deferens: parts, topography, wall structure. Seminal cord, its components. Seminal vesicle: topography, structure, functions. Vas deferens. Prostate gland: topography, parts, structure, functions. Bulbous urethral gland. Age-related features of the internal male genital organs. External male genitalia. Wicket. Penis, its structure. Male urethra: parts, their topography, wall structure.

Female reproductive system: organs, functions. Classification of the organs of the female reproductive system. Internal female genital organs. External female genitalia. Development of the organs of the female reproductive system in phylo- and ontogeny. Variants and abnormalities in the development of the internal female genital organs: ovaries, fallopian tubes, uterus, vagina. Variants and abnormalities in the development of the external female genital organs. Internal female genital organs. Ovary: topography, external structure, internal structure, ovarian ligaments, relationship to the peritoneum, functions. Cyclic changes in the structure of the ovary. Age-related features of the structure of the ovary. Fallopian tube: topography, parts, wall structure, relationship to the peritoneum, functions. Uterus: topography, shape, parts, wall structure. Ligaments of the uterus, relation to the peritoneum, functions. Age-related features of the structure of the uterus and options for its position. Vagina: vault, wall structure. X-ray anatomy of the internal female genital organs. External female genitalia. Female shy area: pubic eminence, large shy lips, small shy lips, vestibule of the vagina, bulb of the vestibule, large vestibules, small vestibules. Clitoris. Female urethra.

Topic 26. Description of anatomical preparations for topics in splanchnology.

Algorithm for describing the internal organ:

1. Name of the organ in English and Latin.
2. Characteristics (what type of organs it belongs to, to which organ system).
3. Topography of the organ (holotopy, skeletopia, syntopy)
4. External structure.
5. Internal structure.

Internal organs: organs of the digestive system (pharynx, esophagus, stomach, small intestine, colon, liver, gallbladder, pancreas), organs of the respiratory system (external nose and nasal cavity, larynx, trachea, bronchi, lungs, pleura), organs of the urinary system (kidneys, ureters, bladder, urethra), organs of the reproductive system (testicle, prostate, penis, ovary, fallopian tube, uterus), organs of the endocrine system (thyroid), organs of the immune system (thymus, spleen).

Content module 4. Nervous system and sensory organs.

Topic 27. General information about the nervous system, phylo- and ontogeny of the central nervous system. Anatomy of the spinal cord. Medulla oblongata, pons, cerebellum. Isthmus, rhomboid fossa. IV ventricle. Topography of the nuclei of the nerves.

The leading role of the nervous system in the body; Its significance for the integration of organs, organ systems into a single integral organism, in the establishment of the relationship between the organism and the external environment. Classification of the nervous system according to the topographic principle (into the central nervous system and the peripheral nervous system) and according to the anatomical-functional principle (into the somatic nervous system and the autonomic

nervous system). The general principle of the structure of the neuron. Morphological and functional classification of neurons. Receptors, their classification. General plan of the structure of synapses. Reflex arcs. Gray matter of the central nervous system. Neuroglia. Principles of spatial organization of the gray matter of the central nervous system. Nerve nodes. The white matter of the central nervous system. Nerve fibers, roots.

Stages of development of the nervous system in phylogeny. Development of the nervous system in ontogeny. Development of the spinal cord in embryogenesis. Brain development in embryogenesis: the stage of three and five brain vesicles and their derivatives. Developmental abnormalities of the spinal cord. Abnormalities in the development of the brain.

Topography of the spinal cord, its limits. External structure of the spinal cord (surfaces, furrows, cords, thickening). Segmental structure of the spinal cord. The relationship between the vertebrae and the segments of the spinal cord (Shipo's rule). The internal structure of the spinal cord: central canal, gray and white matter. Structure of the posterior, lateral and anterior horns of the spinal cord. White matter: classification. Composition of the anterior, lateral and posterior cords of the spinal cord. Own segmental apparatus of the spinal cord. Sensitive node of the spinal nerve. Anterior and posterior roots. Formation of the spinal nerve trunk. Age-related features of the structure of the spinal cord.

Classification of brain regions according to development. The derivatives of the rhomboid brain are the medulla oblongata and the hindbrain (pons and cerebellum). Medulla oblongata: boundaries, external structure. Internal structure: gray and white matter. Bridge: external structure. Internal structure: gray and white matter. Cerebellum: topography, external structure. Internal structure: gray and white matter. Composition of the cerebellar legs.

Isthmus of the rhomboid brain: upper legs of the cerebellum, superior cerebral sail, loop triangle. Fourth ventricle: walls, contents, connections.

Topic 28. *Midbrain. Diencephalon. Third ventricle.*

The midbrain, its parts. Roof plate: external structure; Internal structure: gray and white matter.

Legs of the brain, their parts, internal structure: gray and white matter. Plumbing of the brain.

Diencephalon: parts (dorsal – thalamic brain; ventral part – hypothalamus). Parts of the thalamic brain: thalamus, epithalamus, metathalamus. Thalamus: external structure. Internal structure: nuclei and their functions. Epithalamus: parts. The pineal gland and its functions. Metathalamus: parts and their functions. Hypothalamus: its components. Pituitary gland. Nuclei of the hypothalamus, their function. Hypothalamic-pituitary system. Third ventricle: walls, conjunctions.

Topic 29. *End brain. Relief of the cloak. Localization of functions in the cerebral cortex. Basal nuclei. Lateral ventricles. Ascending conductive pathways. Descending conductive pathways.*

End brain: cerebral hemispheres, lobes, surfaces. Palium. Cerebral cortex: cyto- and myeloarchitectonics of the cortex. Works by V.O.Betz. Relief of the cerebral hemispheres: furrows and convolutions. Morphological bases of dynamic localization of functions in the cortex of the cerebral hemispheres. First and second signaling systems. Basal nuclei: topography, parts, functions. Lateral ventricles: parts, their topography, walls, connections. Leading Paths - Definition. Anatomical and functional classification of the conductive fibers of the central nervous system: associative fibers (short and long), commissural fibers, projection fibers (ascending and descending). Ascending (afferent) pathways: exteroceptive, proprioceptive, interoceptive. Descending (efferent) pathways: pyramidal, extrapyramidal, cortical-pons. Pyramidal locomotor system (centers, conductive pathways). Extrapyramidal system (centers, conductive pathways).

Topic 30. *Olfactory brain. White matter of the hemispheres. The exit points of the 12 pairs of main nerves. Meninges. Venous sinuses of the dura mater. Blood vessels and nerves of the brain. Places of formation and ways of excretion of cerebrospinal fluid.*

White matter of the hemispheres: classification. Olfactory brain: parts, their constituents. Lateral ventricles: parts, their topography, walls, connections. Olfactory brain: parts, their constituents. Meninges. Intershell spaces and their contents. Features of the structure of the dura mater of the brain. Derivatives of the dura mater of the brain, their topography. Venous sinuses of

the dura mater of the brain. Formation and circulation pathways of cerebrospinal fluid. Blood supply of the brain: arteries and veins.

Topic 31. *The organ of taste and smell. Skin. Mammary gland. Pathways and centers of analyzers.*

Anatomical and functional characteristics of the sensory organs. Peripheral receptors, conductors and cortical centers of analyzers, their functional unity. The organ of smell. The olfactory part of the nasal mucosa. Conductive pathways of the olfactory analyzer. Cortical olfactory centers. The organ of taste. Taste buds of the tongue, their topography. Leading pathways of the taste analyzer. Cortical taste centers. Common roof. Skin: functions. Types of skin sensitivity. Mammary gland: topography, function.

Topic 32. *The organ of vision is the eyeball. The nucleus of the eye. Auxiliary apparatus of the eye. The visual pathway and the pupillary reflex pathway.*

Phylo- and ontogeny of the eye. Anomalies and variants of eye development. Topography, structure, functions. Eyeball. The membranes of the eyeball: fibrous, vascular, internal (retina) – their structure. Chambers of the eyeball: anterior, posterior, their walls. Vitreous humor, lens. Aqueous humor: place of formation, outflow paths. Accommodative apparatus of the eye. Additional structures of the eye: eyelids, eyebrow, conjunctiva, external muscles of the eyeball, fascia of the eye socket. Lacrimal apparatus and its components. The Leading Path of the Visual Analyzer. The conductive pathway of the pupillary reflex.

Topic 33. *External ear, middle ear. Inner ear. Conductive pathways of the organ of hearing and balance.*

Ear. Phylo- and ontogeny. Abnormalities in the development of the ear. Parts of the ear: outer, middle and inner ear. External ear: parts, their structure. Middle ear: parts. Tympanic cavity: walls, contents. Auditory ossicles: their structure. Joints, ligaments, muscles of the auditory ossicles. Tympanic cavity coupling. Auditory tube: parts, structure. Inner ear, parts, topography. Bone labyrinth: vestibule, semicircular canals, whorls, their structure. Membranous labyrinth: vestibule labyrinth, semicircular ducts, cochlear duct, their structure. Mechanism of perception and ways of sound conduction. Leading pathways of hearing and balance. Cortical and subcortical centers of hearing and balance.

Topic 34. *I, II, III, IV, VI pairs of cranial nerves.*

General characteristics of cranial nerves. Common features and differences in the structure of cranial and spinal nerves. Classification of cranial nerves according to function (motor, sensitive, mixed). Classification of cranial nerves according to their origin. Development of cranial nerves in connection with sensory organs (I, II, VIII pairs), myotomes of the main somites (III, IV, VI, XII pairs), with gill arches (V, VII, IX, X, XI pairs). Differences in the structure of cranial nerves derived from the brain (I, II pairs) from the rest of the cranial nerves. General plan of the structure of motor, sensory and mixed cranial nerves. General plan of the structure of the vegetative nodes of the head: roots and branches. Anatomy of cranial nerves: nuclei, their localization, nerve exit from the brain, from the skull, branches of nerves, composition of their fibers, topography, areas of innervation. I and II pairs of cranial nerves – features of their anatomy. IV, VI pairs: their nuclei, the exit of nerves from the brain, from the skull, areas of innervation. III pair of cranial nerves: nuclei, nerve exit from the brain, from the skull, branches, composition of their fibers, areas of innervation, connection with the autonomic node of the head (ciliary node).

Topic 35. *Trigeminal nerve.*

V pair of cranial nerves: intracranial part - nuclei, trigeminal node, sensory and motor roots. Branches of the V pair: fiber composition, exit from the skull, areas of innervation, ligaments with the autonomic nodes of the head. And a branch. Areas of innervation, connection with the autonomic node of the head (ciliary node). Branch II. Areas of innervation, connection with the autonomic node of the head (pterygoid of the head). V pair of cranial nerves: intracranial part - nuclei, trigeminal node, sensory and motor roots. Branches of the V pair: fiber composition, exit from the skull, areas

of innervation, ligaments with the autonomic nodes of the head. Branch III. Areas of innervation, connection with the autonomic nodes of the head (auricular, submandibular, sublingual).

Topic 36. Facial nerve. VIII pair of cranial nerves. IX, X (head and cervical sections), XI, XII pairs of cranial nerves.

Facial nerve: nuclei, areas of innervation, knee node, crow's foot (branches). Drum string. Large stony nerve. IX pair: nuclei, nerve exit from the brain, from the skull, branches, composition of their fibers, areas of innervation, connection with the autonomic node of the head (auricular node). X pair: nuclei, sensory nodes, nerve exit from the brain, from the skull, branches of the head and cervical regions, areas of innervation. XI pair: nuclei, nerve exit from the brain, from the skull, areas of innervation. XII pair: nucleus, exit of the nerve from the brain, from the skull, areas of innervation. Vegetative nodes of the head (pterygopalatine, ciliary, submandibular, sublingual, auricular): their roots and branches, areas of innervation.

Topic 37. Spinal nerves. Plexus: cervical, brachial, lumbar, sacral. Thoracic spinal nerves. The autonomic nervous system is the sympathetic division and the parasympathetic division.

Components of the peripheral nervous system: nerves, nerve nodes, nerve plexuses, nerve endings. General plan of the structure of the nerve. Neurovascular bundles. Classification of nerves. Segmental distribution of peripheral nerves. Nerve nodes: classification. General plan of the structure of sensitive nodes. Spinal nerve: formation, composition of fibers, branches; correspondence to the segments of the spinal cord. Posterior branches of spinal nerves: fiber composition, topography, general patterns of innervation. Rear branches of the cervical, thoracic, lumbar, sacral and coccygeal nerves. Anterior branches of the spinal nerves: composition of fibers. General patterns of formation of somatic nerve plexuses. General patterns of anatomy of the anterior branches of the thoracic nerves. Connection of the spinal nerves with the autonomic nervous system. Formation of spinal nerves in the neck, cervical plexus. Sensitive branches. Cervical plexus. Muscular branches. The phrenic nerve is a mixed branch of the cervical plexus: formation, topography, regions of innervation. Segmental distribution of peripheral nerves. General patterns of anatomy of the anterior branches of the thoracic nerves. Connection of the spinal nerves with the autonomic nervous system. The brachial plexus, its structure, short and long branches, regions of innervation.

Thoracic spinal nerves. Lumbar plexus: formation, structure, branches, regions of innervation.

Sacral plexus, formation, its structure, short branches, long branches, regions of innervation.

General regularities of the structure and function of the autonomous part of the peripheral nervous system (autonomic nervous system). Morphological differences in the structure of the somatic nervous system and the autonomic nervous system. Morphological differences in the structure of the reflex arc of the somatic nervous system and the autonomic nervous system. Sympathetic part of the autonomic nervous system: morphological, functional differences, objects of innervation. Centers of the autonomic nervous system in the brain and spinal cord. Peripheral part of the autonomic nervous system: autonomic nodes, nerves, autonomic plexuses. Classification of vegetative nodes, their topography, prenodal and nodular nerve fibers. The sympathetic part of the autonomic nervous system. Centers in the spinal cord. Sympathetic trunk: topography, classification of nodes, interstitial branches. White and gray connecting branches: formation, topography. Branches of the cervical nodes of the sympathetic trunk, their topography and areas of innervation. Sympathetic roots of the vegetative nodes of the head. Branches of the thoracic nodes of the sympathetic trunk, their topography, areas of innervation. Branches of the lumbar nodes of the sympathetic trunk, their topography, areas of innervation. Branches of the sacral nodes of the sympathetic trunk, their topography, areas of innervation.

Parasympathetic part of the autonomic nervous system. Cranial part: vegetative nodes of the head, their topography, roots, branches, areas of innervation. Pelvic part. Internal plexuses: craniocervical part, thoracic part, abdominal part, pelvic part.

Topic 38. Description of anatomical preparations for topics from the nervous system and sensory organs.

To be able to demonstrate on anatomical preparations and name in Latin the parts of the central nervous system (spinal cord, rhomboid medulla, medulla oblongata, hindbrain, pons, cerebellum, midbrain, diencephalon, terminal brain, membranes and their derivatives), their boundaries, external structure, internal structure (white matter, gray matter, cavity). Know the function of the CNS department being demonstrated.

Algorithm for describing the senses:

1. Name of the analyzer in English and Latin
2. Structure of the peripheral part of the analyzer
3. Conductive Analyzer Path
4. Cortical center

Algorithm for describing cranial nerves:

1. Name in English and Latin
2. Function.
3. Cranial nerve nuclei and their topography
4. Exit site from the brain
5. Exit site from the skull
6. Branches
7. Areas of innervation

Be able to demonstrate the organ of vision, the organ of hearing and balance, cranial nerves on the preparations.

Content module 5. Cardiovascular system.

Topic 39. Heart: structure, chambers. Circulatory circles. Heart: topography, valve listening sites. Blood vessels and nerves of the heart. Pericardium.

Topography of the heart. Shape, position of the heart. External structure of the heart. Heart chambers: their structure. Heart valves. Structure of the heart wall: endocardium, myocardium, epicardium. Conduction system of the heart. Projection of the borders of the heart on the anterior wall of the thoracic cavity. Age-related anatomy of the heart. The great circle and the small circle of blood circulation. Fetal blood circulation. Heart development in phylogeny. Stages of heart development in human embryogenesis. Variants and abnormalities in the development of the heart. Structural mechanisms of the development of heart abnormalities. Heart valves. Arteries and veins of the heart. The pericardium, its structure, the cavity of the pericardium, the contents, the sinuses. Projection of the borders of the heart and valves on the anterior wall of the chest cavity. Places of listening to the heart valves.

Topic 40. Aorta: parts, branches of the aorta. External carotid artery, branches. Internal carotid artery.

General principles of the structure and function of the cardiovascular system. Components of the vascular part of the cardiovascular system: arteries, veins, vessels of the hemomicrovasculature. Lymphatic vessels, principles of their structure, functions. Aorta, parts of the aorta. The aortic arch and its branches. Common carotid artery: topography, branches. Features of the right and left common carotid artery. External carotid artery: topography, classification of branches. Branches of the external carotid artery: topography, areas of blood supply. Internal carotid artery: parts, their topography. Branches of the internal carotid artery: topography, areas of blood supply. Arterial circle of the large brain. Intersystemic and intrasystemic arterial anastomoses in the head and neck area. Subclavian artery: parts, their topography. Features of the right and left subclavian artery. Branches of the subclavian artery: topography, areas of blood supply. Axillary artery: topography, parts, branches, areas of blood supply. Brachial artery: topography, branches, areas of blood supply. Radial artery: topography, branches, areas of blood supply. Ulnar artery: topography, branches, areas of blood supply.

Thoracic aorta: topography, parietal and visceral branches. Abdominal aorta: topography, classification of branches. Parietal branches of the abdominal aorta: topography, areas of blood

supply. Visceral branches of the abdominal aorta: paired and unpaired. Paired visceral branches of the abdominal aorta: topography and areas of blood supply. Unpaired visceral branches of the abdominal aorta: topography and areas of blood supply. Intrasystemic arterial anastomoses between branches of the abdominal aorta. Common iliac artery: formation, topography, branches. Internal iliac artery: topography, classification of branches. Parietal and internal branches of the internal iliac artery: topography, areas of blood supply, intrasystemic and intersystemic arterial anastomoses. Arteries of the lower extremity. External iliac artery: topography, branches, areas of blood supply. Femoral artery: topography, branches, areas of blood supply. Arteries of the lower extremity. Popliteal artery: topography, branches, areas of blood supply. Anterior tibial artery: topography, branches, areas of blood supply. Posterior tibial artery: topography, branches, areas of blood supply.

Topic 41. *Superior vena cava. Veins of the head and neck, upper limb.*

Anatomical classification of veins (cardiac, main, extraorgan, intraorgan). Classification of veins according to the structure of the wall. Roots and tributaries of veins. Superficial veins, deep veins. 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 the intracranial and extracranial tributaries of the internal jugular vein. External jugular vein: formation, topography, tributaries. Anterior jugular vein: formation, topography, tributaries. Jugular venous arch: topography, formation. Brachiocephalic vein: formations (roots), topography, tributaries. Superior vena cava: formations (roots), topography, tributaries. Veins of the upper extremity: classification.

Topic 42. *Inferior vena cava. Veins of the walls and organs of the pelvis, veins of the lower limb. Veins of the abdominal cavity. Portal vein. The concept of venous anastomoses.*

Inferior vena cava: roots, topography, classification of tributaries. Parietal and internal tributaries of the inferior vena cava, areas of venous blood collection. Common, external and internal iliac veins: roots, tributaries, areas of blood collection. Veins of the lower limb: classification. Superficial and deep veins of the lower limb: their characteristics, patterns of topography and structure. Portal hepatic vein: roots, topography, tributaries. Superior mesenteric vein: topography, tributaries, venous blood collection sites. Inferior mesenteric vein: topography, tributaries, venous blood collection sites. Splenic vein: topography, tributaries, venous blood collection areas. Branching of the hepatic portal vein in the liver. Venous intrasystemic anastomoses. Venous intersystemic anastomoses: kava-kaval anastomoses, porto-caval anastomoses, and porto-kava-kaval anastomoses.

Topic 43. *Lymphatic system, structure, function, trunks. Lymphatic vessels and nodes of the head and neck.*

Classification of lymphatic vessels. Lymphatic capillaries: wall structure and function. Lymphatic postcapillaries: wall structure and function. Lymphatic vessels (intraorgan and extraorgan): wall structure and function. Superficial and deep lymphatic vessels. Lymphatic trunks: jugular, subclavian, bronchomediastinal, lumbar, intestinal - their formation, topography, functions. Lymphatic ducts: thoracic duct, right lymphatic duct. Development of lymphatic vessels in embryogenesis. Variants and anatomies of the development of the lymphatic ducts. Works of the Kyiv Anatomical School. Age-related features of the structure of lymphatic vessels.

Lymph nodes. Thoracic lymph nodes: classification. Lymph outflow pathways from the lungs, heart, esophagus. Lymph nodes in the abdomen: classification. Pelvic lymph nodes. Lymphatic vessels and regional lymph nodes of the stomach, small intestine, colon, liver, kidneys, uterus, ovaries.

Thoracic duct: roots, topography, tributaries, confluence with the venous system. Right lymphatic duct: roots, topography, confluence with the venous system. Jugular trunks: formation, topography, lymph collection areas, confluence with the lymphatic ducts. Lymph nodes of the head: classification, topography, lymph collection areas, lymph outflow pathways. Lymph nodes of the neck: classification, topography, lymph collection areas, lymph outflow pathways.

4. Structure of the discipline

Topic names	Number of hours			
	Just	including		
		L	SOFTWARE	SRS
1	2	3	4	5
Content module 1. Anatomy of the bones of the skeleton.				
Topic 1. Acquaintance with the department. Responsibilities and rights of students. International Anatomical Nomenclature. Axes and planes of the human body, their practical significance. Bone structure and formation.	5	2	2	1
Topic 2. Structure of the vertebrae. Spinal column. Sternum. Ribs.	5	2	2	1
Topic 3. Scapula and clavicle. Humerus. Bones of the forearm and hand.	3		2	1
Topic 4. Hip and femur. Lower limb and foot bones.	3		2	1
Topic 5. General information about the skull. Frontal, parietal and occipital bones.	5	2	2	1
Topic 6. Sphenoid bone. Ethmoid bone. Temporal bone, canals.	3		2	1
Topic 7. Bones of the facial skull. Nasal cavity. Orbital cavity. Palate.	3		2	1
Topic 8. The skull as a whole. Outer and inner surfaces. 12 pairs of cranial nerves – exit points. Temporal, subtemporal and pterygopalatine fossa.	3		2	1
Topic 9. Description of anatomical specimens from skeletal bones.	3		2	1
Total by content module	33	6	18	9
Content module 2. Joining the bones. Myology.				
Topic 10. Overview of bone connections. Connection of the vertebrae to each other. Junction of the ribs with the vertebrae and the sternum.	5	2	2	1
Topic 11. The connection of the bones of the skull to each other and the 1st, 2nd cervical vertebra. Temporomandibular joint.	3		2	1
Topic 12. Connection of the scapula and clavicle. Shoulder joint. Elbow joint. Connection of the bones of the forearm and hand.	3		2	1

Topic 13.Connection of the pelvic bones. The pelvis as a whole. Hip joint. Knee joint. Connection of the bones of the lower leg and foot.	3		2	1
Topic 14. General myology. Muscles and fascia of the back.	5	2	2	1
Topic 15. Facial muscles. Masticatory muscles. Mechanism of the act of chewing. Fascia of the head, interfascial spaces. Fascia and neck muscles. Topography: neck triangles.	3		2	1
Topic 16. Chest muscles, fascia, and triangles. Diaphragm.Muscles, fascia, abdominal lines. Areas, inguinal canal.	3		2	1
Topic 17.Muscles, fascia, and topography of the shoulder girdle and shoulder. Muscles, fascia, and topography of the forearm and hand.	3		2	1
Topic 18. Muscles, fascia, and topography of the pelvis, perineum, thigh. Muscles, fascia, and topography of the lower leg and foot.	3		2	1
Topic 19. Description of anatomical preparations for topics in arthrosyndesmology and myology.	3		2	1
Total by content module	34	4	20	10
Content module 3. Splanchnology				
Topic 20.Oral cavity. Lips, cheeks, palate, tongue. Glands of the oral cavity. Tongue: structure, function, muscles. Pharynx. Pyrogov's lymphatic ring.	5	2	2	1
Topic 21. Teeth: formula, structure, bite, change of teeth.	3		2	1
Topic 22. Anatomy of the digestive system: esophagus, stomach, small intestine, colon, liver, pancreas. Peritoneum.	3		2	1
Topic 23.External nose. Nasal cavity. Paranasal sinuses. Larynx: muscles, junctions, laryngeal cavities. Trachea, bronchi, lungs. Pleura. Mediastinum.	5	2	2	1
Topic 24. Kidneys: topography, structure, function. Ureters. Bladder.Urethra. Organs of the immune and endocrine systems.	6	3	2	1
Topic 25. Male genitals. Female genitals.	4	1	2	1

Topic 26. Description of anatomical preparations for topics in splanchnology.	3		2	1
Total by content module	29	8	14	7
Content module 4. Nervous system and sensory organs.				
Topic 27. General information about the nervous system, phylo- and ontogeny of the central nervous system. Anatomy of the spinal cord. Medulla oblongata. Pons. Cerebellum. Isthmus of the rhomboid brain. Fourth ventricle. Rhomboid fossa. Topography of the nuclei of the nerves.	4	1	2	1
Topic 28. Midbrain. Diencephalon. Third ventricle.	4	1	2	1
Topic 29. End brain. Relief of the cloak. Localization of functions. Basal ganglia. Lateral ventricles. Ascending conductive pathways. Descending conductive pathways.	4	1	2	1
Topic 30. Olfactory brain. White matter of the hemispheres. Exit points of 12 pairs of h/m nerves. Meninges. Venous sinuses of the dura mater. Blood vessels and nerves of the brain. Places of formation and ways of excretion of cerebrospinal fluid.	4	1	2	1
Topic 31. Organ of taste and smell. Skin, mammary glands. Pathways and centers of analyzers.	3		2	1
Topic 32. Organ of vision, eyeball. Nucleus of the eye. Auxiliary apparatus of the eye. The visual pathway and the pupillary reflex pathway.	4	1	2	1
Topic 33. External ear, middle ear. Inner ear. Conductive pathways of the organ of hearing and balance.	4	1	2	1
Topic 34. I, II, III, IV, VI pairs of cranial nerves.	4	1	2	1
Topic 35. Trigeminal nerve.	4	1	2	1
Topic 36. Facial nerve. VIII pair of cranial nerves. IX, X (head and cervical sections), XI, XII pairs of cranial nerves.	5	2	2	1
Topic 37. Spinal nerves. Plexus: cervical, brachial, lumbar, sacral. Thoracic spinal nerves. The autonomic nervous system is the sympathetic	5	2	2	1

division and the parasympathetic division.				
Topic 38. Description of anatomical preparations for topics from the nervous system and sensory organs.	3		2	1
Total by content module	48	12	24	12
Content module 5. Cardiovascular system.				
Topic 39. Heart: topography, valve listening sites, structure, chambers. Circulatory circles. Blood vessels and nerves of the heart. Pericardium.	5	2	2	1
Topic 40. Aorta: parts, branches of the aorta. External carotid artery, branches. Internal carotid artery	4	1	2	1
Topic 41. Superior vena cava. Veins of the head and neck, upper limb.	3.5	0.5	2	1
Topic 42. Inferior vena cava. Veins of the walls and organs of the pelvis, veins of the lower limb. Veins of the abdominal cavity. Portal vein. Concept of venous anastomoses	3.5	0.5	2	1
Topic 43. Lymphatic system, structure, function, trunks. Lymphatic vessels and nodes of the head and neck.	3		2	1
Total by content module	19	4	10	5
Test control of knowledge	1			1
Exam	16			16
Total Hours	180	34	86	60

5. Topics of lectures / seminars / practical / laboratory classes

5.1. Topics of lectures

№	Topic Name	Quantity Hours
I semester		
1	Introductory lecture. The main stages of human onto- and phylogeny.	2
2	General and Special Osteology.	2
3	Onto- and phylogeny of the skull. Age features. Craniometry. Examination of the skull as a whole.	2
4	General and temporal arthrosyndesmology. Biomechanics of joints	2
5	General myology. Topographic formations of the human body.	2
6	Anatomy of the digestive system. Serous membranes	2
7	Anatomy of the respiratory system.	2

8	Anatomy of the urinary system. Anatomy of the male and female reproductive systems.	2
II semester		
9	Anatomy of the endocrine and immune systems.	2
10	General information about the nervous system. Development of the central nervous system. Anatomy of the spinal cord.	2
11	Anatomy of the brain. Meninges.	2
12	Anatomy of the senses.	2
13	Cranial nerves: I-VI pairs	2
14	Cranial nerves of pairs VII-XII	2
15	Anatomy of the heart.	2
16	Anatomy of the arterial system, venous and lymphatic systems.	2
17	Spinal nerves and nerve plexuses. Autonomic nervous system	2
	Total per course	34

5.2. Seminar topics

Seminars are not provided.

5.3. Topics of practical classes

№	Topic Name	Number of hours
I semester		
1	Acquaintance with the department. International Anatomical Nomenclature. Axes and planes of the human body, their practical significance. Bone structure and formation.	2
2	Structure of the vertebrae. Spinal trunk. Sternum. Rib.	2
3	Scapula and clavicle. Humerus. Bones of the forearm and hand.	2
4	Hip and femur. Lower limb and foot bones.	2
5	General information about the skull. Frontal, parietal and occipital bones.	2
6	Sphenoid bone. Ethmoid bone. Temporal bone, canals.	2
7	Bones of the facial skull. Nasal cavity. Eye socket. Palate.	2
8	The skull as a whole. Outer and inner surfaces. 12 pairs of cranial nerves are the places of exit from the skull. Temporal, infratemporal and pterygopalatine fossa.	2
9	Description of anatomical specimens from skeletal bones.	2

10	General information about bone combinations. Connection of the vertebrae to each other. Connection of the ribs with the vertebrae and sternum.	2
11	The connection of the bones of the skull to each other and the 1st, 2nd cervical vertebra. Temporomandibular joint.	
12	Connection of the scapula and clavicle. Shoulder joint. Elbow joint. Connection of the bones of the forearm and hand.	2
13	Connection of the pelvic bones. The pelvis as a whole. Hip joint. Knee joint. Connection of the bones of the lower leg and foot.	2
14	General myology. Muscles and fascia of the back.	2
15	Facial muscles. Masticatory muscles. Mechanism of the act of chewing. Fascia of the head, interfascial tissue spaces. Fascia and neck muscles. Neck triangles. Interfascial spaces of the neck.	2
16	Chest muscles, fascia, and triangles. Aperture. Muscles, fascia, abdominal lines. Areas, inguinal canal.	2
17	Muscles, fascia, and topography of the shoulder girdle and shoulder. Muscles, fascia, and topography of the forearm and hand.	2
18	Muscles, fascia, and topography of the pelvis, perineum, thigh. Muscles, fascia, and topography of the lower limb and foot.	2
19	Description of anatomical preparations for topics in arthrosyndesmology and myology.	2
20	Oral cavity. Glands of the oral cavity. Tongue: structure, function, muscles. Pharynx. Pirogov's lymphatic ring.	2
21	Teeth: formula, structure, change of teeth.	2
22	Anatomy of the organs of the digestive system: esophagus, stomach, small intestine, colon, liver, pancreas. Peritoneum.	2
	II semester	
23	External nose. Nasal cavity. Paranasal sinuses. Larynx: muscles, junctions, laryngeal cavities. Trachea, bronchi, lungs. Pleura. Mediastinum.	2
24	Kidneys: topography, structure, function. Ureters. Bladder. Urethra. Organs of the immune and endocrine systems.	2
25	Male genitals. Female genitals.	2
26	Description of anatomical preparations for topics in splanchnology.	2
27	General information about the nervous system, phylo- and ontogeny of the central nervous system. Anatomy of the spinal cord. Medulla oblongata. Pons. Cerebellum. Isthmus of the rhomboid brain. Fourth ventricle. Rhomboid fossa. Topography of nerve nuclei	2
28	Midbrain. Diencephalon. Third ventricle.	2
29	End brain. Relief of the palium. Localization of functions. Basal ganglia. Lateral ventricles. Ascending Conductive Paths. Descending Conductive Paths.	2
30	Olfactory brain. White matter of the hemispheres. Exit points of 12 pairs of h/m nerves. Meninges. Venous sinuses of the dura mater. Blood vessels and nerves of the brain. Places of formation and ways of excretion of cerebrospinal fluid.	2
31	The organ of taste and smell. Skin, mammary glands. Paths and centers of analyzers.	2

32	Organ of vision, eyeball. The nucleus of the eye. Auxiliary apparatus of the eye. The visual pathway and the pupillary reflex pathway.	2
33	External ear, middle ear. Inner ear. Conductive pathways of the organ of hearing and balance.	2
34	I, II pair of cranial nerves. III, IV, VI pair of cranial nerves.	2
35	Trigeminal nerve.	2
36	Facial nerve. IX, X (head and cervical regions), XI, XII pairs of cranial nerves. The autonomic nervous system is the sympathetic division and the parasympathetic division.	2
37	Spinal nerves. Plexus: cervical, brachial, lumbar, sacral. Thoracic spinal nerves. The autonomic nervous system is the sympathetic division and the parasympathetic division.	2
38	Description of anatomical preparations for topics from the nervous system and sensory organs.	2
39	Circulatory circles. Arteries of the great circle of blood circulation. Heart: topography, structure, valve listening sites. Blood vessels and nerves of the heart. Pericardium.	2
40	Aorta: parts, branches of the aorta. External carotid artery, branches. Internal carotid artery.	2
41	Superior vena cava. Veins of the head and neck, upper limb.	2
42	Inferior vena cava. Veins of the walls and organs of the pelvis, veins of the lower limb. Veins of the abdominal cavity. Portal vein. The concept of venous anastomoses.	
43	Lymphatic system, structure, function, trunks. Lymphatic vessels and nodes of the head and neck.	2
	Total per course	86

6. Independent work of a higher education applicant

№	Topic Name	Number of hours
1	Preparation for practical classes - theoretical training and development of practical skills: - from the bones of the skeleton - from the connection of bones - structure, function of muscles and topographic formations of the head, neck, trunk and limbs - Splanchnology - from the nervous system - from the cardiovascular system	30 4 2 4 8 8 4
2	Preparation for summarizing classes on theoretical training and practical skills	20
3	Preparation for test control, exam	10
Together		60

7. Teaching Methods

Lectures. The topics of the lecture course reveal the problematic issues of the relevant sections of human anatomy.

Practical classes include: conversation, practicing the skills of examining and describing an anatomical preparation, instructing and practicing skills on the virtual anatomical table "Anatomage Table", solving clinical problems, testing.

Independent work: independent work with the textbook, independent work with the bank of test tasks Krok-1, independent solution of situational tasks.

8. Forms of control and methods of assessment (including criteria for assessing learning outcomes)

Current control: oral questioning, testing, assessment of the implementation of practical skills knowledge of anatomical preparations, followed by analysis and assessment of sex, age, individual features of the structure of human organs, solving situational problems, assessment of skills to analyze topographic and anatomical relationships of human organs and systems; assessment of skills to analyze the patterns of prenatal and early postnatal development of human organs, variants of organ variability, malformations; control over the correctness of filling out the Self-Study Notebook, assessment of activity in the classroom.

Final control: exam.

Assessment of current learning activities in the practical lesson:

Assessment of the success of studying each topic of the discipline "Human Anatomy" is carried out on a traditional 4-point scale.

1. Assessment of theoretical knowledge on the topic of the lesson by questioning, solving tests and situational tasks:

The maximum score is 5, the minimum grade is 3, and the unsatisfactory grade is 2.

2. Assessment of practical skills and manipulations on the topic of the lesson:

The maximum score is 5, the minimum grade is 3, and the unsatisfactory grade is 2.

The grade for one practical lesson is the arithmetic mean for all components and can only have an integer value (5, 4, 3, 2), which is rounded according to the statistical method.

At the practical lesson, students must be interviewed at least once in 2 practical classes, at least 75% of applicants. At the end of the semester, the number of grades for applicants in the group should be the same on average.

Criteria for current assessment in the practical lesson:

Score	Evaluation criteria
Excellent "5"	The higher education applicant is fluent in the material, takes an active part in the discussion and solution of tests, situational clinical tasks, confidently demonstrates practical skills during the examination and description of an anatomical preparation. Expresses his/her opinion on the topic of the lesson, demonstrates clinical thinking.
Well «4»	The higher education applicant has a good command of the material, participates in the discussion and solution of situational clinical problems, tests, demonstrates practical skills during the examination and description of an anatomical drug with some errors, expresses his opinion on the topic of the lesson, demonstrates clinical thinking.
Satisfactory "3"	The higher education applicant does not have sufficient knowledge of the material, hesitantly participates in the discussion and solution of a situational clinical problem, demonstrates practical skills during the examination and description of an anatomical preparation with significant errors.
Disappointing «2»	The higher education applicant does not have the material, does not participate in the discussion and solution of a situational clinical problem, does not answer tests, does not demonstrate practical skills during the examination and description of an anatomical preparation.

Only those applicants who have fulfilled the requirements of the curriculum in the discipline, have no academic debt, their average score for the current educational activity in the discipline is at

least 3.00 and they have passed the test control on the tests "KROK-1" by at least 90% (50 tasks) are allowed to the final control in the form of an exam.

Test control is carried out in the Educational and Production Complex of Innovative Technologies of Training, Informatization and Continuing Education of ONMedU at the last lesson on the eve of the exam.

Assessment of learning outcomes during the final control – exam.

The exam is held in the Educational and Production Complex of Innovative Teaching Technologies, Informatization and Internal Monitoring of the Quality of Education of the University during the examination sessions at the end of the semester (autumn and spring) according to the schedule.

During the exam, the applicant receives a standardized ticket, and the examiners use a checklist for the corresponding ticket with reference answers and determine which mandatory components of the answer were named or not named by the applicant.

Ticket contents
Overview and description of the anatomical specimen UDRZ
4 (four) theoretical questions

The total score for the exam is compiled as the arithmetic mean of all grades received for answers to theoretical questions and practical tasks on a traditional four-point scale, rounded to two decimal places.

Criteria for assessing the learning outcomes of students in the exam

Score	Evaluation criteria
Perfectly «5»	It is awarded to a higher education applicant who has worked systematically during the semester, has shown during the exam a versatile and deep knowledge of the program material, is able to successfully perform the tasks provided by the program, has mastered the content of the main and additional literature, has realized the relationship between individual sections of the discipline, their importance for the future profession, has shown creative abilities in understanding and using educational and program material, has shown the ability to independently update and replenishment of knowledge; level of competence – high (creative);
Well «4»	It is given to a higher education applicant who has shown full knowledge of the educational and program material, successfully performs the tasks provided by the program, has mastered the basic literature recommended by the program, has shown a sufficient level of knowledge in the discipline and is capable of their independent updating and updating in the course of further education and professional activity; level of competence – sufficient (constructive-variable)
Satisfactory «3»	It is awarded to a higher education applicant who has shown knowledge of the main educational and program material to the extent necessary for further study and subsequent work in the profession, copes with the tasks provided for by the program, made some mistakes in the answers to the exam and when performing exam tasks, but has the necessary knowledge to overcome the mistakes made under the guidance of a scientific and pedagogical worker; Level of competence – intermediate (reproductive)
Disappointing «2»	It is given to a higher education applicant who has not shown sufficient knowledge of the basic educational and program material, has made fundamental mistakes in the performance of the tasks provided by the program, cannot use the knowledge in further education without the help of a teacher, has not been able to master the skills of independent work; Level of competence – low (receptive-productive)

9. Distribution of points received by higher education applicants

The average score for the academic discipline for applicants who have successfully mastered the work program of the discipline is converted from the traditional four-point scale into points on a 200-point scale, as shown in the table:

Traditional Score to Multipoint Scale Conversion Table

Traditional four-point scale	Multi-point 200-point scale
Excellent ("5")	185 – 200
Good ("4")	151 – 184
Satisfactory ("3")	120 – 150
Unsatisfactory ("2")	Below 120

A multi-point scale (200-point scale) characterizes the actual success of each applicant in mastering the educational component. The conversion of the traditional grade (average score for the academic discipline) into a 200-point grade is carried out by the Information and Technical Department of the University.

According to the points received on a 200-point scale, the achievements of applicants are evaluated according to the ECTS rating scale. Further ranking according to the ECTS rating scale allows you to evaluate the achievements of applicants in the educational component, who are studying in the same course of the same specialty, in accordance with the points they receive.

The ECTS scale is a relative comparative rating scale, which establishes the applicant's belonging to the group of the best or worst among the reference group of fellow students (faculty, specialty). A grade "A" on the ECTS scale cannot be equal to an "excellent" grade, and a grade "B" cannot be equal to a "good" grade, etc. When converting from a multi-point scale, the boundaries of grades "A", "B", "C", "D", "E" on the ECTS scale do not coincide with the limits of marks "5", "4", "3" on the traditional scale. Applicants who have received "FX" and "F" ("2") grades are not included in the list of ranked applicants. The "FX" grade is given to applicants who have scored the minimum number of points for the current educational activity, but who have not been credited with the final control. The grade "F" is given to applicants who have attended all classes in the discipline, but have not received an average score (3.00) for the current educational activity and are not allowed to the final control.

Applicants studying in one course (one specialty), based on the number of points scored in the discipline, are ranked on the ECTS scale as follows:

Conversion of the traditional grade in the discipline and the sum of points on the ECTS scale

ECTS score	Statistical indicator
And	Top 10% of applicants
Into	The next 25% of applicants
C	The next 30% of applicants
D	The next 25% of applicants
E	The next 10% of applicants

10. Methodological support

- Work program of the discipline
- Syllabus of the discipline
- Situational tasks for the licensing exam "Krok-1"
- Methodical developments for practical classes

- Electronic bank of test tasks by discipline units.
- Self-study workbook on the discipline "Human anatomy" part I. Educational edition. Under the general editorship of Dr. M.Sc. Professor O.L. Appelhans. Odesa, 2021. 136 p.
- Self-study workbook on the discipline "Human anatomy" part II. Educational edition. Under the general editorship of Doctor of Medicine, Professor O.L. Appelhans. Odesa, 2021. 120 p.
- Self-study workbook on the discipline "Human anatomy" part III. Educational edition. Under the general editorship of Doctor of Medicine, Professor O.L. Appelhans. Odesa, 2021. 104 p.

11. Questions to prepare for the final control

1. Skeletal development in phylo- and ontogeny. Skeleton: structure, division, function. Primary, secondary bones. Types of ossification.
2. Bone growth in length and thickness. Periods of growth, relationship with physical activity. Age, sex, individual characteristics of bones and bone marrow. Bone structure. Structural unit. Compact and spongy substances. Bone marrow. Chemical composition and physical properties of bones.
3. Parts of the bone and external structure. Periosteum: structure, function, age-related changes. Classification of bones. X-ray anatomy of bones.
4. Vertebral column: divisions. The structure of the vertebrae in different sections, X-ray images. Variants and abnormalities of the vertebrae .
5. Ribs, sternum: development, structure, variants, abnormalities, X-ray images.
6. Scapula, clavicle, humerus: structure, abnormalities, X-ray images.
7. Ulna, radius and bones of the wrist, phalanges of the fingers : structure, abnormalities, X-ray images.
8. Pelvic bones: structure, age and sex characteristics, X-ray images. Femur: structure, abnormalities, X-ray images.
9. Tibia bones, tarsus, metatarsus, phalanges of the fingers: structure, abnormalities, X-ray images.
10. Basic transformations of the skull in phylogeny. Cerebral and facial skull: bones, X-ray images. Frontal bone: topography, parts, structure. Parietal bone: topography, structure. Occipital bone: topography, parts, structure.
11. Sphenoid bone: topography, parts, structure. Ethmoid bone: topography, parts, structure.
12. Temporal bone: topography, parts, structure of the tympanic and scale-like parts. Temporal bone: structure of the stony part, temporal bone canals and their contents.
13. Upper jaw: topography, parts, structure. Zygomatic and hyoid bones: topography, structure.
14. Lower jaw: topography, parts, structure. Palatine bone, inferior nasal concha, hyoid bone, nasal and lacrimal bones, topography, structure.
15. Structure of the cranial vault. Formation of the inner surface of the base of the skull. Formation of the outer surface of the base of the skull.
16. Orbital cavity: walls, canals, crevices.
17. Nasal cavity: walls, channels, passages, connections. Paranasal sinuses: topography, structure, function, age-related changes.
18. Hard palate and nasal membrane: bones, structure, function, age-related changes.
19. Temporal, subtemporal and pterygopalatine fossa: walls, connections.
20. Development of the bones of the cerebral and facial skull in ontogenesis (primary, secondary bones), fontanelle. Age-related changes in the skull. Craniometry: points. Variants, abnormalities of the bones of the skull.
21. Classification of bone joints. Planes and axes of the body, movements around them. Characteristics of synarthrosis: syndesmoses, synchondrosis, synostoses, synelastosis, synsarcoses. Characteristics of the semi-joints.
22. Characteristics of diarthrosis: parts of the joint, their morpho-functional characteristics. Characteristics of joints: simple, complex, complex, combined congruent, one-, two-, three- and multi-axial.

23. Connections of the bones of the skull: syndesmoses: (sutures, fontanelle), synchondrosis and synostosis. Temporomandibular joint, characteristics.
24. The connection of the vertebrae to each other, with the occipital and sacral bones. Connection of the first and second cervical vertebrae. The spinal column as a whole: function, bends, causes and timing of their occurrence.
25. The connection of the ribs with the vertebrae, the sternum and with each other. Chest as a whole: structure, age and sex characteristics, function, developmental abnormalities.
26. The connection of the scapula and clavicle to each other and the sternum. Shoulder joint: structure, function, X-ray image.
27. Elbow joint: structure, function, X-ray image. Junction of the ulna and radius. Wrist joint: structure, function, X-ray image. Connection of the bones of the hand: structure, function, X-ray image.
28. Connection of the pelvic bones: structure, function, X-ray image. The pelvis as a whole: walls, cavities, orifices, evolution of the pelvis. Sexual discrepancies of the pelvis, the size of the female pelvis. Hip joint: structure, function, X-ray image.
29. Knee joint: structure, function, X-ray image. Connection of the shin bones. Ankle joint: structure, function, X-ray image. Connection of the bones of the foot: structure, function. The joints of Chopard and Lisfranc, their ligaments are the keys.
30. Muscle development in onto- and phylogeny. Autochthonous, trunkofugal and trunkopetal muscles. Morpho-functional differences between striated and non-striated muscles. Structure of skeletal muscle: parts, origin, attachment, function. Auxiliary apparatus of muscles.
31. Classification of muscles: by shape, function, direction, location. Antagonist muscles, synergists and pro-traders. Superficial Back Muscles: Origin, Attachment, Function, Fascia. Deep Back Muscles: Origin, Attachment, Function, Fascia.
32. Diaphragm: structure, parts, functions. Muscles and fascia of the chest.
33. Abdominal muscles: origin, attachment, functions, fascia. Formation of the white line and vagina of the rectus abdominis muscle. Inguinal canal: walls, superficial and deep rings. Content.
34. Superficial neck muscles and muscles that attach to the hyoid bone: origin, attachment, function. Neck triangles: borders, contents. Deep Neck Muscles: Origin, Attachment, Function. Fascia of the neck and interfascial spaces.
35. Masticatory muscles: origin, attachment, function, fascia. Facial muscles: principle of location, origin, attachment, function, fascia.
36. Shoulder girdle and shoulder muscles: origin, attachment, function. Fascia and topography of the shoulder, inguinal fossa, its walls, holes, radial nerve canal.
37. Muscles of the forearm and hand: origin, attachment, functions.
38. Pelvic muscles: origin, attachment, function, fascia. Topography of the pelvis: holes, channels, lacunae, pits.
39. Thigh Muscles: Origin, Attachment, Function, Fascia. Hip topography: femoral triangle, borders, contents, femoral canal, walls, external and internal openings.
40. Lower limb and foot muscles: beginning, attachment, function, topography.
41. Understanding the insides, dividing them into systems. The principle of the structure of hollow and parenchymal organs, their function. The primary intestine, its sections, derivatives and their relationship to the peritoneum.
42. Oral cavity: wall structure, connections, developmental abnormalities, blood supply, lymphatic drainage. Lips, cheeks, gums: structure, function. Age-related features, developmental anomalies.
43. Palate: pigtails, muscles. Function, innervation, blood supply, lymphatic drainage.
44. Teeth: parts, cavity, canals. Crown surfaces. Permanent Teeth Formula. Dental anomalies. Features of the structure and distinctive features of the structure of the teeth of the upper and lower jaw. Innervation, blood supply, lymphatic drainage.
45. Milk teeth: development, sequence and timing of eruption, structural features, dental formula. Mechanism of tooth change.

46. Structure of the dentoalveolar segment. Periodontium, periodontium. Bite and its types. The concept of the masticatory apparatus: the systems that form it and the organs, their function.
47. Tongue: parts, surfaces, muscles, glands, papillae. Tongue: functions, developmental abnormalities, innervation, blood supply, lymphatic drainage.
48. Parotid, submandibular and sublingual salivary glands: structure, location, excretory ducts, innervation, blood supply, lymphatic drainage.
49. Pharynx: parts, topography, muscles, orifices, function, mechanism of the acts of breathing and swallowing, innervation, blood supply, lymphatic drainage. Lymphoepithelial ring of Pirogov, its age-related changes.
50. Esophagus: sections, their topography, structure. Walls, constriction. Function. Abnormalities in the development of the esophagus, its innervation, blood supply, lymphatic drainage, X-ray imaging.
51. Stomach: topography, parts, surfaces, wall structure, glands, stomach function, innervation, blood supply, lymphatic outflow, X-rays.
52. Small intestine – parts, their topography, relation to the peritoneum, wall layers, function, innervation, blood supply, lymphatic drainage.
53. Colon – parts, their topography, relation to the peritoneum, external distinguishing features of the colon, wall layers, function, innervation, blood supply, lymphatic drainage.
54. Liver: development, topography, borders, peritoneal coverage, structure, ligaments, lobes, margins, surfaces, furrows, X-ray images. Innervation, blood supply, lymphatic drainage from the liver. Gallbladder: structure, topography, excretory ducts of the liver and gallbladder.
55. Pancreas: topography, structure, peritoneal coverage, function, endo- and exocrine parts, excretory duct, innervation, blood supply, lymphatic drainage.
56. Components of the human respiratory system, conditional division into upper and lower respiratory tracts. External nose. Wall structure (bones, cartilage, joints), function, innervation, blood supply, lymphatic drainage. Nasal cavity. Paranasal sinuses.
57. Larynx – topography, cartilage, joints, ligaments. Internal structure, functions, laryngoscopy. Innervation of the larynx, blood supply, lymphatic drainage.
58. Trachea: structure, topography, functions. Bronchi: wall structure, branching, bronchoscopy, X-ray, innervation, blood supply, lymphatic drainage.
59. Lungs: development in phylo- and ontogeny, topography, external structure, X-ray images. Structural unit and function of the lungs, innervation, blood supply, lymphatic drainage.
60. Pleura. Mediastinum: definition, conditional division, divisions, contents, blood supply, lymph drainage.
61. Kidneys: phylo- and ontogeny, topography, skeletopy. Shape, size, structure, kidney fixation apparatus, developmental abnormalities, X-ray imaging, innervation, blood supply, lymph and venous drainage.
62. Ureters: parts, structure, relationship to the peritoneum, function. Bladder: parts, structure, peritoneal covering, function, innervation, blood supply, lymph and venous drainage, X-ray image.
63. Testicle: size, shape, external and internal structure, tubules and their functions, epididymis and epididymis, testicular abnormalities, testicular innervation, blood supply, lymph and venous drainage.
64. Composition of the spermatic cord, vas deferens, topography, length, parts. Seminal vesicles, prostate gland, bulbous-urethral glands: structure, function, innervation, blood supply, lymph and venous drainage.
65. Scrotum: membranes (their origin), innervation, blood supply, lymph outflow. Penis: external structure, structure and functions of the corpora cavernosum and spongios, fixation apparatus, innervation, blood supply, lymph and venous drainage.

66. Female genital organs, internal and external, ovary: shape, size, topography, ligaments, external structure, appendages.
67. Uterus: names, shapes, sizes, parts, topography, normal position, uterine ligaments, layers, internal structure. Fallopian tubes: names, topography, parts, layers, holes, constriction, innervation, blood supply, lymph and venous drainage.
68. Vagina: names, topography, dimensions, wall structure, vaults, abnormalities, innervation, blood supply, lymph and venous drainage.
69. External female genital organs: large and small lips, adhesions, vestibule, hymenal membrane, clitoris: structure, innervation, blood supply, lymph and venous drainage.
70. Peritoneum. The concept of the abdominal cavity and peritoneal cavity, fascia, types of peritoneal organ coverage. Derivatives of the peritoneum: ligaments, mesenteries, caps, folds, bags, sinuses, canals, fossa, depressions, meaning, innervation, blood supply, lymph drainage.
71. Classification of the nervous system. Structural components of the reflex arc. Representation of neuron, neuroglia, synapses, receptors, reflex arc. Development of the nervous system in phylogeny: diffuse, nodular, tubular form, stages of three, five brain vesicles.
72. Spinal cord: topography, shape, external relief, structure of gray and white matter, membranes, intermembrane spaces, their contents, blood supply. Conductive pathways of the spinal cord and their localization.
73. End brain: constituent parts, sulci and convolutions of the cerebral hemispheres. Cyto- and myeloarchitectonics of the cerebral cortex, layers, Betz cells. Fiber system (associative, commissural, projection), corpus callosum, adhesions, internal capsule. Localization of functions in the cerebral cortex.
74. Basal ganglia, capsules. Representation of the extrapyramidal system. Lateral ventricles of the brain: topography, structure, conjunctions, choroid plexuses. Formation and outflow of cerebrospinal fluid, its functional significance.
75. Diencephalon: borders, divisions (thalamic, subthalamic, third ventricle). Hypothalamic area: distribution.
76. Midbrain: parts, external and internal structure.
77. Hindbrain: constituent parts, external structure of the Varolian pons. Cerebellum: topography, external and internal structure.
78. Rhomboid fossa: boundaries, relief, internal structure, projection of the nuclei of the cranial nerves. Fourth ventricle of the brain: structure, conjunction, choroid plexus.
79. Medulla oblongata: external and internal structure.
80. Formation of the Willisian Circle and its branch. Veins of the brain, venous sinuses of the dura mater, diploic veins. Meninges and intermembrane spaces of the brain.
81. Conductive pathways of pain and temperature sensitivity, proprioceptive sensitivity of the cerebellar direction and cortical direction of Goll and Burdach.
82. Motor: pyramidal and extrapyramidal pathways.
83. Organ of taste and smell: development in phylogeny, location, structure, conductive pathways.
84. Skin and its derivatives: hair, nails, sebaceous and sweat glands, their structure, function, blood supply, lymphatic drainage. Mammary gland: topography, structure, function, innervation, blood supply, lymphatic drainage.

85. Organ of vision: development in phylo- and ontogeny, significance for humans. Topography of the eye, structure, membranes of the eye and their division into parts. Chambers of the eye, lens, vitreous: structure, function. Formation and outflow of moisture from the chambers of the eye. Accessory organs of the eye: muscles, fascia, adipose body, eyelids, conjunctiva, glands. Lacrimal apparatus: structure, topography, function.
86. Development of the vestibule-cochlear organ in phylo- and ontogeny. The constituent parts of the outer, middle and inner ear. Structure and function.
87. Cranial nerves: number, names, development in phylogeny, their difference from spinal nerves. Olfactory and optic nerves.
88. Oculomotor nerve: nuclei, exit from the brain and skull, branches, regions of innervation. Trochlear nerve: nuclei, exit from the brain and skull, branches, regions of innervation. Abducens nerve: nuclei, exit from the brain and skull, regions of innervation.
89. Trigeminal nerve: nuclei, exit from the brain, Gasser node, exit from the skull, branches, areas of innervation.
90. Facial nerve: nuclei, exit from the brain and skull, formation of the "big crow's foot". Intermediate nerve: nuclei, exit from the brain and skull. Branches, their location, regions of innervation.
91. Vestibule-cochlear nerve: nuclei, exit from the brain, nodes, branches, regions of innervation
92. Glossopharyngeal nerve: nuclei, exit from the brain and skull, upper and lower nodes, branches (tympanic, small stony, etc.), area of innervation.
93. Vagus nerve: nuclei, exit from the brain and skull, upper and lower nodes, branches of the cranial region, branches of the cervical, thoracic and abdominal regions.
94. Accessory nerve: nucleus, exit from the brain and innervating skull. Hypoglossal nerve: nucleus, exit from the brain and skull, branches, area of innervation. Formation of the cervical loop and its importance.
95. Heart: development in phylo- and ontogeny; topography, dimensions, external structure, function. The internal structure of the heart: layers, chambers, relief of the ventricles and atria. Valvular apparatus of the heart: structure, location, place of their listening. Wired system. Arteries and veins of the heart. Innervation of the heart. Pericardium.
96. Circulatory System: Structure, Function, Development in Phylo- and Ontogeny. Vascular anastomoses: types, function, formation. Terminal vessels. The principle of the name of the vessel, the types of branching (main, loose). The structure of the vascular wall and its features in arteries and veins. Patterns of location and number of arteries and veins.
97. Large and small circle of blood circulation: blood vessels, their outlets, branches, confluences. Aorta – divisions (parts), topography, syntopia, branches. Common carotid artery: topography, syntopia, branching.
98. External carotid artery: topography, divisions, branches, areas of blood supply.
99. Internal carotid artery: topography, divisions, branches.
100. Superior vena cava: structure, tributaries, confluences. Brachiocephalic veins: location, tributaries, confluences.
101. Internal jugular vein: topography, intracranial and extracranial tributaries, dura sinuses, diploic and emissary veins.
102. Brachial artery: topography, branches. Radial and ulnar arteries: topography, ramifications on the forearm and hand.

103. Superior and inferior mesenteric arteries: topography, branching.
104. External and internal iliac arteries: topography, branches. Femoral artery: topography, branches.
105. Inguinal and subclavian veins: borders, location, tributaries.
106. Superficial and deep veins of the upper extremity: formations, topography, tributaries, anastomoses.
107. Superficial and deep veins of the lower extremity: topography, tributaries.
108. Subclavian artery: right and left outlets, divisions and branches.
109. Thoracic aorta: parietal and visceral branches. Abdominal aorta: topography, parietal and visceral branches..
110. Portal vein: roots, tributaries, ramifications in the liver. Formation of a "magnificent" venous network.
111. Inferior vena cava: roots, tributaries, topography.
112. Superior vena cava: roots, tributaries, topography.
113. Cava-caval anastomoses. Porto-caval anastomoses.
114. Spinal nerves: formation, number by section, relationship to intervertebral nodes, branches. Formation of plexuses. Cervical plexus: formation, topography, branches. Topography of the phrenic nerve.
115. Brachial, lumbar, sacral plexus, formation, branches.
116. Autonomic nervous system: function, localization of centers, structural features of the sympathetic and parasympathetic parts of the autonomic nervous system.
117. Lymphatic system: structure, function, development in onto- and phylogeny, differences from the venous system and lymphatic tissue, age-related changes. Lymphatic trunks, thoracic duct, right lymphatic duct, their location, tributaries and confluences.
118. Organs of the immune system: features of structure, location, function. Sternal gland: topography, structure, function, age-related changes, innervation, blood supply, lymph outflow. Spleen: topography, structure, functions, blood supply.
119. Endocrine glands, their origin, classification. Thyroid gland: topography, external and internal structure, function, age-related features, innervation, blood supply, lymph outflow. Adrenal gland. Pituitary gland: topography, size, structure, function, relationship with the hypothalamus.

12. Recommended literature

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1. Human anatomy: a textbook /V.R. Cherkasov, S.Y. Kravchuk. Vinnytsia: New book, 2020. 656 p.
2. Frank H. Netter. Atlas of human anatomy.7th edition. Elsevier. 2018. 672p.
3. Sobotta. Atlas of human anatomy. In 2 volumes. Processing and editing of the Ukrainian edition: V.G. Cherkasov, trans. O.I. Kovalchuk. Kyiv: Ukrainian Medical Bulletin, 2019.

Additional

1. Human anatomy: a textbook in three volumes / edited by prof. V.G. Kovechnikov. Lugansk 2011.
2. Gray's Anatomy/H. V. Carter Henry Gray/ Barnes & Noble, 2018. 1280 p.
3. Test tasks "Step-1" - human anatomy / 5th edition, revised / Edited by V.G. Cherkasova, I.V. Dzevulska I.V., O.I. Kovalchuk Tutorial. 2016. 100 p.
4. Human anatomy. V.G. Cherkasov, S.Yu. Kravchuk – Vinnytsia: Nova kniga, 2015.184 p. (educational and methodical manual)
5. Human anatomy (control of independent preparation for practical classes) for students. higher medical (pharmaceutical) studies. closing IV level of accreditation] / Educational and methodological manual / Edited by V.G. Cherkasova, I.V. Dzevulska I.V., O.I. Kovalchuk
6. Frederic Martini Anatomical atlas of man: Trans. from the 8th Eng. Type [scientified. trans. V.G. Cherkasov], A-USPH "Medicine", 2017. 128 p. (Atlas)

13. Electronic information resources

1. <http://anatom.ua>. – the leading resource on Human Anatomy
2. <https://www.primalpictures.com>. – a 3D anatomy resource for educators, students, practitioners and professionals
3. <https://www.visiblebody.com> – resource of the international educational community «Visible Body»
4. <https://3d4medical.com> - the world's most advanced 3D anatomy platform
5. <https://info.odmu.edu.ua/chair/anatomy/files/6/ua> - materials from the course "Human Anatomy"