MINISTRY OF HEALTH OF UKRAINE

ODESSA NATIONAL MEDICAL UNIVERSITY

Department of Human Anatomy

APPROVED
Vice-Rector of Scientific and Pedagogical Work

_____ Eduard BURIACHKIVSKYI

01 September 2023

WORK PROGRAM OF THE DISCIPLINE

Human anatomy

Level of higher education: second (master's)

Field of knowledge: 22 «Health care»

Specialty: 222 Medicine

Educational and professional program: Medicine

2023

The program is based on the educational and professional program "Medicine", training of specialists of the second (master's) level of higher education in the specialty 222 "Medicine" of the field of knowledge 22 "Health Care", approved by the Academic Council of ONMedU (Protocol No. 8 of June 29, 2023).

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The work program was approved at a meeting of the Department of Normal and Pathological Clinical Anatomy Protocol № 1 dated 29.08.2023

Head of the Department _____ Olena APPELHANS

Agreed with the guarantor of EPP _____ Valeria MARICHEREDA

Approved at the Subject Cyclic Methodical Commission on Medical-Biological Disciplines of ONMedU
Protocol № 1 dd 29.08.2023

Head of Subject Cycle Methodical Commission on Medical and Biological

Disciplines _____ Leonid GODLEVSKY

Revised and approved at a meeting of the Department _____

Protocol No ___ of "___" ____ 20__ p.

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

Reviwed and approved at a meeting of the Department _____

Protocol No ___ of "___" ____ 20__ p.

Head of the Department _____ _____
(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: 12 Hours: 360 Content Modules: 7	Field of study 22 "Health care" Speciality 222 "Medicine" Level of higher education second (master's) Specialty: 222 Medicine	*Full-time education* *Required discipline*
		Year of study: 1
		Semesters I - II
		Lectures (44 hours)
		Seminar (0 hours)
		Practical (160 hours)
		Laboratory classes (0 hours)
		Independent work (156 hours)
		including individual tasks (0 hours)
		Form of final contro: exam

2. The purpose and objectives of the discipline, competence, program results of training.

Purpose. Applicants' acquisition of knowledge of anatomy in the world of natural-scientific 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 practical work 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 performed functions, taking into account the age, gender and individual characteristics of a person.

Task. 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 performed functions, taking into account the age, gender and individual characteristics of a person.

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

- integral (IC)

The ability to solve typical and complex problems, including those of a research and innovation nature in the field of medicine. Ability to continue learning with a high degree of autonomy.

- general (GC):

GC4. Knowledge and understanding of the subject area and understanding of professional activity.

GC11. Ability to search, process and analyze information from various sources.

GC12. Determination and persistence in relation to assigned tasks and assumed responsibilities.

GC15. The ability to preserve and multiply moral, cultural, scientific values and achievements of society based on an understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technologies, to use various types and forms of motor activity for active recreation and leading a healthy lifestyle.

- special professional (SC):

PC23. Ability to develop and implement scientific and applied projects in the field of health care.

PC25. Adherence to professional and academic integrity, to be responsible for the reliability of the obtained scientific results.

PC28. Ability to apply fundamental biomedical knowledge at a level sufficient to perform professional tasks in the field of health care.

Program learning outcomes (PLO):

PLO1. Have thorough knowledge of the structure of professional activity. To be able to carry out professional activities that require updating and integration of knowledge. To be responsible for professional development, the ability for further professional training with a high level of autonomy.

PLO2. Understanding and knowledge of basic and clinical biomedical sciences, at a level sufficient for solving professional tasks in the field of health care.

PLO3. Specialized conceptual knowledge that includes scientific achievements in the field of health care and is the basis for conducting research, critical understanding of problems in the field of medicine and related interdisciplinary problems.

PLO21. Search for the necessary information in the professional literature and databases of other sources, analyze, evaluate and apply this information.

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

To know:

a) the form and structure of the bodies united in the system:
- the shape and structure of bones (skeleton system);
- bone connections (articular system);
- muscles (muscular system);
- viscera (alimentary system, respiratory system, urinary system, genital);
- central and peripheral nervous system (including the autonomous part of the peripheral nervous system (nervous system);
- endocrine organs (endocrine glands);
- organs and formations of the immune system;

- lymphoid system;
- sense organs;
- total cover (integument)
- cardiovascular (cardiovascular system);

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

c) age and sexual aspects of the anatomical features of individual human development at different stages of ontogenesis;

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

Be able to:

- demonstrate and describe the anatomical structure of organs, systems of human organs;
- to determine on anatomical preparations the topographic-anatomical relationships of organs and systems of human organs;
- be able to assess the age, sex and individual characteristics of the structure of human organs;
- be able to assess the influence 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 the international anatomical nomenclature (San-Paulo, 1997, Kyiv, 2001)

Master the skills:

- to define and describe the anatomical preparation of students' educational and research work;
- determine the organs of the human body, parts of the skeleton and bones of the skull on X-rays, computer tomography and magnetic resonance tomography scans;
- determine the topography of individual bones and formations of the skull and skeleton of a living person;
- find locations of the main groups of regional lymph nodes of the head, neck and extremities.

3. Contents of the discipline

Content module 1. *Anatomy of skeletal bones.*

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, its organs and systems. Anatomy involves a systematic description of the shape, structure, state and topographic relationships of parts and organs of the body, taking into account their age, sex and individual characteristics.

The main modern directions of anatomy development are age anatomy, comparative anatomy, plastic anatomy, anthropology, ecological anatomy, etc.

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

Analysis of the development of anatomy in ancient times, in the Renaissance, in the XVP-XIX centuries. The significance of the works of Hippocrates, Aristotle, Galen, Avicenna, Andrei Vesalius,

Leonardo da Vinci, V. Garvey, M. Malpighi, M.I. Pirogov, and others. Formation and development of Ukrainian anatomical schools.

The initial stages of human embryogenesis. Germinal leaves: ectoderm, endoderm, mesoderm, theirs derivatives.

General data about the skeleton. Bone development (in phylogenesis and ontogenesis). Primary and secondary bones. Bone classification. Bone as an organ. Compact and spongy bone substances, their structure. Chemical composition, physical and mechanical properties of the bone. The structure of the tubular bone: its parts. Features of the bone structure in childhood, adolescence, mature, old age. Bones in X-rays. The influence of sports and labor on the structure of bones. The influence of social factors and ecology on the development and structure of the bones of the skeleton.

The concept of the International Anatomical Nomenclature, its significance for the study of anatomy and the unification of the study of natural and clinical disciplines. The main anatomical terms that reveal the topography of anatomical objects, and their main characteristics.

Anatomical planes (sagittal, frontal, horizontal) and axes (frontal, vertical, sagittal), their characteristics, use to describe bones and their parts.

Topic 2. ***The structure of the vertebrae. Spinal column. Sternum. Ribs.***

Bones of the skeleton: vertebrae, ribs, chest. The principle of segmental structure of the axial skeleton. Phylo- and ontogenesis of the spinal column. General characteristics of the spinal column, of the structure of the vertebrae. Features of the structure of the cervical, thoracic, lumbar vertebrae, sacral bone, coccygeal bone. Age and sexual characteristics of the structure of the vertebrae. The influence of social and environmental factors on the structure of the vertebrae.

The development of ribs and chest in phylo- and ontogenesis. Classification of ribs. The structure of the ribs and chest. Forms of variability of the ribs and chest, variants and developmental anomalies. Age and sexual features of the structure of the chest. The influence of social and environmental factors on the structure of the ribs and chest.

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

Bones of the upper limb: sections. Pectoral girdle: clavicle, scapula; their structure. Free part of the upper limb: humerus, bones of the forearm and hand, sesamoid bones. Terms of ossification of the bones of the upper limb. The development of the bones of the upper limb in ontogenesis. Variants and anomalies in the development of the bones of the upper limb.

Topic 4. ***Hip bone and femur. Bones of the leg and foot***.

Bones of the lower limb: sections. Pelvic girdle: hip bone, its structure. Parts of the hip bone, their structure. Free part of the lower limb: femur, bones of the leg, feet, their structure. Terms of ossification of the bones of the lower limb. Variants and anomalies in the development of the bones of the lower limb.

Homology of the bones of the upper and lower extremities. Age, sexual features of the structure of the bones of the limbs. Specific structural features of the bones of the upper and lower extremities, due to the processes of anthropogenesis. The influence of sports, labor, 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.***

The development of the skull in phylo- and ontogenesis. Brain and facial parts of the skull. The structure of the bones that form the brain skull: frontal, occipital, parietal.

Topic 6. ***The sphenoid and ethmoid bones.***

The structure of the sphenoid, and ethmoid bones. The holes and cranial nerves that pass through them.

Topic 7. ***Temporal bone: structure, canals, cavity.***

Structure, channels, tympanic cavity (walls).

Topic 8. ***Bones of the facial skull.***

The structure of the bones that form the facial skull: lower jaw, upper jaw, zygomatic, nasal, palatine, lacrimal, hyoid bones, vomer, lower nasal concha.

Topic 9. ***The skull as a whole. The structure of the outer and inner surfaces of the skull. Cranial fossae. XII pairs of cranial nerves.***

The vault of the skull.The outer surface, the bones that form it. The inner base of the skull: the cranial fossa, the borders, the bones and the parts of the bones that form them.

The 12 pairs of cranial nerves: name and holes at the base of the skull, being the exit points of these nerves and their branches.

Topic 10. ***Nasal cavity. Orbital cavity. Bony palate.***

Nasal cavity: walls (bones and parts of the bones that form them), nasal passages, communications, paranasal sinuses and their connections with the nasal cavity. Orbital cavity: walls (bones and parts of the bones that form them), openings, communications.The bony palate.

Topic 11. ***Temporal, infratemporal and pterygopalatine fossa. Age features.***

Temporal, infratemporal, pterygopalatine fossa: walls, openings, communication, contents.

Topic 12. Description of anatomical preparations from the bones of the skeleton.

Bone description algorithm:

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

Describe the bones that need to be washed: vertebrae (cervical, thoracic, lumbar), sacrum, coccyx, ribs, sternum, bones of the girdle of the upper limb (clavicle, scapula), humerus, bones of the forearm (ulnar, radius), carpal bones , wrist, phalanges of the fingers, hip bone, femur, bones of the tibia (fibula, fibula), bones of the metatarsals, metatarsals, phalanges of the fingers, bones of the skull (occipital, frontal, ethmoid, sphenoid, temporal, upper jaw, lower jaw, palatine , nasal, lacrimal, frontal, zygomatic, lower nasal concha, hyoid).

Content module 2. *Arthrosyndesmology and myology*

Topic 13. ***General information about the connection of bones. Connecting the vertebrae with each other. Connection of ribs with vertebrae and sternum.***

The development of compounds between bones in phylo- and ontogenesis. Classification of compounds between bones. Types of synarthrosis : connection by means of connective tissue (syndesmosis) - membranes, ligaments, sutures, fountains; connections by means of cartilage tissue (synchondrosis) - permanent, temporary, hyaline, fibrous; connection by means of bone tissue (synostosis). The cartilaginous bone articulation, which contains cleft-like cavity - symphysis. Diarthrosis (synovial joints, articulations): definition, the main features of the joint, their characteristics. Additional components of the joints. Classification of joints by structure, the shape of the articular surfaces, in function. Simple, compound, complex and combined joints: their characteristics. Types of movements and their analysis (axes of movements, planes of movements). Uni-axial, bi-axial and multi-axial joints, their types, characteristics of movements in each type of joint.

Classification of spinal column connections. 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, zygapophysial joints, lumbosacral joint, sacro-coccygeal joint: their structure. Chest connections: syndesmosis, synchondrosis and joints (costovertebral joints, costotransverse joints, sternocostal joints): their characteristics and structure. The chest as a whole, its structure. The influence of sports, labor, social factors and environmental factors on the structure of the chest as a whole.

Topic 14. Connection of the *bones of the skull between themselves and the Ist, 2nd 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. Joints of the skull: temporomandibular joint and atlanto-occipital joint: their structure. Age-related features of the connection of the skull: fountains, their types, structure, timing of ossification.

Median atlanto-axial joint, lateral atlanto-axial joint: structure, ligaments, movements.

Topic 15. *Connection of the scapula and clavicle. Shoulder joint. Elbow joint. Connection of the bones of the forearm and hand.*

Connections between the bones of the upper limb. Connections of the shoulder girdle: syndesmosis of the upper limb girdle and joints of the upper limb girdle (acromioclavicular joint and sternoclavicular joints), 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 16. ***Connection of the bones of the pelvis. Pelvis as a whole. Hip joint. Knee joint. Connection of the bones of the leg and foot.***

Connections between the bones of the lower limb. Connections of the pelvic girdle: syndesmosis, synostosis, pubic symphysis, sacroiliac joint. The pelvis as a whole: its structure, basic dimensions. Age, sexual, individual characteristics of the pelvis. Connections between the bones of the free lower limb: hip joint. Knee joint, connection of the bones of the leg, ankle joint, joints of the foot. Arch of the foot.

X-ray of the connections of the bones of the upper and lower extremities. The influence of sports, labor, social factors and environmental factors on the structure of the bone joints of the upper and lower extremities.

Topic 17. *General information, classification, muscle development in onto- and phylogenesis. Muscles and fascia of the back.*

Muscle as an organ is the definition. Tendons, aponeurosis. Auxiliary muscle apparatuses: fascia, synovial sheaths, synovial bags, sesamoid bones, tendon arch, muscle block. Anatomical and physiological muscle transverses: basic data on muscle strength and work; the concept of leverage. The beginning and attachment of muscles: their functional characteristics. Muscle classification: development, topografy, shape, size, direction of muscle fibers, function, etc. Muscle development in phylo- and ontogenesis. Sources of development of the muscles of the body, head, neck, upper and lower extremities. Classification of the muscles of the body according to topography, development and shape. Segmental structure of the muscles of the body. Back muscles: superficial and deep, their characteristics. Thoacolumbar fascia.

Topic 18. ***Facial muscles. Chewing muscles. The mechanism of the act of chewing. Fasciae of head. Interfascial spaces.***

Head muscles: classification. Chewing muscles, their characteristics. Facial muscles, structural features, function. The act of chewing: stages. Head fascia: buccopharyngeal fascia, masseteric fascia, parotid fascia, temporal fascia. Areas of the head: borders, contents. Interfascial spaces: walls, contents.

Topic 19. ***Fasciae and muscles of the neck. Topography: neck triangles.***

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

Topic 20. ***Muscles, fascia and triangles of the chest. Diaphragm. Muscles, fascia, abdominal line. Areas, inguinal canal.***

Chest muscles: superficial and deep, their characteristics. Pectoral fascia. Endothoracic fascia. 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. The rectus sheath. Umbilical ring. Abdominal press. Topography of areas of the abdomen. Inguinal canal: walls, contents in women and men. Weak points of the anterior abdominal wall.

Topic 21. ***Muscles and fascia of the shoulder girdle and upper arm. Muscles, fascia of the forearm and the hand.***

Muscles of the upper limb: classification. The muscles of the shoulder girdle, their characteristics. Muscles of upper arm: classification, their characteristics. Fascia of the shoulder girdle and upper arm. Muscles of the forearm: classification, their characteristics. Fascia of the forearm. Relation to the joints. Muscles of the hand: classification, their characteristics. Fascia of the hand. Relation to the joints. Palmar aponeurosis. Axillary fossa, axillary cavity, its topography, triangles, quadrangular and triangular openings. Radial canal. Groows on the front surface of the shoulder. Cubital fossa. Groows on the front surface of the forearm. Osteofibrous canals, retinacula. Carpal canals, synovial sheaths. Synovial bursas.

Topic 22. ***Muscles, fascia and topography of the pelvis, perineum and thigh. Muscles, fascia and topography of the leg and foot.***

Muscles of the lower limb: classification. Muscles of the pelvic girdle: classification, their characteristics. Muscles and fascia of the perineum. Thigh muscles: classification, their characteristics.

Fascia of the thigh. Attitude to the joints. Muscles of the leg: classification, their characteristics. Muscles of the foot: classification, their characteristics. Fascia of the lower limb.

Muscular and vascular spaces, their topography and contents. Femoral triangle. Furrows on the front surface of the thigh. Adductor canal. Popliteal fossa. Leg's canals: cruropopliteal canal, superior and inferior musculoperoneal canals. Furrows of the plantar surface of the foot. Saphenous opening. Femoral canal. Retinacula. Synovial bursas and synovial sheaths of the muscles of the lower limb. Mechanisms that will support the arch of the foot:foot puffs, passive (ligaments) and active (muscles).

Topic 23. ***Description of anatomical preparations for topics on arthrosyndesmology and myology.***

Joint description algorithm:

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

Muscle description algorithm:

1. The name of the muscle 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 skull bones, fountains, junction between vertebrae, junction of ribs with vertebrae and sternum, sternoclavicular joint, shoulder joint, elbow joint, radiocarpal joint, sacroiliac joint, pubic symphysis, hip joint, knee joint, ankle joint, surgical joints of the foot.

Muscles: latissimus dorsi, trapezius, rhomboid major, levator scapulae, erector spinae, pectoralis major, pectoralis minor, subclavian muscle, serratus anterior muscle, external intercostal muscles, internal intercostal muscles, transverse pectoralis muscle, diaphragm, masticatory muscles, epicranial muscle, procerus muscle, orbicularis oculi, buccal muscle, orbicularis oculi muscle, platisma, sternocleidomastoid muscle, suprahyoid muscles, infrahyoid muscles, scalene muscles, long muscles of the head and neck, quadratus lumborum, rectus abdominis, external oblique abdominis, internal oblique abdominis, transversus abdominis, shoulder girdle muscles, muscles of the upper arm, forearm muscles, muscles of the hand, muscles of the perineum, internal muscles of the pelvis, external muscles of the pelvis, muscles of the thigh, muscles of the leg, muscles of the foot.

Content module *3.Splanchnology*

Topic 24. ***General anatomy of the digestive system. Oral cavity. Lips. Cheeks. Palate.***

Classification of internal organs: hollow and parenchymal. General plan of the structure of the wall of tubular organs: mucous membrane, muscular membrane, outer shell. Characteristics of each shells. Organ-specific features of the structure of the mucous membrane, depending on the function of the organ. Serous membrane: peritoneal relation. Ehe main regularities of the structure of parenchymal organs. Glands: their classification, general principles of structure, function.

Digestive system: organs, functions. The development of the oral cavity and its derivatives. The development of the organs of the digestive canal. Oral cavity: its parts. The walls of the oral vestibule and oral cavity proper, their communication. Palate: hard palate, soft palate, their structure.

Topic 25. ***Tongue: structure, function, muscles. Glands of the oral cavity.***

Tongue: topography, parts. Functions of the tongue. Features of the structure of the mucous membrane of the tongue. Muscles of the tongue: skeletal and own, function, movements. Oral glands: classification, their development. Small salivary glands: classification, topography, structure. Major salivary glands: topography, characteristics, structure, location.

Topic 26. ***Teeth: formula, structure, bite, change of teeth.***

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

Topic 27. ***Pharynx. Pirogov's lymphatic ring. Esophagus. Stomach.***

Pharynx, its topography, parts, connections. Border of the fauces. Lymphatic (lymphoid) ring of the pharynx. The structure of the pharyngeal wall: mucous membrane, pharyngobasilar fascia, pharyngeal muscles, superficial layer. 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), muscle membrane and serous membrane. X-ray and gastroscopic characteristics of the mucous membrane The peritoneal ralation of the stomach. Ligaments of the stomach. Variants of the shape of the stomach: anatomical (on the corpse) and radiological (in a living person). The shape of the stomach depending on the types of body structure. Age features of topography and structure of the stomach.

Topic 28. ***Small intestine. Colon.***

Small intestine, its sections. Duodenum: parts, topography, variants of its shape and position. X-ray anatomy of the duodenum. Topography of the mesenteric part of the small intestine: jejunum and ileum. The structure of the wall of the small intestine.The 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 various parts. The structure of the muscular membrane. Relation to the peritoneum of each part of the small intestine. Age features of the structure of the small intestine.

Colon: segments. The structure of the colon wall: mucous membrane (glands, folds, lymphatic (lymphoid) nodules), muscular membrane, serous membrane. Relation to the peritoneum of each part of the colon. Cecum and appendix: topography, structural features. Variants of the position of the appendix and its projection on the anterior abdominal wall. Colon: parts, folds, their topography, structural features of the mucous membrane and muscle membrane. Relation to the peritoneum. Rectum: parts, folds, topography. Features topography of the rectum depending on gender. Features of the structure of the mucous membrane and muscle membrane. Relation to the peritoneum. Anal canal: topography, structural features of the mucous membrane and muscle membranes. Anal canal muscles. Macroscopic differences of the structure of the small and large intestine. Age features of the structure of the colon. X-ray of the colon. The shape and position of the colon in a living person.

Topic 29. ***Liver, gallbladder, pancreas.***

Liver. Topography. External structure: edges, surfaces and their relief. Ligaments of the liver. Relation to the peritoneum. The internal structure of the liver: lobes, segments, lobules. Vessels of the liver. Liver function. Ways of excretion of bile. Gallbladder: topography, parts, wall structure, functions. Common bile duct: formation, topography. Age features of the topography and structure of the liver. Age features of the structure of the gallbladder. Pancreas: parts, topography, structure, functions. Pancreatic ducts. Pancreatic islets. Age features of the topography and structure of the pancreas. The development of the liver and pancreas.

Topic 30. ***Peritoneum***

Peritoneum. Abdominal cavity, its contents. Peritoneal cavity, its contents. Parietal peritoneum, visceral peritoneum: their characteristics. Peritoneal relations of viscera. Derivatives of the peritoneum: mesentery, omentum, ligaments, their structure and functions. Derivatives of the peritoneal cavity: bursas (hepatic, pregastric, omental - walls, connections), sinuses, gutters, recess, fossas, pouchs. 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 31. ***External nose. Nasal cavity. Larynx: muscles, connections, laryngeal cavities.***

Respiratory system: classification, organs, functions. Upper and lower respiratory tract. The development of the respiratory system in phylo- and ontogenesis. Variants and anomalies in the development of the organs 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 features of the nasal cavity. Larynx. Topography. The structure of the larynx: cartilage, ligaments, joints, muscles. Elastic cone, quadrangular membrane. Laryngeal cavity: parts, boundaries. Vocal folds, vestibular folds. Glottis. Mechanisms of voice formation, laryngoscopy. Age features of the larynx.

Topic 32. ***Trachea, bronchi, lungs.***

Trachea: parts, topography, wall structure. Main bronchi: topography, wall structure. Bronchial tree. Age features of the trachea and main bronchi. Lungs: topography, external structure. Hilum of lungs. Lung root and its components. Lobes, segments, lobules of the lung. The structural and functional unit of the lungs is acinus. Circulatory system of the lungs. X-ray anatomy of the trachea, bronchi, lungs. Age features of the lungs.

Topic 33. ***Pleura. Mediastinum.***

Pleura. Parietal pleura and its topographic parts. Visceral pleura. Pleural cavity: contents, recess, their functional significance. Projection of pleural sacs on the walls of the thoracic cavity. Mediastium: definition, classification, boundaries, contents of each department.

Topic 34. ***Kidneys: topography, structure, function. Ureters. Urinary bladder. Urethra.***

Urinary system: organs, functions. The development of the urinary system in phylo- and ontogenesis. Variants and developmental anomalies of the urinary system: kidneys, ureters, urinary bladder and urethra. Kidney: topography. The external structure of the kidney. The peritoneal relation of the kidney. The interior of the kidney. Kidney's support. Renal stalk: topography, elements. Segments of the kidney. The structural and functional unit of the kidney is nephron. The structure of the circulatory system of the kidney (excellent arterial network). Intrarenal urinary tract. Small renal calyx, large renal calyx, renal pelvis, wall structure, function. X-ray anatomy of the kidney. Age features of the topography and structure of the kidney. Ureter: parts, topography, wall structure, function. Relation to the peritoneum. Narrowing of the ureter. Urinary bladder: shape, external structure, parts. Features of

topography in men and women. The structure of the wall of the bladder: structural features of the mucous membrane, muscle membrane. Relation to the peritoneum (depending on the functional state). Female urethra. Male urethra. Extrarenal urinary tract. X-ray anatomy of the urinary tract (ureters, bladder, urethra). Age features of the bladder.

Topic 35. ***Male reproductive organs.***

Male reproductive system: organs, functions. Classification of organs of the male reproductive system. Internal male genitals. External male genitalia. The development of the organs of the male reproductive system in phylo- and ontogenesis. Variants and developmental anomalies of internal male genital organs: testicles, spermatic duct, seminal vesicle, prostate gland. Variants and developmental anomalies of the external male genital organs. Hermaphroditism. Internal male genitals. Testicle: topography, structure. The process of lowering the testicle. Testicular membranes. Seminal duct: parts, topography, wall structure. Spermatic cord, its components. Seminal gland: topography, structure, functions. Ejaculated duct. Prostate gland: topography, parts, structure, functions. Bulbourethral gland. Age features of the internal male genital organs. External male genitalia. Scrotum. Penis, its structure. Male urethra: parts, topography, wall structure.

Topic 36. ***Female reproductive organs.***

Female reproductive system: organs, functions. Classification of organs of the female reproductive system. Internal female genitals. External female genitalia. The development of the organs of the female reproductive system in phylo- and ontogenesis. Variants and developmental anomalies of the internal female genital organs: ovaries, fallopian tubes, uterus, vagina. Variants and developmental anomalies of the external female genital organs. Internal female genitals. Ovary: topography, external structure, internal structure, ovarian ligaments, peritoneal relation, function. Cyclical changes in the structure of the ovary. Age features of the structure of the ovary. Fallopian tube: topography, parts, wall structure, peritoneal relation, function. Uterus: topography, shape, parts, wall structure. Ligaments of the uterus, peritoneal relation, function. Age features of the structure of the uterus and options for its position. Vagina: wall structure. X-ray anatomy of the internal female genital organs. External female genitalia. Pudendum femininum: pubic mons, large lips, small lips, vaginal vestibule, large and small vestibular glands. Clitoris. Female urethra. Perineum: definition, topography. Genitourinary diaphragm: borders, muscles, fascia. Pelvic diaphragm: borders, muscles, fascia.

Topic 37. ***Organs of the immune and endocrine systems.***

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

Peripheral organs of the immune system (secondary lymphatic or lymphoid organs): functions. The development of the organs of the immune system in embryogenesis. Central organs of the immune system (primary lymphoid or lymphoid organs). Red bone marrow. Yellow bone marrow. Topography, structure, functions. Age features of the bone marrow. Thymus: topography, structure, functions. Age features of the thymus. Peripheral organs of the immune system (secondary lymphoid or lymphoid organs). Spleen: topography, structure, functions. Lymphatic (lymphoid) ring of the pharynx: the tonsils that form it, their topography, structure, functions. Lymph nodes: classification, structure, function. Solitary lymphoid nodules: topography, structure, function. Aggregated lymph nodules: topography, structure, functions. Appendicular lymphoid nodules: topography, structure, functions. Age features of the structure of the peripheral organs of the immune system.

General principles of the structure of the endocrine organs. Structural definition of the concept of "endocrine function". Structural mechanisms for the implementation of the action of hormones. Classification of endocrine organs. The development of endocrine organs in embryogenesis. Features of the functional activity of the endocrine organs in the prenatal period of human ontogenesis. Variants and malformations of the endocrine organs. Thyroid gland: topography, structure, functions. Adrenal gland: structure, functions. Endocrine part of the pancreas: structure, function. Pituitary gland: topography, parts, structure, functions. Pineal gland: topography, structure, functions.

Topic 38. ***Description of anatomical preparations for topics in splanchnology.***

Algorithm for describing an internal organ:

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

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

Content module 4. *Anatomy of the central nervous system*

Topic 39. ***General information about the nervous system, phylo- and ontogenesis of the central nervous system. Anatomy of the spinal cord***

The leading role of the nervous system in the body; its importance for the integration of organs, organ systems into a single a single holistic organism, in establishing the relationship of the organism with the external environment. Classification of the nervous system according to the topographic principle (on the central nervous system and peripheral nervous system) and according to the anatomical and functional principle (on the somatic nervous system and 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 gray matter of the central nervous system. Nerve nodes. White substance of the central nervous system. Nerve fibers, nerve bundles, roots.

Stages of development of the nervous system in phylogenesis. The development of the nervous system in ontogenesis. The development of the spinal cord in embryogenesis. Brain development in embryogenesis: stage three and five brain vesicles and their derivatives. Abnormalities in the development of the spinal cord. Abnormalities in the development of the brain.

Topography of the spinal cord, its boundaries. The external features of the spinal cord (surface, fissures, foniculi, enlargements). Segmental structure of the spinal cord. The relationship between the vertebrae and segments of the spinal cord (Shipo's rule). The internal structure of the spinal cord: central canal, gray and white matter. The structure of the posterior, lateral and anterior horns of the spinal cord. White matter: classification. The composition of the anterior, lateral and posterior funiculi of the spinal cord. The segments of spinal cord. Sensory ganglion of the spinal nerve. Anterior and posterior roots. Formation of the trunk of the spinal nerve. Age-related features of the structure of the spinal cord.

Topic 40. ***Medulla oblongata. Pons. Cerebellum.***

Classification of brain departments according to development. Derivatives of the rhomboid brain: the medulla oblongata and metencephalon (pons and cerebellum). Medulla oblongata: borders, external features. Internal structure: gray and white matter. Pons: external feature. Internal structure: gray and white matter. Cerebellum: topography, external feature. Internal structure: gray and white matter. The composition of the pedunculus of the cerebellum.

Topic 41. ***Isthmus of the rhombencephalon. IV ventricle. Rhomboid fossa. Topography of the nuclei of cranial nerves.***

Isthmus of the rhombencephalon. Topography, of the rhomboid fossa. Fourth ventricle: walls, contents, communications.

Topic 42 ***Midbrain.***

The midbrain, parts. Lamina tecti: external structure. Internal structure: gray and white matter. The pedunculus of the brain, their parts, internal structure: gray and white matter. Cerebral aqueduct.

Topic 43. ***Diencephalon. Third ventricle.***

Diencephalon: parts (dorsal – thalamus; ventral part – hypothalamus). Parts of the thalamus: dorsal thalamus, epithalamus, metathalamus. Dorsal thalamus: external structure. Internal structure: nuclei and their functions. Epithalamus: parts. Pineal gland and its functions. Metathalamus: parts and their functions. Hypothalamus: its components. Pituitary gland. The nuclei of the hypothalamus, their function. Hypothalamo-hypophyseal system. Third ventricle: walls, connections.

Topic 44. ***Telencephalon. The relief of the cerebral cortex. Functional arrangement of the cerebral cortex. Basal nuclei. Lateral ventricles.***

Telencephalon: cerebral hemispheres, lobes, surfaces. Telencephalon: parts. Cerebral cortex: cyto- and myeloarchitectonics of the cortex. Works of V.O. Bets. Relief of the cerebral hemispheres: sulci cerebri and gyri cerebri. Morphological bases of dynamic localization of functions in the cortex of the cerebral hemispheres. Primary and secondary signal systems. Basal nuclei: topography, parts, functions. Lateral ventricles: parts, their topography, walls, connections.

Topic 45. ***Olfactory brain. White matter of the hemispheres. Exit points 12 pairs of main nerves.***

White matter of the hemispheres: classification. Olfactory brain: parts, their components. Lateral ventricles: parts, their topography, walls, connections. Olfactory brain: parts, their components.

Topic 46. ***The meninges. Venous sinuses of the dura mater of the brain. Vessels and nerves of the brain. Places of formation and ways of excretion of cerebrospinal fluid.***

Meninges of the brain. Intermeningeal spaces and their contents. Derivatives of the dura mater of the brain, their topography. The dural venous sinuses. Formation and circulation of cerebrospinal fluid. Blood supply ща the brain: arteries and veins.

Topic 47. ***Ascending pathways. Descending pathways.***

The pathways - definition. Anatomical and functional classification of 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, corticopontine. Pyramidal system (centers, pathways). Extrapyramidal system (centers, conductive pathways).

Topic 48. ***Description of anatomical preparations for topics on the central nervous system.***

Be able to demonstrate on anatomical spasimen and to call Latin the parts of the CNS (spinal cord, rhombencephalon, medulla oblongata, metencephalon, pons, cerebellum, midbrain, diencephalon, telencephalon, meninges and their derivatives), their boundaries, external structure, internal structure (white matter, gray matter, cavitys). Know the function of the CNS department being demonstrated.

Content module 5. *Sense organs and cranial nerves*

Topic 49. ***Organ of taste and smell. Skin. Mammary gland. Pathways and centers of analyzers.***

Anatomical and functional characteristics of the sense organs. Peripheral receivers, conductors and cortical centers of analyzers, their functional unity. Organ of smell. Olfactory part of the nasal mucosa. Conductive pathways of the olfactory analyzer. Cortical centers of smell. Organ of taste. Taste buds of the tongue, their topography. Gustatory pathways. Cortical centers of taste. Skin: functions. Types of skin sensitivity. The mammary gland: topography, function.

Topic 50. ***The organ of vision is the eyeball. The internal media of eyeball. The accessory visual structure. Visual pathway and pupillary reflex pathway.***

Phylo- and ontogenesis of the eye. Anomalies and options for the development of the eye. Topography, structure, functions. Eyeball. Layers of the eyeball: fibrous, vascular, internal (retina) – their structure. Eyeball chambers: anterior, posterior, their walls. Vitreous body, lens. Aqueous humor: the place of formation, outflow paths.

Topic 51. ***The accessory visual structure. Visual pathway and pupillary reflex pathway.***

The accessory visual structure: eyelids, eyebrow, conjunctiva, external muscles of the eyeball, fascia of orbita. Lacrimal apparatus and its components. The pathways of the visual analyzer. The pathways of the pupillary reflex.

Topic 52. ***External ear, middle ear.***

The ear. Phylo- and ontogenesis. Anomalies in the development of the ear. Parts of the ear: external, 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. Communication of the tympanic cavity. Auditory tube: parts, structure.

Topic 53. ***Inner ear. Pathways and centers of auditory analyzer and balance. Organs of balance. The pathways of the organ of hearing and balance.***

Inner ear, parts, topography. Bony labyrinth: vestibule, semicircular canals, cochlea, their structure. Membranous labyrinth: vestibular part, semicircular ducts, cochlear duct, their structure. The mechanism of perception and the ways of conducting sound. Pathways of hearing and balance. Cortical and subcortical centers of hearing and balance.

Topic 54. ***I, II pair of cranial nerves. III, IV, VI pair of cranial nerves.***

General characteristics of the cranial nerves. Common features and differences of the structure of the cranial and spinal nerves. Classification of cranial nerves by function (motor, sensitive, mixed). Classification of cranial nerves by origin. Development of cranial nerves in connection with the senses (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 the cranial nerves, derivatives of the brain (I, II pairs) from the

rest of the cranial nerves. General plan of the structure of the 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, the exit of a nerve from the brain, from the skull, nerve branches, the composition of their fibers, topography, areas of innervation. I, 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, the exit of a nerve from the brain, from the skull, branches, the composition of their fibers, areas of innervation, ligaments with the autonomic ganglions of the head (ciliary ganglion).

Topic 55. ***Trigeminal nerve – I branch and II branch.***

V pair of cranial nerves: intracranial part - nuclei, trigeminal ganglions, sensory and motor branches. Branches of the V pair: the composition of the fibers, the exit from the skull, the areas of innervation, connections with the vegetative ganglions of the head. I branch. Areas of innervation, connection with the vegetative ganglion of the head (ciliary ganglion). II branch. Areas of innervation, connection with the vegetative ganglion of the head (pterygopalatine ganglion).

Topic 56. ***Trigeminal nerve – III branch.***

V pair of cranial nerves: intracranial part - nuclei, trigeminal ganglion, sensory and motor branches. Branches of the V pair: the composition of the fibers, the exit from the skull, the areas of innervation, connections with the vegetative ganglions of the head. III branch. Areas of innervation, connection with the vegetative ganglions of the head (otic, submandibular, sublingual).

Topic 57. ***Facial nerve. VIII pair of cranial nerves***

Facial nerve: nuclei, areas of innervation, ganglion geniculi, branches, large crow's feet (branches). The chorda tympany. Vectibulocochlear nerve: nuclei, ganglions.

Topic 58. ***IX, X (main and cervical divisions), XI, XII pairs of cranial nerves.***

IX pair: nuclei, the exit of a nerve from the brain, from the skull, branches, the composition of their fibers, areas of innervation, connection with the vegetative ganglion of the head (otic ganglion). X pair: nuclei, sensory ganglions, nerve exit from the brain, from the skull, branches of the cranial and cervical parts, areas of innervation. XI pair: nuclei, nerve exit from the brain, from the skull, areas of innervation. XII pair: nucleus, nerve exit from the brain, from the skull, areas of innervation. Vegetative ganglions of the head (pterygopalatine, ciliary, submandibular, sublingval): their roots and branches, areas of innervation.

Topic 59. ***Description of anatomical preparations for topics of sense organs and cranial nerves.***

Algorithm of description of sense organs:
1. Name of the analyzer in English and Latin
2. Structure of the peripheral part of the analyzer
3. Conductor path of the analyzer
4. Cortical center

Algorithm of description of cranial nerves:
1. Name in English and Latin
2. Function.
3. Cranial nerve nuclei and their topography
4. Place of exit from the brain
5. Place of exit from the skull

6. Branches
7. Areas of innervation

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

Content module 6. ***Anatomy of the heart. Cardiovascular system.***

Topic 60. Heart: ***structure, chambers. Rings of blood circulation.*** Topography of the heart. Shape, position of the heart. The external structure of the heart. Heart chambers: their structure. Heart valves. The structure of the heart wall: endocardium, myocardium, epicardium. Conducting system of the heart. Projection of the boundaries of the heart on the anterior wall of the chest cavity. Age-related anatomy of the heart. A large circle and a small circle of blood circulation. Blood circulation of the fetus. The development of the heart in phylogenesis. Stages of heart development in human embryogenesis. Variants and anomalies of heart development. Structural mechanisms for the development of heart abnormalities. Heart valves.

Topic 61. ***Heart: topography, places of listening to valves. Vessels and nerves of the heart. Pericardium.***

Arteries and veins of the heart. Pericardium, its structure, pericardial cavity, contents, sinuses. Projection of the boundaries of the heart and valves on the anterior thoracic wall. Places of listening of the heart valves.

Topic 62. ***Aorta: parts, branches of the aortic arch. External carotid artery.***

General principles of the structure and function of the cardiovascular system. Components of the vascular part of the cardiovascular system: arteries, veins. Lymphatic vessels, the principles of their structure, function. Aorta, parts of the aorta. The arch of the aorta 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.

Topic 63. ***Internal carotid artery: branches. Anastomoses of the head. Subclavian and axillary arteries: sections, branches.***

Internal carotid artery: parts, topography. Branches of the internal carotid artery: topography, areas of blood supply. Arterial ring of the brain. Intersystem and intrasystem arterial anastomoses of the head and neck. Subclavian artery: parts, 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.

Topic 64. ***Axillary artery: parts, branches. Arteries of the shoulder, forearm and hand. Arterial arches.***

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. Cubital arterial network: sources of formation. Dorsal carpal arch: topography, sources of formation, branches, areas of blood supply. Palmar carpal arch: topography, sources of formation, areas of blood supply. Superficial palmar arch: topography, sources of formation, areas of blood supply. Deep palmar arch: topography, sources of formation, areas of blood supply. Arterial anastomoses of the upper limb. Projections of the arteries of the upper limb on the skin.

Topic 65. The thoracic aorta, its branches. The abdominal aorta is paired *and unpaired visceral branches. The abdominal aorta is parietal branches.*

Thoracic aorta: topography, parietal and visceral branches.

Topic 66. ***The abdominal aorta - unpaired visceral branches***

Abdominal aorta: topography, classification of branches. Unpaired visceral branches of the abdominal aorta.

Topic 67. The abdominal aorta is paired visceral and parietal branches.

Paired visceral branches of the abdominal aorta: topography and areas of blood supply. Partral branches of the abdominal aorta: topography, areas of blood supply. Intrasystemic arterial anastomoses between the branches of the abdominal aorta.

Topic 68. ***Internal iliac artery.***

Common iliac artery: formation, topography, branches. Internal iliac artery: topography, classification of branches. Parietal and visceral branches of the internal iliac artery: topography, areas of blood supply, intrasystem and intersystem arterial anastomoses.

Topic 69. ***External iliac artery. Branches of the femoral artery. Vessels of the limb and foot.***

Arteries of the lower limb. External iliac artery: topography, branches, areas of blood supply. Femoral artery: topography, branches, areas of blood supply.

Arteries of the lower limb. 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. Genicular anastomoses: sources of formation. Lateral malleolar anastomoses: topography, sources of formation, areas of blood supply. Medial malleolar anastomoses: topography, sources of formation, areas of blood supply. Arteries of the foot: the posterior artery of the foot, the lateral plantar artery, the medial plantar artery – their topography, branches, areas of blood supply. Arterial anastomoses of the lower limb. Projection of the arteries of the lower limb on the skin.

Topic 70. ***Superior vena cava. Veins of the head and neck, upper limb.***

Superior vena cava. Veins of the walls and organs of the pelvis, veins of the lower limb. Veins of the abdominal cavity. Portal vein. Cava-caval and porto-caval anastomoses

Anatomical classification of veins (parietal, main, extraorganic, intraorganic). Classification of veins according to the structure of the wall. Roots and tributaries of the veins. Superficial veins, deep veins. Venous networks, venous plexuses. Sources and mechanisms of development of the main veins. Variants and anomalies of the development of the main veins. Works of M.A.Tikhomirov. Age features of the veins. X-ray anatomy of 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 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: formation (roots), topography, tributaries. Subclavian vein: formation (roots), topography, tributaries. Veins of the upper limb: classification. Superficial and deep veins of the upper limb: their characteristics, patterns of topography and structure.

Topic 71. ***Inferior vena cava. Veins of the walls and organs of the pelvis, veins of the lower limb.***

Inferior vena cava: roots, topography, classification of tributaries. Parietal and visceral tributaries of the inferior vena cava, areas of venous blood collection. General, external and internal iliac veins: roots, tributaries, areas of blood collection. Veins of the lower extremity: classification. Superficial and deep veins of the lower extremity: their characteristics, patterns of topography and structure.

Topic 72. ***Veins of the abdominal cavity. Portal vein. Cava-caval and porto-caval anastomoses.***

Portal hepatic vein: roots, topography, tributaries. Superior mesenteric vein: topography, tributaries, areas of venous blood collection. Inferior mesenteric vein: topography, tributaries, areas of venous blood collection. Splenic vein: topography, tributaries, areas of venous blood collection. Branching of the portal hepatic vein in the liver. Venous intrasystemic anastomoses. Venous intersystemic anastomoses: cava-caval anastomoses, porto-caval anastomoses and porto-cava-caval anastomoses.

Topic 73. ***Lymphatic system, structure, function, trunks. Lymphatic vessels and nodes of the head and neck. Lymphatic vessels and nodes of the thoracic, abdominal and pelvic cavities, upper and lower extremities.***

Classification of lymphatic vessels. Lymphatic capillaries: wall structure and function. Lymphatic vessels (intraorgan and extraorganic): wall structure and function. Superficial and deep lymphatic vessels. Lymphatic trunks: jugular, subclavian, broncho-mediastinal, lumbar, intestinal - their formation, topography, functions. Lymphatic ducts: thoracic duct, right lymphatic duct. The development of lymphatic vessels in embryogenesis. Variants and anatomy of lymphatic duct development. Works of the Kyiv anatomical school. Age-related features of the structure of the lymphatic vessels.

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

Thoracic duct: roots, topography, tributaries, the place of confluence with the venous system. Right lymphatic duct: roots, topography, place of 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 drainage and ways. Lymph nodes of the neck: classification, topography, lymph drainage and ways.

Superficial and deep lymphatic vessels of the upper limb. Lymph nodes of the upper limb: classification. Ways of lymph drainage from the chest. Superficial and deep lymphatic vessels of the lower limb. Lymph nodes of the lower limb: classification.

Topic 74. ***Description of anatomical preparations of the heart and blood vessels.***

Algorithm of the description of the artery:
1. Name in English and Latin
2. Place of beginning
3. Topography
4. Branches
5. Areas of blood supply

Vein description algorithm:
1. Name in Ukrainian and Latin
2. Root veins

3. Tributaries
4. Topography
5. Areas of blood collection

Describe and demonstrate the structure of the heart and the following vessels: aorta, arteries of the aortic arch, internal carotid artery, external carotid artery, arterial circle of the cerebrum, subclavian artery, axillary artery, brachial artery, ulnar artery, radial artery, palmar arterial arches, branches of the thoracic aortas, parietal branches of the abdominal aorta, abdominal trunk, superior mesenteric artery, inferior mesenteric artery, paired visceral branches of the abdominal aorta, internal iliac artery, external iliac artery, femoral artery, popliteal artery, anterior and posterior tibial arteries, internal jugular vein, external jugular vein, superficial and deep veins of the upper limb, superior vena cava, portal vein, superficial and deep veins of the lower limb, inferior vena cava, lymphatic trunks, right thoracic lymphatic duct, thoracic lymphatic duct.

Content module 7. ***Peripheral nervous system.***

Topic 75. ***Spinal nerves. Cervical plexus, its structure, sensitive branches. Motor branches. Mixed branch.***

Components of the peripheral nervous system: nerves, nodes, plexuses, nerve endings. General plan of the structure of the nerve. 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, typical divisions. Posterior branches of the spinal nerves: contens, topography, responsibility areas. Posterior branches of the cervical, thoracic, lumbar, sacral and coccygeal nerves. Anterior branches of the spinal nerves: the composition of the 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 motor branches. The phrenic nerve is a mixed branch of the cervical plexus: formation, topography, regions of innervation.

Topic 76. ***Brachial plexus, its structure and short branches. The brachial plexus: long branches.***

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. Brachial plexus, topography, its structure, short and long branches, regions of innervation.

Topic 77. ***Thoracic spinal nerves. Lumbar plexus, its structure and branches.***

Lumbar plexus: formation, structure, topography, branches, regions of innervation.

Topic 78. ***The sacral plexus, its structure, short branches, long branches.***

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

Topic 79. ***The autonomic nervous system is a sympathetic section and a parasympathetic section.***

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, vegetative plexuses. Classification of vegetative nodes, their topography, preganglion and postganglion nerve fibers. Sympathetic part of the autonomic nervous system. Centers in the spinal cord. Sympathetic trunk: topography, classification of nodes, interganglionic branches. White and gray connecting branches: formation, topography. Branches of the cervical nodes of the sympathetic trunk, their topography and areas of innervation. 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.

The parasympathetic part of the autonomic nervous system. Cranium: vegetative nodes of the head, their topography, roots, branches, areas of innervation. Pelvic part. Visceral plexuses: cranio-cervical part, thoracic part, abdominal part, pelvic part. The cranio-cervical part of the viscera plexuses: the general carotid plexus, the internal carotid plexus, the external carotid plexus, the subclavian plexus - their formation, areas of innervation. Thoracic part of the viscera plexuses: thoracic aortic plexus, cardiac plexus, esophageal plexus, pulmonary plexus – their formation, areas of innervation.

Topic 80. ***General principles of complex innervation and blood supply of internal organs.***

Anatomical classification of arteries (pericardial, main, extra-organ, intra-organ). Classification of arteries according to wall structure. Types of arterial branching. The main regularities of the distribution of arteries in the human body. Arterial intersystemic and intrasystemic anastomoses. Sources and mechanisms of development of arteries. Arterial arches and their derivatives. Variants and abnormalities of the development of main arteries. Works by M.A. Tikhomirov. Vessels of the hemomicrocirculatory channel, the structure of their walls and functions. Sources and mechanisms of blood vessel formation in the hemomicrocirculatory bed. Works of the Department of Normal Anatomy of NMU named after O.O. Bogomolets. Organ specificity of blood vessels of the hemomicrocirculatory channel. The concept of ways of collateral (bypass) blood flow. Age-related features of arteries.

4. The structure of the discipline

Names of topics	**Number of hours**			
	Total	**including**		
		l	**p/s**	**IWA**
1	**2**	**3**	**4**	**5**
Content module 1. Anatomy of bones				
Topic 1. Acquaintance with the department. Duties and rights of students. International anatomical nomenclature. Axes and planes of the human body, their practical significance. Structure and formation of bones.	7,5	4	2	1,5
Topic 2. The structure of the vertebrae. Vertebral column. Sternum. Ribs.	3,5		2	1,5

Topic 3. Scapula and clavicle. Humerus. Bones of the forearm and hand.	3,5		2	1,5
Topic 4. Hip and femur. Bones of the leg and foot.	3,5		2	1,5
Topic 5. General information about the skull. Frontal, parietal and occipital bones.	4,5	1	2	1,5
Topic 6. Spenoid bone. Ethmoid bone.	3,5		2	1,5
Topic 7. Temporal bone: structure, canals, cavity	3,5		2	1,5
Topic 8. Bones of the facial skull.	3,5		2	1,5
Topic 9. The skull as a whole. The structure of the outer and inner surfaces of the skull. Cranial fossae. 12 pairs of cranial nerves.	4,5	1	2	1,5
Topic 10. Nasal cavity. Orbita. Palate.	3,5		2	1,5
Topic 11. Temporal, infratemporal and pterygopalatine fossa. Age features.	3,5		2	1,5
Topic 12. Description of anatomical preparations from the bones of the skeleton.	6		2	4
Total content module 1	*50,5*	*6*	*24*	*20,5*
Content module 2. Arthrosyndesmology and myology				
Topic 13. General information about the joints of bones. Connecting the vertebrae to each other. Connecting of ribs with vertebrae and sternum.	5,5	2	2	1,5

Topic 14. Connection of the bones of the skull and the C_1, C_2. Temporomandibular joint.	3,5		2	1,5
Topic 15. Connection of the scapula and clavicle. Shoulder joint. Elbow joint. Connection of the bones of the forearm and hand.	3,5		2	1,5
Topic 16. Connection of the bones of the pelvis. Pelvis as a whole. Hip joint. Knee joint. Connection of the bones of the leg and foot.	3,5		2	1,5
Topic 17. General information, classification, muscle development in onto- and phylogenesis. Muscles and fascia of the back.	5,5	2	2	1,5
Topic 18. Facial muscles. Chewing muscles. The mechanism of the act of chewing. Fascia of the head, interfascial spaces.	3,5		2	1,5
Topic 19. Fascia and neck muscles. Topography: neck triangles.	3,5		2	1,5
Topic 20. Muscles, fascia and chest triangles. Diaphragm. Muscles, fascia, abdominal lines. Areas, axillary canal.	3,5		2	1,5
Topic 21. Muscles, fascia and topography of the shoulder girdle and shoulder. Muscles, fascia and topography of the forearm and hand. hand.	3,5		2	1,5
Topic 22. Muscles, fascia and topography of the pelvis, perineum, thigh. Muscles, fascia and topography of the leg and foot.	3,5		2	1,5

Topic 23. Description of anatomical spacimen for topics 0f arthrosyndesmology and myology.	6		2	4
Total content module 2	*45*	*4*	*22*	*19*
Content module 3. Splanchnology				
Topic 24. Oral cavity. Lips, cheeks, palate.	4	0,5	2	1,5
Topic 25. Tongue: structure, function, muscles. Glands of the oral cavity.	4	0,5	2	1,5
Topic 26. Teeth: formula, structure, bite, change of teeth.	3,5		2	1,5
Topic 27. Pharynx. Pirogov's lymphatic ring. Esophagus, stomach.	4	0,5	2	1,5
Topic 28. Small intestine. Colon.	4	0,5	2	1,5
Topic 29. Liver. Pancreas.	4,5	1	2	1,5
Topic 30. Peritoneum.	4,5	1	2	1,5
Topic 31. External nose. Nasal cavity. Larynx: muscles, joints, laryngeal cavities.	4	0,5	2	1,5
Topic 32. Trachea, bronchi, lungs.	4,5	1	2	1,5
Topic 33. Pleura. Mediastinum.	4	0,5	2	1,5
Topic 34. Kidneys: topography, structure, function. Ureters. Urinary bladder. Urethra.	5,5	2	2	1,5
Topic 35. Male genitals.	5,5	2	2	1,5
Topic 36. Female genitals.	5,5	2	2	1,5
Topic 37. Organs of the Immune and Endocrine Systems	5,5	2	2	1,5
Topic 38. Description of anatomical spacimen for topics in splanchnology.	6		2	4
Total content module 3	*69*	*14*	*30*	*25*

Content module 4. Central nervous system				
Topic 39. General information about the nervous system, phylo- and ontogenesis of the central nervous system. Anatomy of the spinal cord.	5,5	2	2	1,5
Topic 40. Medulla oblongata. Ponc. Cerebellum.	3,5		2	1,5
Topic 41. Isthmus of the rhombencephalon. IV ventricle. Rhomboid fossa. Topography of cranial nerves nuclei.	3,5		2	1,5
Topic 42. Midbrain.	3,5		2	1,5
Topic 43. Diencephalon. Third ventricle.	3,5		2	1,5
Topic 44. Telencephalon. The relief of the cortex. Localization of functions. Basal nuclei. Lateral ventricles.	3,5		2	1,5
Topic 45. Olfactory brain. White matter of the hemispheres. Exit points 12 pairs of nerves.	3,5		2	1,5
Topic 46. The meninges. Venous sinuses of the dura mater. Vessels and nerves of the brain. Places of formation and ways of excretion of cerebrospinal fluid.	3,5		2	1,5
Topic 47. Ascending conducting pathways. Descending conducting pathways.	5,5		2	1,5
Topic 48. Description of anatomical spacimen for topics of the central nervous system.	6		2	4
Total content module 4	*41,5*	*4*	*20*	*17,5*
Content module 5. Sense organs. Cranial nerves.				
Topic 49. Organ of taste and smell. Skin, mammary glands. Ways and centers of analyzers.	3,5		2	1,5

Topic 50. Organ of vision, eyeball. The internal media of the eye.	4	0,5	2	1,5
Topic 51. Auxiliary apparatus of the eye. Visual path and path of the pupillary reflex.	4	0,5	2	1,5
Topic 52. External ear, middle ear.	4	0,5	2	1,5
Topic 53. Internal ear. The conductung pathways of the organ of hearing and balance.	4	0,5	2	1,5
Topic 54. I, II pair of cranial nerves. III, IV, VI pair of cranial nerves.,5	4,5	1	2	1,5
Topic 55. Trigeminal nerve – I branch and II branch.	4	0,5	2	1,5
Topic 56. Trigeminal nerve – III branch.	4	0,5	2	1,5
Topic 57. Facial nerve. VIII pair of cranial nerves.	4,5	1	2	1,5
Topic 58. IX, X (cranial and cervical divisions), XI, XII pairs of cranial nerves.	4,5	1	2	1,5
Topic 59. Description of anatomical spacimen for topics of sense organs and cranial nerves.	6		2	4
Total content module 5	*47*	*6*	*22*	*19*
Content module 7. Heart. Cardiovascular system.				
Topic 60. Heart: structure, cameras	4,5	1	2	1,5
Topic 61. Heart: topography, places of listening of valves. Vessels and nerves of the heart. Pericardium.	4,5	1	2	1,5
Topic 62. Aorta: parts, branches of the aortic arch. External carotid artery.	4	0,5	2	1,5
Topic 63. Internal carotid artery: branches. Anastomoses of the head. Subclavian artery: sections, branches. Head and neck anastomoses	4	0,5	2	1,5

Topic 64. Axillary artery. Arteries of the shoulder, forearm, hand. Arterial arches.	3,5		2	1,5
Topic 65. The thoracic aorta, its branches. The abdominal aorta is paired visceral and parietal branches. The abdominal aorta is an unpaired visceral branch.	4	0,5	2	1,5
Topic 66. The abdominal aorta: unpaired visceral branches.	4	0,5	2	1,5
Topic 67. The abdominal aorta: paired visceral and parietal branches.	3,5		2	1,5
Topic 68. Internal iliac artery.	3,5		2	1,5
Topic 69. External iliac artery. Branches of the femoral artery. Vessels of the leg and foot	3,5		2	1,5
Topic 70. Superior vena cava. Veins of the head and neck, upper limb.	4	0,5	2	1,5
Topic 71. Inferior vena cava. Veins of the walls and organs of the pelvis, veins of the lower limb.	4	0,5	2	1,5
Topic 72. Veins of the abdominal cavity. Portal vein. Cava-caval and porto-caval anastomoses.	4	0,5	2	1,5
Topic 73. Lymphatic system, structure, function, trunks. Lymphatic vessels and nodes of the head and neck. Lymphatic vessels and nodes of the thoracic, abdominal and pelvic cavities, upper and lower extremities.	4	0,5	2	1,5
Topic 74. Description of anatomical spacimen of the heart and blood vessels.	6		2	4
Total content module 6	*61*	*6*	*30*	*25*
Content module 7. Peripheral nervous system.				

Topic 75. Spinal nerves. Cervical plexus, its structure, sensory branches. Motor branches. Mixed branch.	4	0,5	2	1,5
Topic 76. Brachial plexus, its structure and short branches. The brachial plexus: long branches.	4	0,5	2	1,5
Topic 77. Thoracic spinal nerves. Lumbar plexus, its structure and branches.	4	0,5	2	1,5
Topic 78. The sacral plexus, its structure, short branches, long branches	4	0,5	2	1,5
Topic 79. The autonomic nervous system is a sympathetic section and a parasympathetic section.	5,5	2	2	1,5
Topic 80. General principles of complex innervation and blood supply of internal organs.	3,5		2	1,5
Total content module 7	*25*	*4*	*12*	*9*
Test control of knowledge	1			1
Exam	20			20
Total hours	**360**	**44**	**160**	**156**

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

5.1. Topics of lectures

№	Topic name	Quantity Hours
First semester		

1	Lecture 1. Introductory lecture. The main stages of human onto- and phylogenesis.	2
2	Lecture 2. General and frequent osteology.	2
3	Lecture 3. Onto- and phylogenesis of the skull. Age features. Craniometry. Overview of the skull as a whole.	2
4	Lecture 4. General arthrosindesmology.	2
5	Lecture 5. General myology. Topographic formations of the human body.	2
6	Lecture 6. Introduction to splanchnology.	2
7	Lecture 7. Anatomy of the digestive system. Serous membranes.	2
8	Lecture 8. Anatomy of the respiratory system.	2
9	Lecture 9. Anatomy of the urinary system.	2
10	Lecture 10. Anatomy of the male reproductive system.	2
11	Lecture 11. Anatomy of the female reproductive system.	2
12	Lecture 12. Anatomy of the endocrine and immune systems.	2
13	Lecture 13. General information about the nervous system. Development of the nervous system. Anatomy of the spinal cord.	2
14	Lecture 14. Anatomy of the brain. Conductive ways.	2
II semester		
15	Lecture 15. General and frequent anatomy of sense organs.	2
16	Lecture 16. Cranial nerves: I-VI pairs	2
17	Lecture 17. Cranial nerves of the VII-XII pair	2

18	Lecture 18. Anatomy of the heart.	2
19	Lecture 19. Anatomy of the arterial system.	2
20	Lecture 20. Anatomy of the venous and lymphatic systems.	2
21	Lecture 21. Peripheral nervous system	2
22	Lecture 22. Autonomic nervous system	2
	Total hours	**44**

5.2. Topics of seminars

Seminars are not provided.

5.3. Topics of practical classes

№	Topic name	Number of
1	Acquaintance with the department. Duties and rights of students. International anatomical nomenclature. Axes and planes of the human body, their practical significance. Structure and formation of bones.	2
2	The structure of the vertebrae. Vertebral column. Sternum. Rib.	2
3	Scapula and clavicle. Humerus. Bones of the forearm and hand.	2
4	Hip bone and femur. Bones of the leg and foot.	2
5	General information about the skull. Frontal, parietal and occipital bones.	2
6	Sphenoid bone. Ethmoid bone.	2
7	Temporal bone: structure, canals, cavity.	2

8	Bones of the facial skull.	2
9	The skull as a whole. The structure of the outer and inner surfaces of the skull. Cranial fossae. 12 pairs of cranial nerves.	2
10	Nasal cavity. Orbital cavity. Palate.	2
11	Temporal, infratemporal and pterygopalatine fossae. Age features.	2
12	Description of anatomical spacimen from the bones of the skeleton.	2
13	General information about joints. The connection of the vertebrae with each other. Joints of ribs with vertebrae and sternum.	2
14	Connection of the skull bones and the 1st, 2nd cervical vertebra. Temporomandibular joint.	2
15	Connection of the scapula and clavicle. Shoulder joint. Elbow joint. Connection of the bones of the forearm and hand.	2
16	Connection of the pelvic bones. The pelvis as a whole. Hip joint. Knee joint. Connection of the bones of the leg and foot.	2
17	General information, classification, muscle development in onto- and phylogenesis. Muscles and fascia of the back.	2
18	Facial muscles. Chewing muscles. The mechanism of the act of chewing. Fascia of the head, interfascial spaces.	2
19	Fascia and neck muscles. Topography: neck triangles.	2
20	Muscles, fascia and triangles of the chest. Diaphragm. Muscles, fascia, abdominal lines. Areas, inguinal canal.	2

21	Muscles, fascia and topography of the pectoral girdle and shoulder. Muscles, fascia and topography of the forearm and hand.	2
22	Muscles, fascia and topography of the pelvis, perineum, thighs. Muscles, fascia and topography of the lower limb and foot.	2
23	Description of anatomical spaciment for topics in arthrosyndesmology and myology.	2
24	General anatomy of the digestive system. Oral cavity. Lips. Cheeks. Palate. Glands of the oral cavity.	2
25	Tongue: structure, function, muscles. Glands of the oral cavity.	2
26	Teeth: formula, structure, bite, change of teeth.	2
27	Pharynx. Pirogov's lymphatic ring. Esophagus, stomach.	2
28	Small intestine. Colon.	2
29	Liver. Pancreas.	2
30	Peritoneum.	2
31	External nose. Nasal cavity. Larynx: muscles, connections, laryngeal cavities.	2
32	Trachea, bronchi, lungs.	2
33	Pleura. Interstitium.	2
34	Kidneys: topography, structure, function. Ureters. Urinary bladder. Urethra.	2
35	Male genitals.	2

36	Female genitals.	
37	Organs of the immune and endocrine systems.	2
38	Description of anatomical speciment for topics of splanchnology.	2
II semester		
39	General information about the nervous system, phylo- and ontogenesis of the central nervous system. Anatomy of the spinal cord.	2
40	Medulla oblongata. Pons. Cerebellum.	2
41	Isthmus of the rhombencephalon. IV ventricle. Rhomboid fossa. Topography of cranial nerves nuclei.	2
42	Midbrain.	2
43	Diencrphalon. Third ventricle.	2
44	Telencephalon. The relief of the cortex. Localization of functions. Basal ganglia. Lateral ventricles.	2
45	Olfactory brain. White matter of the hemispheres. Exit points of 12 pairs of cranial nerves.	2
46	The meninges. Venous sinuses of the dura mater. Vessels and nerves of the brain. Places of formation and ways of excretion of cerebrospinal fluid.	
47	Ascending pathway. Descending pathway.	2
48	Description of anatomical spacimen for topics from the central nervous system.	2
49	The organ of taste and smell. Skin, mammary glands. Ways and centers of analyzers.	2

50	Organ of vision, eyeball. Internal media of eyeball.	2
51	Auxiliary apparatus of the eye. Visual pathway and pathway of the pupillary reflex.	2
52	External ear, middle ear.	2
53	Inner ear. The pathways of the organ of hearing and balance.	2
54	I, II pair of cranial nerves. III, IV, VI pair of cranial nerves.	2
55	Trigeminal nerve – I branch and II branch.	2
56	Trigeminal nerve – III branch.	2
57	Facial nerve. VIII pair of cranial nerves.	2
58	IX, X (cranial and cervical parts), XI, XII pairs of cranial nerves.	2
59	Description of anatomical spaciment for topics of sense organs and cranial nerves.	2
60	Heart: structure, cameras. Rings of blood circulation.	2
61	Heart: topography, places of listening to valves. Vessels and nerves of the heart. Pericardium.	2
62	Aorta: parts, branches of the aortic arch. External carotid artery.	2
63	Internal carotid artery: branches. Anastomoses of the head. Subclavian artery: departments, branches.	2
64	Axillary artery. Arteries of the shoulder, forearm, hand. Arterial arcs.	2
65	The thoracic aorta, its branches.	2

66	The abdominal aorta: unpaired visceral branches.	2
67	The abdominal aorta: paired visceral and parietal branches.	2
68	Internal iliac artery.	2
69	External iliac artery. Branches of the femoral artery. Vessels of the leg and foot.	
70	Superior vena cava.Veins of the head and neck, upper limb.	2
71	Inferior vena cava. Veins of the walls and organs of the pelvis, veins of the lower limb.	2
72	Veins of the abdominal cavity. Portal vein. Cava-caval and porto-caval anastomoses.	2
73	Lymphatic system, structure, function, trunks. Lymphatic vessels and nodes of the head and neck. Lymphatic vessels and nodes of the thoracic,a bdominal and pelvic cavities, upper and lower extremities.	2
74	Description of anatomical spacimen of the heart and blood vessels.	2
75	Spinal nerves. Cervical plexus, its structure, sensory branches. Motor branches. Mixed branch.	2
76	Brachial plexus, its structure and short branches. The brachial plexus is a long branch.	2
77	Thoracic spinal nerves. Lumbar plexus, its structure and branches.	2
78	The sacral plexus, its structure, short branches, long branches.	2
79	The autonomic nervous system is a sympathetic section and a parasympathetic section.	2
80	General principles of complex innervation and blood supply of internal organs.	2

	Total	**160**

5.4. Topics of laboratory classes

Laboratory classes are not provided**.**

6. Independent work of a student of higher education

№	Topic name	Number of hours
1	**Preparation for practical classes** - theoretical preparation and development of practical skills in the description of anatomical spacimen: Anatomy of bones - 20.5 hours. Arthrosyndesmology and myology - 7 p.m. Splanchnology - 25 hours. Central nervous system - 17.5 hours. Sense organs. Cranial nerves. - 7 p.m. Heart. Cardiovascular system. - 25 hours Peripheral nervous system - 9 hours.	**135**
2	**Test control of knowledge**	**1**
3	**Preparation for the exam**	**20**
Total		**156**

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 and check of knowledge, practicing the skills of examining and describing an anatomical drug, instructing and practicing skills on the virtual -anatomical table "Anatomage Table", solving clinical problems, testing.
Independent work: with a textbook, independent work with a test-book Krok-1, independent solution of situational problems.

8. Forms of control and methods of evaluation (including criteria for evaluating learning proccess)

Current control: oral survey, testing, evaluation of the performance of practical skills of knowledge of anatomical preparations, followed by analysis and evaluation of gender, age, and individual characteristics of the structure of human organs, solving situational tasks, evaluation of the ability to analyze the topographical-anatomical relationships of human organs and systems; assessment of the ability to analyze patterns of prenatal and early postnatal development of human organs, variants of organ variability, developmental defects; control over the correctness of filling in the self-training workbook, assessment of activity in the lesson.

Final control: oral exam.

Evaluation of the current educational activity in a practical session:

Evaluation of the success of studying each topic of the discipline "Human Anatomy" is performed according to a traditional 4-point scale.

1. Assessment of theoretical knowledge on the topic of the lesson by means of surveys, solving tests and situational problems:

the maximum score is 5, the minimum score is 3, the unsatisfactory score is 2.

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

the maximum score is 5, the minimum score is 3, the unsatisfactory score is 2.

The grade for one practical session is the arithmetic average of all components and can only have a whole value (5, 4, 3, 2), which is rounded according to the statistical method.

At the practical session, the students must be interviewed at least once in 2 practical sessions, not less than 75% of the students. At the end of the semester, the number of grades of the students in the group should be the same on average.

Criteria for the current assessment in a practical lesson:

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

Only those applicants who have fulfilled the requirements of the training program 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 according to the tests "STEP - 1" are admitted to the final control in the form of an exam at least 90% (50 tasks).

The test control is held in the Educational and Production Complex of Innovative Technologies of Learning, Informatization and Continuous Education of ONMedU on the eve of the exam.

Evaluation of learning results during the final control - exam.

The exam is held in the educational and production complex of innovative technologies of learning, 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 standard answers and determine which mandatory components of the answer were or were not named by the applicant.

Content of the ticket
Overview and description of the anatomical preparation of ERWS
4 (four) theoretical questions

The overall grade for the exam is calculated as the arithmetic average of all grades obtained for answers to theoretical questions and practical tasks on a traditional four-point scale, rounded to two decimal places.

Criteria for evaluating the learning outcomes of education seekers on the exam

Grade	Evaluation criteria
Perfectly «5»	Awarded to a higher education applicant who has worked systematically during the semester, demonstrated versatile and deep knowledge of the program material during the exam, is able to successfully perform the tasks provided for in the program, has mastered the content of the main and additional literature, has realized the relationship of individual sections of the discipline, their importance for the future profession, showed creative abilities in understanding and using educational program material, showed the ability to independently update and replenish knowledge; the level of competence is high (creative);
Well «4»	It is awarded to a higher education applicant who has demonstrated complete knowledge of the curriculum material, successfully completes the tasks prescribed by the program, 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 renewal in the course of further education and professional activity; the level of competence is sufficient (constructive and variable).

Satisfactory «3»	It is issued to a higher education applicant who has demonstrated knowledge of the main curriculum material in the amount necessary for further education and subsequent work in the profession, copes with the tasks provided for in the program, made some mistakes in the answers on the exam and when completing the exam tasks, but has the necessary knowledge to overcome mistakes made under the guidance of a scientific and pedagogical worker; level of competence - average (reproductive).
Disappointing «2»	It is issued to a higher education applicant who has not demonstrated sufficient knowledge of the basic curriculum material, has made fundamental mistakes in the performance of the tasks provided for in the program, cannot use the knowledge in further studies without the help of a teacher, has not managed to master the skills of independent work; the level of competence is low (receptive-productive).

9. Distribution of points received by students of higher education

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

Conversion table of a traditional assessment into a multi-point scale

Traditional four-point scale	Multipoint 200-point scale
Perfectly («5»)	185 – 200
Fine («4»)	151 – 184
Satisfactorily («3»)	120 – 150
Unsatisfactorily («2»)	Lower 120

A multi-point scale (200-point scale) characterizes the actual success of each applicant in learning the educational component. The conversion of the traditional grade (average score for the academic discipline) into a 200-point grade is performed by the information and technical department of the University.

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

The ECTS scale is a relative-comparative rating, which establishes the applicant's belonging to the group of better or worse among the reference group of fellow students (faculty, specialty). An "A" grade on the ECTS scale cannot be equal to an "excellent" grade, a "B" grade to a "good" grade, etc. When converting from a multi-point scale, the limits of grades "A", "B", "C", "D",

"E" according to the ECTS scale do not coincide with the limits of grades "5", "4", "3" according to the traditional scale. Acquirers who have received grades of "FX" and "F" ("2") are not included in the list of ranked acquirers. The grade "FX" is awarded to applicants who have obtained the minimum number of points for the current learning activity, but who have not passed the final examination. A grade of "F" is assigned to applicants who have attended all classes in the discipline, but have not achieved a grade point average (3.00) for the current academic activity and are not admitted to the final examination.

Applicants who study 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 from the discipline and the sum of points on the ECTS scale

Evaluation on the ECTS scale	Evaluation on the ECTS scale
A	The best 10% of applicants
B	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

- Working program of the academic discipline

- Syllabus of the academic discipline

- Situational tasks for the licenшτπ exam "Step -1"

- Methodical developments for practical classes

- Electronic bank of test tasks by subdivisions of the discipline.

Educational and methodical literature:

- 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 for preparing for the final control

1. Development of the skeleton in phylo- and ontogenesis. Skeleton: structure, division, function. Methods of making bone preparations.
2. Primary, secondary bones. Types of ossification: endesmal, enchondral, perichondral and periostal. Ossification points: primary, secondary, additional.
3. Bone growth in length and thickness. Periods of growth, connection with physical activity. Age, sex, individual characteristics of bones and bone marrow.
4. Bone structure. Structural unit. Compact and spongy substance. The bone marrow. Chemical composition and physical properties of bones.

5. Bone parts and external structure. Periosteum: structure, function, age-related changes Classification of bones. X-ray anatomy of bones.
6. Spinal column: divisions. Structure of vertebrae in different departments, X-ray image. Variants and anomalies of vertebrae (spina bifida, sacralization, lumbarization).
7. Ribs, sternum: development, structure, variants, anomalies, X-ray image.
8. Scapula, clavicle: structure, anomalies, X-ray image.
9. Humerus: structure, anomalies, X-ray image.
10. Ulnar and radial bones: structure, anomalies, X-ray image.
11. Bones of the wrist, flanks of the fingers: structure, anomalies, X-ray image.
12. Bones of the pelvis: structure, age and sex characteristics, X-ray image. Femur: structure, anomalies, X-ray image.
13. Bones of the lower leg: structure, anomalies, X-ray image.
14. Metatarsal bones, metatarsals, phalanges of the fingers: structure, anomalies, X-ray image.
15. The difference in the structure of the bones of the upper and lower limbs in connection with upright walking and labor activity of a person.
16. The main transformations of the skull in phylogeny. Cerebral and facial skull: bones, X-ray image.
17. Frontal bone: topography, parts, structure. Parietal bone: topography, structure. Occipital bone: topography, parts, structure.
18. Sphenoid bone: topography, parts, structure. Ethmoid bone: topography, parts, structure
19. Temporal bone: topography, parts, structure of tympanic and scaly parts. Temporal bone: structure of the bony part, channels of the temporal bone and their content.
20. Upper jaw: topography, parts, structure.
21. Palatine bone, lower nasal concha, lobe, nasal and lacrimal bones, topography, structure.
22. The zygomatic and hyoid bones: topography, structure.
23. Lower jaw: topography, parts, structure.
24. Structure of the vault of the skull. Formation of the inner surface of the base of the skull
25. Formation of the outer surface of the base of the skull.
26. Orbita: walls, channels, slits, pits.
27. Nasal cavity: walls, channels, passages, connections. Paranasal sinuses: topography, structure, function, age-related changes.
28. Bony palate and nasal septum: bones, structure, function, age-related changes.
29. Temporal, infrabtemporal and pterygopalatine fossa: walls, connections.
30. Development of the bones of the brain and facial skull in ontogenesis (primary, secondary bones), parietal bone. Age-related changes in the skull.
31. Gender differences and anthropological features of the skull. Racial differences of the skull. The fallacy of racist and phrenological theories
32. Craniometry: points, tools, Frankfurt horizontal, frontal angle, skull shapes. Variants, anomalies, asymmetries of the bones of the skull.
33. Development of connections in phylo- and ontogenesis, factors determining their development and diversity. Classification of bone joints. Planes and axes of the body, movements around them.
34. Characteristics of synarthroses: syndesmoses, synchondroses, synostoses, synelastoses, synsarcoses. Characteristics of hemiarthroses.
35. Characteristics of diarthrosis: parts of the joint, their morpho-functional characteristics. Factors holding articular surfaces. Characteristics of joints: simple, complex, complex, combined, congruent, one-, two-, three- and multi-axial.
36. Connection of bones of the head: syndesmoses: (seams, crown), synchondroses and

synostoses. Temporomandibular joint: type of joint, disc, ligaments, movements.
37. Connection of vertebrae to each other, with the occipital and sacral bones. Connection of the first and second cervical vertebrae. The spine as a whole: function, changes, causes and timing of their occurrence.
38. Connection of ribs with vertebrae, sternum and between themselves. Chest as a whole: structure, age and sex characteristics, function, developmental anomalies.
39. Connection of the scapula and clavicle between itself and the sternum. False ligaments of the scapula. Shoulder joint: structure, function, X-ray image.
40. Elbow joint: structure, function, X-ray image. Connection of the ulna and radius.
41. Radiocarpal joint: structure, function, X-ray image. Connection of the bones of the hand: structure, function, X-ray image.
42. Connection of pelvic bones: structure, function, X-ray image. The pelvis as a whole: walls, cavities, openings, evolution of the pelvis. Gender differences in the pelvis, sizes of the female pelvis.
43. Hip joint: structure, function, X-ray image.
44. Knee joint: structure, function, X-ray image. Connection of the bones of the leg.
45. Ankle joint: structure, function, X-ray image. Connection of the bones of the foot: structure, function. Chopard and Lisfranc joints, their ligaments are the keys. The foot as a whole: evolution, arch of the foot and their function, points of support.
46. Muscle develop ment in ontology and phylogeny. Autochthonous, truncofugal and truncopetal muscles. Morpho-functional differences between striated and non-striated muscles. The structure of skeletal muscle: parts, origin, attachment, function.
47. Auxiliary muscle apparatus: fascia, synovial sheaths, mesenteries and bursae, sesamoid bones, vascular-nerve gates.
48. Classification of muscles: by form, function, direction, location. Anatomical and physiological diameter of muscles. Muscle strength. An idea about the levers of strength, speed and balance.
49. Superficial muscles of the back: origin, attachment, functions, fascia. Deep muscles of the back: origin, attachment, functions, fascia.
50. Diaphragm: structure, parts, muscles, fascia, functions. Muscles and fascia of the chest.
51. Muscles of the front, side and back walls of the abdominal cavity: origin, attachment, functions, fascia. Formation of the white line and sheath of the rectus abdominis muscle. Inguinal canal: walls, superficial and deep rings. Contents.
52. Superficial muscles of the neck and muscles attached to the hyoid bone: origin, attachment, function. Triangles of the neck: boundaries, content.
53. Deep muscles of the neck: origin, attachment, functions. Fasciae of the neck and interfascial spaces.
54. Chewing muscles: origin, attachment, function, fascia.
55. Facial muscles: principle of location, origin, attachment, function, fascia.
56. Muscles of the shoulder girdle: origin, attachment, function. Shoulder muscles: origin, attachment, function.
57. Fascias and topography of the shoulder, inguinal fossa, its walls, openings, canal of the radial nerve. Intermuscular grooves and membranes.
58. Anterior group of forearm muscles: origin, attachment, function. Fasciae and topography of the anterior surface of the forearm. Posterior group of forearm muscles: origin, attachment, function, fascia.
59. Muscles of the hand: origin, attachment, functions. Fascia and topography of the hand: and synovial sheaths.
60. Internal group of pelvic muscles: origin, attachment, function, fascia.
61.External group of pelvic muscles: origin, attachment, function, fascia. Topography of the pelvis: openings, channels, lacunae, fossaes.

62. Muscles of the thigh: origin, attachment, function, fascia. Fascia lata of the thigh: iliotibial tract, sheets, intermuscular septum. Topography of the thigh: femoral triangle, boundaries, contents, femoral canal, walls, external and internal openings.
63. Leg muscles: origin, attachment, function, fascia. Fasciae of the leg and their formation: intermuscular septum, upper and lower retainnacula of tendons. Femoral popliteal canal: walls, inlet and outlet openings, contents. Popliteal fossa: boundaries, connections, contents.
64. Dorsal and plantar muscles of the foot: groups, origin, attachment, function. Dorsal fascia of the foot, plantar aponeurosis, their formation. Bone-fibrous channels and synovial sheaths of the foot, lateral and medial intermuscular sulcus of the foot, their contents.
65. Concepts of internal organs, their division into systems. The principle of the structure of tubular and parenchymal organs, their function. The primary intestine, its divisions, derivatives and their relation to the peritoneum.
66. Oral cavity: wall structure, connections, developmental anomalies: blood supply, lymphatic drainage. Lips, cheeks: structure, function. Age characteristics, developmental anomalies.
67. Hard, soft palate: bones, muscles. Function, innervation, blood supply, lymphatic drainage.
68. Comparative anatomy of teeth. The connection of their structure, shape and quantity with the nature of nutrition. Morpho-functional characteristics of human teeth.
69. Teeth: parts, cavity, canals. Crown surfaces. Permanent teeth formula. Anomalies of teeth: diastema, crowding, dystonia, polydentia, etc. X-ray images of teeth.
70. Peculiarities of the structure and distinguishing features of the structure of the teeth of the upper and lower jaw, right and left side. Innervation. Blood supply, lymphatic drainage from the teeth of the upper and lower jaw.
71. Milk teeth: development, sequence and timing of eruption, structural features, dental formula. Mechanism of tooth change.
72. Gums: structure, age-related changes, gingival papillae and pockets, innervation, blood supply, lymph outflow.
73. Structure of the maxillofacial segment. Periodontium, paradontium. Bite and its types. Main and additional antagonists. The concept of the chewing apparatus: the systems that form it and the organs, their function.
74. Tongue: parts, surfaces, muscles, glands, papillae. Tongue: functions, developmental abnormalities, innervation, blood supply, lymph outflow.
75. Salivary glands. Submandibular and sublingual salivary glands: structure, location, excretory ducts, innervation, blood supply, lymphatic drainage. Parotid salivary gland: structure, location, excretory ducts, innervation, blood supply, lymphatic drainage.
76. Fauces: limits. Pirogov's lymphoepithelial ring, its age-related changes.
77. Pharynx: parts, topography, muscles, openings, function, mechanism of acts of breathing and swallowing, innervation, blood supply, lymphatic drainage.
78. Esophagus: departments, their topography, structure. Walls, narrowing. Function. Anomalies of the development of the esophagus, its innervation, blood supply, lymph drainage, X-ray imaging.
79. Stomach: topography, parts, surfaces, structure of the wall, glands, function of the stomach, its innervation, blood supply, lymphatic drainage, X-ray imaging.
80. Duodenum: shape variants, topography, parts, wall structure, relation to the peritoneum, innervation, blood supply, lymphatic drainage. Anomalies of development.
81. The mesenteric part of the small intestine: topography, wall layers, relief of the mucous membrane, structure and function of the intestinal villi. Innervation, blood supply of the small intestine, lymphatic drainage.
82. Colon - parts, their topography, relation to the peritoneum, external distinguishing

features of the colon, wall layers, function, innervation, blood supply, lymphatic drainage.
83. Cecum and appendix: structure, topography, function, innervation, blood supply, lymphatic drainage.
84. The rectum: parts, relationship to the peritoneum, position options, wall layers, sphincters, function, innervation, blood supply, lymphatic drainage. Rectomanoscopy. Anomalies of development.
85. Liver: development, topography, boundaries, peritoneum covering, ligaments, lobes, edges, surfaces, furrows, X-ray image.
86. Internal structure of the liver: hepatic lobe, function, age-related changes, influence of alcohol. Innervation, blood supply, lymph drainage from the liver.
87. Gallbladder: structure, topography, excretory ducts of the liver and gall bladder. Innervation, blood supply, lymphatic drainage from the gallbladder. X-ray image.
88. Pancreas: topography, structure, peritoneum covering, function, endo- and exocrine parts, excretory duct, innervation, blood supply, lymphatic drainage.
89. Phylo- and ontogenesis of the respiratory system. Components of the human respiratory system, conditional division into upper and lower respiratory tracts.
90. External nose. The structure of the walls (bones, cartilage, joints), function, innervation, blood supply, lymphatic drainage.
91. Nasal cavity: areas, their function, nasal passages, blood supply, outflow of venous blood and lymph. Paranasal sinuses: structure, location, function, individual and age characteristics.
92. Larynx - topography, cartilages, joints, ligaments. Internal structure, functions, laryngoscopy. Muscles of the larynx: origin, attachment, functions. Voice formation mechanism. Innervation of the larynx, blood supply, lymphatic drainage.
93. Trachea: structure, topography, functions, developmental anomalies, X-ray imaging, innervation, blood supply, lymph drainage.
94. Bronchi: wall structure, branching, bronchoscopy, X-ray imaging, innervation, blood supply, lymphatic drainage.
95. Lungs: development in phylo- and ontogenesis, topography, external structure, X ray image. Structural unit and function of lungs, innervation, blood supply, lymphatic drainage.
96. Pleura: development, topography, pleural cavity, sinuses, function, innervation, blood supply, lymph drainage. Borders of lungs and parietal pleura, projection, sulcuses, X-ray image.
97. Mediastinum: definition, conventional division, divisions, content, blood supply, lymph outflow.
98. Kidneys: phylo- and ontogenesis, topography, skeletotopy. Shape, dimensions, external structure, shells, kidney fixation device, developmental anomalies, X-ray image.
99. Kidneys: external structure, structural unit of the kidney, its function, fornix apparatus of the kidney, large and small calyces, innervation, blood supply, outflow of lymph and venous blood.
100. Ureters: parts, structure, relation to the peritoneum, function, innervation, blood supply, outflow of lymph, X-ray image. Urinary bladder: parts, structure, peritoneum covering, function, innervation, blood supply, lymph drainage, X-ray image.
101. Female urethra: length, topography, wall structure, sphincters, innervation, blood supply, lymph drainage. Male urethra: length, topography, wall structure, glands, formation, innervation, blood supply, lymph drainage.
102. Testicle: size, shape, external and internal structure, tubules and their functions, appendix and epididymis, testicular anomalies, innervation of the testicle, blood supply, drainage of lymph and venous blood.

103. Composition of the spermatic cord: vas deferens, topography, length, parts. Seminal vesicles, prostate gland, bulbourethral glands: structure, functions, innervation, blood supply, lymph drainage.
104. Scrotum: layers (their origin), innervation, blood supply, outflow of lymph. Penis: external structure, structure and functions of cavernous and spongy bodies, fixation apparatus, innervation, blood supply, outflow of lymph.
105. Female genitals, internal and external, ovary: shape, dimensions, topography, ligaments, external structure, epoophoron.
106. Ovary: layers, follicles, red, yellow, white bodies, abnormalities, innervation, blood supply, lymph drainage.
107. Uterus: names, shapes, sizes, parts, topography, normal position, ligaments of the uterus, layers, internal structure, glands, innervation, blood supply, outflow of lymph.
108. Fallopian tubes: names, topography, parts, layers, openings, narrowing, innervation, blood supply, lymph outflow.
109. Vagina: names, topography, dimensions, wall structure, vault, anomalies, innervation, blood supply, lymph drainage.
110. External female genitalia: labia majora and minora, comissuras, vestibulum, hymen, clitoris: structure, innervation, blood supply, lymph drainage.
111. Perineum: definition, boundaries, fascia, holes, fossaes, innervation, blood supply, lymph drainage.
112. Peritoneum. The concept of the abdominal cavity and the peritoneal cavity, fascia, types of covering of organs with peritoneum. Derivatives of peritoneum: ligaments, mesenteries, omentums, plicas.
113. Peritoneum: surfaces, bursae, sinuses, channels, fossaes, recesses, location, significance, innervation, blood supply, lymph drainage.
114. Classification of the nervous system. Structural components of the reflex arc. Concept of neuron, neuroglia, synapses, receptors, reflex arc. Development of the nervous system in phylogeny: diffuse, nodular, tubular form, stages of three, five brain bubbles.
115. Development of the nervous system in ontogeny, stages of the neural plate, three layered neural tube and its derivatives. Paleo-, archi-, and neocortex, corticalization, functions.
116. Spinal cord: topography, shape, external relief, structure of gray and white matter. Spinal cord: membranes, intermembrane spaces, their contents, blood supply.
117. Conductive paths of the spinal cord and their localization.
118. Cerebrum: component parts, cerebral fissure and gyri of the cerebral hemispheres. Cyto-myeloarchitectonics of the cortex of the cerebral hemispheres, layers, Betz cells.
119. System of fibers (associative, commissural, projection), corpus callosum, comissuras, internal capsule.
120. Localization of functions in the cortex of the cerebrum: general and proprioceptive sensitivity, motor, movements of the combined rotation of the head and eyes, praxia, stereognosia, hearing, taste, vision, smell. Concept of the first and second signal systems, their substrate, centers of oral and written speech.
121. Basal ganglia, capsules. Ideas about the extrapyramidal system.
122. Lateral ventricles of the brain: topography, structure, connections, vascular plexuses. Formation and outflow of cerebrospinal fluid, its functional significance.
123. Diencephalon: boundaries, divisions (thalamic, subthalamic, third ventricle). Hypothalamic area: distribution. The concept of neurocrinia, the connection with the pituitary gland.
124. Midbrain: parts, external and internal structure.
125. Metencephalon: component parts, external structure of the Pons Varolii.
126. Cerebellum: topography, external and internal structure.

127. The fourth ventricle of the brain: structure, connections, vascular plexus, formation and outflow of cerebrospinal fluid.
128. Medulla oblongata: external and internal structure
129. Rhomboid fossa: boundaries, relief, internal structure, projection of cranial nerve nuclei.
130. Meninges and intermeningeal spaces of the brain.
131. Formation of the Vilysian circle and its branches. Brain veins, venous sinuses of the dura mater, diploic veins.
132. Conductive pathways of pain and temperature sensitivity.
133. Pathways of proprioceptive sensitivity of the cerebellar direction.
134. Pathsways of proprioceptive sensitivity of the cortical direction of Holl and Burdach, medial loop.
135. Motor, pyramidal and extrapyramidal pathways.
136. General characteristics of sense organs, meaning, occurrence, types, features in humans. Pavlov's teaching about analyzers.
137. Organ of smell: development in phylogeny, location, structure, olfactory pathway.
138. Organ of taste: development in phylogeny, location of receptors, taste pathway.
139. 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.
140. Organ of vision: development in phylo- and ontogenesis, significance for humans. Topography of the eye.
141. Eye: structure, poles, axes, membranes of the eye and their division into parts. The structure of the retina, visual pathway. The path of the pupillary reflex. Innervation, blood supply, lymph outflow from the eye.
142. Cameras of the eye, lens, vitreous body: structure, function. Formation and outflow of aquous humor from the eye chambers.
143. Auxiliary organs of the eye: muscles, fascia, fat body, eyelids, conjunctiva, glands. Lacrimal apparatus: structure, topography, function.
144. Development of the vestibulocochlear organ in phylo- and ontogenesis. Components of the external, middle and inner ear. The structure and functions of the external ear, the external auditory canal and the tympanic membrane.
145. Structure and functions of the tympanic cavity, auditory tube, auditory ossicle, their joints, ligaments, muscles. Innervation, blood supply, lymphatic drainage.
146. Structure and functions of the vestibulum, semicircular canals and cochlea. Perilymph and endolymph: formation, location, outflow, function.
147. Structure of the organ of Corti. VIII pair of cranial nerves. Auditory pathway.
148. Cranial nerves: number, names, development in phylogeny, their difference from spinal nerves.
149. 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. Abductor nerve: nuclei, exit from the brain and skull regions of innervation.
150. Trigeminal nerve: nuclei, exit from the brain, Gasser's node. The first branch of the trigeminal nerve: the beginning, the exit from the skull, the branches, the area of innervation, the ciliary node.
151. The second branch of the trigeminal nerve: origin, exit from the skull, branches, area of innervation, wing-palatine node.
152. The third branch of the trigeminal nerve: origin, exit from the skull, branches, area of innervation, auricular, submandibular and hypoglossal nodes.
153. Facial nerve: nuclei, exit from the brain and skull, formation of the "big crow's feet", regions of innervation.
154. Intermediate nerve: nuclei, exit from the brain and skull. Branches (great petrosal

nerve and chorda tympany), their location, relation to vegetative nodes, innervation.
155. Vestibulocochlear nerve: nuclei, exit from the brain, nodes, branches, regions of innervation
156. Glossopharyngeal nerve: nuclei, exit from the brain and skull, upper and lower nodes, branches (tympanic, lesser petrosal, etc.), area of innervation.
157. Vagus nerve: nuclei, exit from the brain and skull, upper and lower nodes, branches of the cranial department.
158. Vagus nerve: branches of the cervical, thoracic and abdominal departments.
159. Accessory nerve: nucleus, exit from the brain and skull, which innervates. Hypoglossal nerve: nucleus, exit from the brain and skull, branches, area of innervation. The formation of the ansa cervicalis and its meaning.
160. Heart: development in phylo- and ontogenesis; topography, weight, dimensions, external structure, function.
161. Internal structure of the heart: layers, chambers, relief of ventricles and atria. Heart muscles: features of the structure, layers, beginning, attachment.
162. Valvular apparatus of the heart: structure, location. Projection of the heart valves on the front wall of the chest and the place of their listening.
163. Coronary arteries of the heart: origin, location, their options. Additional sources of blood supply to the heart. Veins of the heart: their topography, coronary sinus, lymphatic drainage from the heart.
164. Conductive (autonomic) nervous system of the heart. Innervation of the heart – the significance of the works of I.P. Pavlova, V.P. Vorobyova, F.A. Volynsky on the study of innervation of the heart.
165. Heart: structure, leaves, function, innervation, sinuses, blood supply, lymph outflow.
166. Topography of the heart. Limits of the heart: age, sex, constitutional and professional features of the location of the heart. Heart examination methods: percussion, auscultation, X-ray imaging, echography, endoscopy, angiography.
167. Circulatory system: structure, function, development in phylo- and ontogenesis. The structure and function of the microcirculatory channel. Avascular organs.
168. Vascular anastomoses: types, function, formation. Terminal vessels. The principle of the name of the vessel, types of branching (long-distance, friable).
169. The structure of the vessel wall and its features in arteries and veins. Regularities in the location and number of arteries and veins. Innervation and blood supply of vessels.
170. Large and small circle of blood circulation: vessels, their departure, branching, confluence.
171. Aorta - divisions (parts), topography, syntopy, branches. Common carotid artery: topography, syntopy, branching.
172. External carotid artery: topography, divisions, branches, areas of blood supply.
173. Maxillary artery: topography, divisions, branches, areas of blood supply.
174. Internal carotid artery: topography, divisions, branches.
175. The structure of veins: layers, walls, valves, types of veins, their number, venous plexuses, anastomoses, collateral pathways, age-related changes.
176. Arteries of the small ring of blood circulation (lobar, lobular, segmental, interlobular).
177. Superior vena cava: structure, tributaries, confluence. Brachial veins: location, tributaries, confluence.
178. Internal jugular vein: topography, intracranial tributaries, sinuses of the dura mater, diploic and emissary veins.
179. Extracranial tributaries of the internal jugular vein.
180. External and anterior jugular veins: origin, tributaries. Venous jugular arch.
181. Aorta: parts, their topography. Thoracic aorta: topography, branches, areas of blood

supply.
182. Abdominal aorta: topography, branches, areas of blood supply. Intersystemic and intrasystemic arterial anastomoses.
183. Common and internal iliac arteries: topography, branches of the blood supply area.
184. General anatomy of veins: classification, structure, patterns of topography. Development of veins. Anomalies and options for the development of veins. The works of M.A. Tikhomirova. Intrasystemic and intersystemic venous anastomoses.
185. Azygos and hemyazygos veins: formation, topography, tributaries.
186. Portal hepatic vein: its roots, topography, tributaries.
187. Inferior vena cava: formation, topography, tributaries.
188. Pelvic veins. Cava-caval anastomoses. Porto-caval anastomoses.
189. Lymphatic system. General characteristics. Links and their structure, functions. Works of the Kyiv Anatomical School: F.A. Stefanis, M.S. Spirov, O.A. Sushko, O.I. Sviridov, L.S. Bespalova, L.V. Chernyshenko.
190. Lymphatic system. Thoracic duct, its roots, topography, place of confluence with the venous system.
191. Upper and lower mesenteric arteries: topography, branching.
192. Internal iliac artery: topography, branches.
193. Lymphatic vessels: links, their structure, topography, functions.
194. Autonomic part of the peripheral nervous system (vegetative nervous system): parts, functions, objects of innervation.
195. Differences between the somatic nervous system and the autonomic nervous system.
196. Morphological differences of the reflex arc of the autonomous part of the peripheral nervous system (vegetative nervous system).
197. Autonomic nervous system: central department, its classification, topography, formation. Autonomic nervous system: peripheral department, its components. Vegetative nodes: classification, structure, topography, difference from sensitive nodes.
198 Sympathetic trunk: topography, divisions, nodes, their connections. Connecting white branches: formation, topography. Connecting gray branches: formation, topography.
199. Cervical part of the sympathetic trunk: the nodes forming it, their topography, sources of preganglionic fibers.
200. Thoracic part of the sympathetic trunk: nodes, their topography, sources of preganglionic fibers, branches, areas of innervation. Greater, lesser and least splanchnic nerves: their formation, composition of fibers, topography.
201. Lumbar division of the sympathetic trunk: nodes, their topography, sources of preganglionic fibers, branches, areas of innervation.
202. Sacral division of the sympathetic trunk: nodes, their topography, sources of preganglionic fibers, branches, areas of innervation.
203. Vegetative plexuses of the abdominal cavity: formation, topography, composition of fibers, areas of innervation. Vegetative plexuses of the pelvis: formation, topography, composition of fibers, areas of innervation.
204. Axillary artery: topography, sections, branches, areas of blood supply; describe and demonstrate on anatomical spacimen.
205. Brachial artery: topography, branches, areas of blood supply; describe and demonstrate on anatomical spacimen. Brachial artery: deep artery of the shoulder, its topography, branches, areas of blood supply; describe and demonstrate on anatomical spacimen.
206. Radial artery: topography, branches, areas of blood supply; describe and demonstrate on anatomical spacimen.
207. Ulnar artery: topography, branches, areas of blood supply; describe and

demonstrate on anatomical spacimen. Elbow articular mesh: sources of formation, topography, areas of blood supply.
208. Superficial palmar arch: sources of formation, topography, branches, areas of blood supply. Deep palmar arch: sources of formation, topography, branches, areas of blood supply. Arterial anastomoses of the hand.
209. Veins of the upper limb: classification. Superficial veins: their topography, areas of confluence with venous vessels. Anastomoses between superficial veins. Deep veins, their topography, location features on the hand, forearm and shoulder; describe and demonstrate on preparations.
210. Axillary vein: topography, tributaries; describe and demonstrate on anatomical spacimen.
211. External iliac artery: formation, topography, branches, areas of blood supply; describe and demonstrate on anatomical spacimen.
212. Femoral artery: topography, branches, areas of blood supply; describe and demonstrate on anatomical spacimen.
213. Popliteal artery: topography, branches, areas of blood supply; describe and demonstrate on anatomical spacimen.
214. Anterior tibial artery: topography, branches, areas of blood supply; describe and demonstrate on anatomical spacimen. Posterior tibial artery: topography, branches, areas of blood supply; describe and demonstrate on anatomical spacimen.
215. Genicular anastomosis: sources of formation, topography, areas of blood supply.
216. Dorsal artery of the foot: formation, topography, branches, areas of blood supply; describe and demonstrate on anatomical spacimen. Arterial anastomoses of the foot.
217. Veins of the lower limb: classification. Superficial veins: their topography, areas of confluence with venous vessels. Superficial veins of the lower limb: large subcutaneous vein, its formation, topography; describe and demonstrate on anatomical spacimen.
218. Veins of the lower extremity: classification. Deep veins, their topography, features of the location on the foot, lower leg and thigh; describe and demonstrate on anatomical spacimen.
219. Femoral vein: topography, tributaries; describe and demonstrate on anatomical spacimen.
220. Peripheral nervous system: components, their general characteristics.
221. Spinal nerve: formation, topography, branches; corresponding to the segments of the spinal cord.
222. Brachial plexus: formation, topography, parts, classification of branches. Brachial plexus: trunks, bundles, their topography; describe and demonstrate on anatomical spacimen.
223. Brachial plexus: supraclavicular part, its topography, components; describe and demonstrate on anatomical spacimen. Short branches of the brachial plexus: their topography, areas of innervation; describe and demonstrate on anatomical spacimen.
224. Brachial plexus: subclavian part, its topography, components; describe and demonstrate on anatomical spacimen. Long branches of the brachial plexus: their topography, areas of innervation; describe and demonstrate on anatomical spacimen.
225. Lumbar plexus: formation, topography, branches, areas of innervation; describe and demonstrate on anatomical spacimen. Lumbar plexus: femoral nerve, its topography, branches, areas of innervation; describe and demonstrate on anatomical spacimen; occipital nerve, its topography, branches, areas of innervation; describe and demonstrate on anatomical spacimen.
226. Sacral plexus: formation, topography, classification of branches. Sacral plexus: short branches, their topography, areas of innervation; describe and demonstrate on anatomical spacimen.

227. Long branches of the sacral plexus: their topography, areas of innervation; describe and demonstrate on anatomical spacimen.
228. Coccygeal plexus: formation, topography, branches, areas of innervation.

12. Recommended literature

Basic

1. Human anatomy: a textbook /V.R. Cherkasov, S.Y. Kravchuk. Vinnytsia: New book, 2020. 656 p.
2. Atlas of human anatomy: 7th edition / Frank G. Netter (bilingual) [science. ed. trans.from English L.R. Mateusz-Watseba, others]. All-Ukrainian. Special "Medytsina"publishing house, 2020. 736 p.
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 [scientificed.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"