

**PRIVATE HIGHER EDUCATIONAL ESTABLISHMENT  
«INTERNATIONAL ACADEMY OF ECOLOGY AND MEDICINE»**

**Department of fundamental disciplines with a course of pharmacology**

**SYLLABUS OF THE EDUCATIONAL  
DISCIPLINE**

**«HUMAN ANATOMY»**

LEVEL OF HIGHER EDUCATION The second (master's) level

DEGREE OF HIGHER EDUCATION Master

AREA OF KNOWLEDGE 22 "Health care"

SPECIALTY 221 "Dentistry"

Reviewed and approved  
at the meeting of the Department of fundamental  
disciplines with a course of pharmacology

Protocol № 1 of « 01 » 09 2020  
Head of the department Doctor of Biological  
Sciences, associate professor

  
M.R. Vergolyas

**Kiev 2020**

<b>1. General information</b>	
<b>Subject</b>	<b>Human anatomy</b>
<b>Lector</b>	<i>Solovchenko L. M.</i>
<b>Teacher's contact phone number</b>	
<b>Teacher's e-mail</b>	<i>kaffunda@ukr.net</i>
<b>Discipline format</b>	Normative discipline.
<b>The volume of the discipline</b>	330 hours
<b>Link to the distance learning site</b>	maem.kiev.ua
<b>Consultations</b>	
<b>2. Annotation to the course</b>	
<p><b>The subject of study of the discipline:</b>  <b>Anatomy</b> (Greek <i>anatomē</i>, 'dissection') is the branch of biology concerned with the study of the structure of organisms and their parts. Anatomy is a branch of natural science which deals with the structural organization of living things. It is an old science, having its beginnings in prehistoric times. Anatomy is inherently tied to developmental biology, embryology, comparative anatomy, evolutionary biology, and phylogeny, as these are the processes by which anatomy is generated, both over immediate and long-term timescales. Anatomy and physiology, which study the structure and function of organisms and their parts respectively, make a natural pair of related disciplines, and are often studied together. Human anatomy is one of the essential basic sciences that are applied in medicine.</p>	<p><b>Interdisciplinary links:</b>  Human anatomy as a discipline:  a) is based on the study of medical biology, histology, cytology and embryology, biophysics, Latin, ethics, philosophy, ecology and integrates with these disciplines;  b) lays the foundations for students to study normal and pathological physiology, pathological anatomy, operative surgery and topographic anatomy, deontology, propaedeutics of clinical disciplines and the formation of skills to apply knowledge of human anatomy in the further study of all clinical disciplines and future professional activities.</p>
<b>3. Purpose and objectives of the course</b>	
<p><b>The purpose</b> of teaching the discipline "Human anatomy" consistent with objectives of the educational-professional training program for applicants for the second educational (master's) level of higher education and are determined by the content of those systemic knowledge and skills that must be mastered by a doctor. The knowledge that students receive from the discipline "Human anatomy" is basic for the block of disciplines that provide scientific and professional training.</p>	<p><b>The main tasks</b> of studying the discipline "Human anatomy" are:  - To analyze information about the structure of the human body, system it is made up of organs and tissues;  - To provide interdependence and unity of structures and functions of human organs, their variability is influenced by environmental factors;  - To determine the influence of social conditions and labor on the development and structure of the human organism;  - To demonstrate mastering moral-ethical attitude to a living person and his body as an object of anatomical and clinical studies.</p>

#### 4. Competencies and learning outcomes

As a result of learning of "Human anatomy " student have to

**know:**

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

**To be able:**

- to demonstrate and describe the anatomical structure of organs, systems of human organs;
- to determine the anatomical relationships of organs and systems of human organs on anatomical preparations (topography of organs);
- to assess the impact of social conditions and labor on the development and structure of the human body;
- to use Latin anatomical terms and their Ukrainian equivalents in accordance with the requirements of the international anatomical nomenclature (São Paulo, 1997; Kyiv, 2001);

According to the requirements of Educational Standard of higher education the discipline provides obtaining **competencies** by students:

- *integrated*: ability to solve general and complex specialized tasks and practical problems in careers in health care or in learning, which provides research and/or implementation of innovation and characterized by complexity and uncertainty of the conditions and requirements.
- *general*: ability for abstract thinking, analysis and synthesis; ability to learn and acquire modern knowledge; ability to apply knowledge in practical situations; knowledge and understanding of the subject area and understanding of the profession; ability to make informed decisions; ability to use information and communication technologies; determination and persistence on tasks and responsibilities taken.
- *special (professional)*: ability to determine the list of necessary laboratory and instrumental studies and evaluating their results; skills to perform medical procedures; ability to assess the impact of environmental, social, economic and biological determinants of the health state of the individual, family and population.

#### Matrix of competencies

	Competence	Knowledge	Ability	Communication	Autonomy and responsibility
	<b>Integral competence</b>				
	The ability to solve general and complex specialized tasks and practical problems in careers in health care or in learning, which provides research and / or implementation of innovation and characterized by complexity and uncertainty of the conditions and requirements.				
	<b>General competences</b>				

1	Ability for abstract thinking, analysis and synthesis, ability to learn and be trained simultaneously.	To know: methods of analysis, synthesis and further modern training.	Be able to: analyze information, make informed decisions, acquire modern knowledge.	Establish appropriate relationships to achieve goals.	To take responsibility for the timely acquisition of modern knowledge.
2	Ability to apply knowledge in practical situations.	To know: specialized conceptual knowledge.	Be able to: solve complex problems and issues that arise in professional activities.	Clear and unequivocal reports of their findings, knowledge and explanations that justify them to specialists and nonspecialists.	To take responsibility for making decisions in difficult conditions.
3	Knowledge and understanding of the subject area and understanding of professional activity.	To know: the structure of professional activity.	Be able to: carry out professional activity that needs updating and integration of knowledge.	Ability to form effective communication strategy in professional activities.	To take responsibility for professional development, ability to further professional training with a high level of autonomy.
4	The ability to make informed decisions; to work in team; skills of interpersonal interaction.	To know: tactics and strategies of communication, laws and methods of communicative behavior.	Be able to: make informed decisions, choose methods and strategies of communication to ensure effective teamwork	Use communication strategies and skills of interpersonal interaction	To take responsibility for the choice of tactics and methods of communication.
5	Skills of using information and communication technologies.	To know: information and communication technologies used in professional activities.	Be able to: use information and communication technologies in the professional field that needs updating and integration of knowledge.	Use information and communication technologies in professional activity.	To take responsibility for the development of professional knowledge and skills.
6	Certainty and persistence on tasks and responsibilities taken.	To know: responsibilities and ways to perform the tasks.	Be able to: define goals and objectives, be persistent and diligent in the performance of duties.	Set interpersonal communication for effective implementation of tasks and responsibilities.	To take responsibility for qualitative performance of tasks.
<b>Special (professional) competences</b>					
1	The ability to determine the list of necessary laboratory and instrumental studies and to evaluate their results.	To know: the impact of physical factors on the human body, standard methods of laboratory and instrumental studies.	Be able to: analyze research results.	Select and evaluate research results.	To take responsibility for the decisions on the evaluation of research results.

2	Skills of performing medical procedures.	To know: biophysics of human organs and systems.	Be able to: analyze the biophysical parameters of human organs and systems.	Form and bring the conclusions to patients and professionals about the need for a health care manipulation.	Responsibility, independence.
3	Ability to evaluate the impact of environmental, social, economic and biological determinants on the health of the individual, family and population.	To know: environmental factors that affect health negatively in the population; statistical analysis methods for the evaluation of environmental factors and methods for determination of relation between them.	Be able: to evaluate the environment state and negative impacts on health. To know methods of statistical analysis.	Make conclusions about the health of the population on the basis of the relationship with environmental factors.	To take responsibility for the correct conclusions regarding the negative impact of environmental factors.

### 5. Organization of course training

#### *The volume of the course*

Type of lesson	<b>Total amount of hours 330</b>
Lectures	40
Practical (seminar) classes	180
Independent work	110

#### *Course signs*

Semester the 1st, the 2nd Specialty 221 "Dentistry"	Course (year of study) the 1st, the 2nd	Normative discipline
--	--	----------------------

#### *Course thematics*

The syllabus is structured into 3 modules, which include content modules.

#### **Module 1. The locomotor system.**

##### **Submodules:**

1. Introduction to anatomy.
2. Osteology.
3. Syndesmology.
4. Myology.

#### **Module 2. Splanchnology. Central nervous system and sensory organs**

##### **Submodules:**

5. Anatomy of the digestive system.
6. Anatomy of the respiratory system.
7. Anatomy of the urinary system.
8. Anatomy of the reproductive systems.
9. Anatomy of the endocrine system.
10. Anatomy of the spinal cord.
11. Anatomy of the brain.

12. *Sensory organs.*

**Module 3. Heart. Vessels and nerves of the head, neck, trunk and extremities.**

**Submodules:**

13. *Anatomy of the heart.*

14. *Vessels of the head and neck.*

15. *Nerves of the head and neck.*

16. *Arteries and veins of the trunk and extremities.*

17. *Innervation of the trunk and extremities.*

**THE CONTENT OF THE PROGRAMME**

**Module 1. The locomotor system.**

**Submodule 1. Introduction to anatomy**

**Specific objectives:**

- *Determine the subject and problems of anatomy, basic anatomical methods of study;*
- *To assess the main modern trends in the development of the anatomy;*
- *Analyze stages of formation of the human anatomy as the fundamental discipline;*
- *To analyze the contribution of eminent scientists, anatomists of different eras in the development of the human anatomy;*
- *To analyze the contribution of eminent scientists, anatomists of Ukraine and Kiev in the formation of the Ukrainian school of anatomists, and in particular, from Kyiv anatomical school.*
- *Identify the main stages of embryogenesis. To analyze the derivatives of each germ layer.*

***Theme. Introduction to anatomy. Research methods in anatomy. The main modern trends in the development of anatomy***

Human anatomy is a science about form and structure, origin and evolution of the human body, its organs and systems. Anatomy provides a systematic description of the form, structure, position and topographic relationships of the parts and organs of the body, taking into account their age, sex and individual characteristics.

The main modern trends in the development of anatomy - anatomy, comparative anatomy, plastic anatomy, anthropology, ecological anatomy, etc.

Basic research methods in anatomy of a visual study, anthropometric study, preparation, macro-microscopic study microscopic study. Modern methods of investigation in anatomy: rengeration methods, computed tomography, magnetic resonance imaging (MRI), ultrasound (sonography), endoscopy, etc.

***Theme. The main stages of development of anatomy in ancient times, in the Renaissance, in XVII-XIX centuries.***

Analysis of the development of anatomy in ancient times, in the Renaissance, in XVII-IT art the Value of works of Hippocrates, Aristotle, Galen, Avicenna, Andrew Vesalius, Leonardo da Vinci, V. Harvey, M. Malpighi, N. And. Pirogov and others.

***Theme. The development of Ukrainian anatomical schools***

The formation and development of Ukrainian anatomical schools.

***Theme. Kyiv anatomical school***

The formation and development of Kyiv anatomical school. The Contribution Of M. I. Kozlov, O. P. Valter, V. O. Betz, N. And.Tikhomirov, F. A. Stefani, M. S. Spirov, I. I. Bobryk in the development of Kyiv anatomical school and the value of their work for the modern anatomy.

***Theme. The initial stages of human embryogenesis. The doctrine of the embryonic sheets.***

The initial stages of human embryogenesis. Embryonic leaves: ectoderm, entoderm, mesoderm, and their derivatives.

**Submodule 2. Osteology**

**Specific objectives:**

- Apply anatomical terminology to denote skeletal bones, explain their topography;
- Use anatomical planes and axes to explain the topography of bones and their individual parts;
- Define and analyze the concept of "bone as an organ";
- Analyze the mechanisms of bone development in embryogenesis;
- Apply bone classification to analyze the structure of skeletal bones;
- Describe and demonstrate the structure of the bones of the torso, skull and limbs.

**Theme 1. Anatomic nomenclature and terminology. Axes and planes of the human body.**

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

Bone as an organ. Classification of bones. Bone development in embryogenesis. General data on the skeleton. Bone development (in phylogeny and ontogenesis). Primary and secondary bones. Classification of bones. Bone as an organ. Compact and spongy bone substances, their structure. Chemical composition, physical and mechanical properties of bone. The structure of the tubular bone: its parts. Features of bone structure in children, adolescents, adults, the elderly and senile age.

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

Bone as an organ. Classification of bones. Bone development in embryogenesis. General data on the skeleton. Bone development (in phylogeny and ontogenesis). Primary and secondary bones. Classification of bones. Bone as an organ. Compact and spongy bone substances, their structure. Chemical composition, physical and mechanical properties of bone. The structure of the tubular bone: its parts. Features of bone structure in children, adolescents, adults, the elderly and senile age.

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

**Theme. Vertebrae. General features, signs of vertebrae in different parts of vertebral column. Sacrum, coccyx. Anomalies.**

Skeletal bones: vertebrae, ribs, sternum. The principle of segmentation in the structure of the axial skeleton.

Brief data on phylogeny and ontogenesis of the spine. General characteristics of the spine. General plan of the structure of the vertebrae. Features of the structure of the cervical, thoracic, lumbar vertebrae, sacrum, coccyx. Age and sex features of the structure of the vertebrae. The influence of social and environmental factors on the structure of the vertebrae. Vertebral malformations.

**Theme. Ribs, sternum, clavicle, scapula.**

Development of ribs and sternum in phylogeny and ontogenesis. Classification of ribs. The structure of the ribs, sternum and scapula. Forms of variability of ribs and sternum, variants and anomalies of development. Age and sex features of the structure of the sternum. The influence of social and environmental factors on the structure of the ribs and sternum. Ribs, Sternum. Collarbone. Scapula, its structure and anomalies of development.

**Theme. Bones of shoulder and forearm: humerus, ulna, radius.**

Upper limb: its parts. Upper limb bones: divisions. Upper limb girdle: clavicle, scapula; their structure. Free part of the upper limb: humerus, forearm bones; their structure. Terms of ossification of the bones of the upper extremity. Development of bones of the upper extremity in ontogenesis. Variants and anomalies of the development of the humerus and forearm bones.

**Theme. Bones of the hand.**

Upper limb bones: divisions. Free part of the upper limb: humerus, forearm and hand bones, sesamoid bones; their structure. Homology of the bones of the upper extremity. Age, sex features of the structure of the bones of the hand. Specific features of the structure of the bones of the hand due to the processes of anthropogenesis. Influence of sports, work, social factors and environmental factors on the structure of the bones of the upper extremity.

***Theme. Hip bone, femur.***

Lower limb girdle: hip bone; its structure. Parts of the hip bone, their structure. Free part of the lower extremity: the femur, its structure. Terms of ossification of the bones of the lower extremity. Development of bones of the lower extremity in ontogenesis. Variants and anomalies of lower extremity bone development.

***Theme. Bones of the foreleg (shin) and foot.***

Free part of the lower extremity: shin bones, feet; their structure. Terms of ossification. Development in ontogenesis. Variants and anomalies of development.

Homology of the bones of the lower extremity. Specific features of the structure of the bones of the lower extremity due to the processes of anthropogenesis. The influence of sports, labor, social factors and environmental factors on the structure of the bones of the lower extremity.

***Theme. Bones of the skull: frontal, parietal, occipital.***

Skull development in phylogeny and ontogenesis. Cerebral and facial parts of the skull. The structure of the bones that make up the skull: frontal, occipital, parietal.

***Theme. Sphenoid and ethmoid bones.***

The structure of the bones that form the skull: wedge-shaped, lattice. The structure of the bones that form the skull: wedge-shaped, lattice.

***Theme. Temporal bone: structure, parts. Canals, tympanic cavity of temporal bone.***

The structure of the bones that make up the skull: the temporal bone. Its features of structure, development, parts. Channels and canals of the temporal bone. Drum cavity, its walls. Anomalies in the development of the temporal bone.

***Theme. Bones of facial skull.***

The structure of the bones that make up the facial skull: lower jaw, upper jaw, chin, nasal, palatine, lacrimal, sublingual bones, ploughshare, lower nasal concha.

***Theme. External, internal base of the skull. Skull as a whole.***

Vault of the skull, outer and inner bases of the skull. The skull as a whole. Age and sex features of the skull structure. Variants and anomalies of skull bone development. X-ray anatomy of the skull.

***Theme. Orbital fossa. Bone basis of nasal cavity. Bone palate. Malformations. Temporal, infratemporal, pterygo-palatine fossae, its connections, clinical significance.***

Anterior, middle and posterior cranial fossa, orbit, bony nasal cavity, temporal, subtemporal, pterygopalatine fossa. Age and gender. Variants and anomalies of development.

**Submodule 3. Syndesmology.**

***Specific goals:***

- Identify and analyze the types of connections between bones;
- Analyze the development of connections between bones in phylogenetic and ontogenesis;
- Describe and demonstrate the connections between the bones of the torso;
- Describe and demonstrate the connections between the skull bones;
- Describe and demonstrate the connection between the bones of the upper extremities;
- Describe and demonstrate the connection between the bones of the lower extremities.

***Theme. General syndesmology. Types of the connections. Classification of the articulations. Connections between vertebrae. Vertebral column as a whole.***

Development of connections between bones in phylogeny and ontogenesis. Classification of connections between bones. Types of synarthrosis: fibrous joints (syndesmoses) - membranes, ligaments, sutures, temples; cartilaginous joints (synchondrosis) permanent, temporary, hyaline, fibrous, symphysis. Diarthrosis (synovial joints, joints): definition, main features of the joint, their characteristics. Additional components of the joints. Classification of joints by structure, shape of joint surfaces, by function. Simple, complex, complex and combined joints: their characteristics. Types of movements and their analysis (axes of movements, planes of movements). Uniaxial, biaxial and multiaxial joints, their types, characteristics of movements in each type of joint. The spinal column as a whole. Age, sex features of the spine as a whole. The impact of sports, labor, social factors and environmental factors on the spine as a whole.

***Theme. Connections of vertebral column with the skull. Atlanto-occipital and atlanto-axial joints. Connections of the bones of the skull. Temporo-mandibular joint.***

Classification of spinal column connections. Syndesmoses of the spine: their characteristics and structure. Synchrondrosis of the spine: their characteristics and structure. Spinal joints: middle atlanto-axial joint, lateral atlanto-axial joint, arch-process joints, lumbosacral joint, sacrococcygeal joint: their structure. Skull connection: classification. Skull syndesmosis: sutures, their types and characteristics. Skull synchrondrosis: their types, characteristics, age features. Skull joints: temporomandibular joint and atlanto-occipital joint: their structure. Age features of the skull joint: temples, their types, structure, terms of ossification.

**Theme. Connections between ribs and vertebral column, ribs and sternum. Thorax. Connections of the bones of the girdle of upper extremity.**

Chest joints: syndesmoses, synchrondrosis and joints (rib-vertebral joints, rib-transverse joints, thoracic-rib joints): their characteristics and structure. 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.

Upper limb connection. Thoracic girdle joints: syndesmoses of the upper extremity girdle and upper extremity girdle joints (supraclavicular joint and sternoclavicular joint), their structure.

**Theme. Shoulder joint, elbow joint. Connections of the bones of forearm and hand.**

Upper limb connection. Syndesmosis of the upper extremity. Free upper limb joints: shoulder joint, elbow joint, forearm bone connection, radial wrist joint, wrist joints. X-ray anatomy of the joints of the bones of the upper extremities. Influence of sports, work, social factors and environmental factors on the structure of the joints of the upper extremities.

**Theme. Connections of the bones of pelvic girdle. Pelvis as a whole. Hip joint. Connections of the bones of pelvic girdle. Pelvis as a whole. Hip joint.**

Lower limb connection. Pelvic girdle joints: syndesmosis, pubic symphysis, sacroiliac joint. The pelvis as a whole: its structure, the basic sizes. Age, sex, individual features of the pelvis. Free lower limb joint: hip joint.

**Theme. Knee-joint. Connections of the bones of leg (shin) and foot.**

Free lower limb joints: knee joint, tibia, ankle joint, foot joints. The arch of the foot.

X-ray anatomy of the joints of the bones of the upper and lower extremities. Influence of sports, work, social factors and environmental factors on the structure of the joints of the lower extremities.

#### **Submodule 4. Myology.**

##### ***Specific goals:***

- Define and analyze the concept of "muscle as an organ";
- Analyze the classification of skeletal muscles by topography, development, structure, shape, etc.;
- Analyze the development of skeletal muscles in phylogenetic and ontogenesis;
- Describe and demonstrate the muscles and fascia of the torso;
- Describe and demonstrate the muscles and fascia of the head and neck;
- Describe and demonstrate the muscles and fascia of the upper extremities;
- Describe and demonstrate the muscles and fascia of the lower extremities.

**Theme. General myology. Muscles and fascias of the back. Topography. General myology. Muscles and fascias of the back. Topography.**

Muscle as an organ - definition. Tendons, aponeuroses. Auxiliary muscles: fascia, synovial vagina, synovial sacs, sesamoid bones, tendon arch, muscle block. Anatomical and physiological diameters of muscles: basic data on muscle strength and function; the concept of levers. Starting and attaching muscles: their functional characteristics. Muscle classification: by development, topography, shape, size, direction of muscle fibers, function, etc. Muscle development in phylogeny and ontogenesis.

Back muscles: superficial and deep, their characteristics. Thoracolumbar fascia.

**Theme. Muscles and fascias of the chest. Diaphragm.**

Classification of torso muscles by topography, development and shape. Segmental structure of torso muscles.

Chest muscles: superficial and deep, their characteristics. Thoracic fascia, intra-thoracic fascia.

Aperture - definition. Parts of the diaphragm, holes, their contents, triangles.

**Theme. Muscles and fascias of the abdomen. Vagina of rectus abdominis. Inguinal canal. White line of abdomen. Topography of the anterior wall of the abdominal cavity.**

Abdominal muscles: muscles of the anterior, lateral and posterior walls of the abdomen, their characteristics. Abdominal fascia. White line. Umbilical ring. Abdominal press. Topography of the abdomen. Inguinal canal. Vagina of the rectus abdominis muscle. Sources of torso muscle development.

**Theme. Muscles and fascias of the neck. Topography of the neck: triangles of the neck.**

Muscles of the head: classification. Chewing muscles, their characteristics. Fascia of the head.

Neck muscles: classification. Superficial, middle and deep neck muscles, their characteristics.

Fascia of the neck: anatomical classification and anatomical and topographic classification.

Topography of the neck: areas, triangles, spaces.

Sources of neck muscle development.

**Theme. Muscles and fascias of the head. Muscles of mastication, mimic muscles.**

Sources of head muscle development. Chewing and facial muscles. Biomechanics of movements.

Interfascial spaces of the head. Sources of head muscle development. Chewing and facial muscles.

Biomechanics of movements. Interfascial spaces of the head.

**Theme. Muscles and fasciae of the shoulder girdle. Axillary cavity. Muscles and fascias of the shoulder. Topography of the shoulder.**

Upper limb muscles: classification. Upper limb girdle muscles, their characteristics. Shoulder

muscles: classification, their characteristics. Axillary fossa, axillary cavity, its topography, triangles, quadrilateral and triangular openings. Shoulder-muscle canal. Furrows on the front surface of the shoulder.

**Theme. Muscles and fascias of the forearm and hand. Synovial sheaths..**

Forearm muscles: classification, their characteristics. Hand muscles: classification, their characteristics. Fascia of the upper limb.

Elbow fossa. Furrows on the front surface of the forearm. Bone-fibrous canals, flexor muscle holders, extensor muscle holders. Carpal tunnels, synovial sheaths of flexor tendons. Synovial bags.

**Theme. Muscles and fascias of the pelvic girdle. Muscles and fascias of the thigh. Femoral canal. Muscular and vascular lacunas.**

Lower limb muscles: classification. Lower limb girdle muscles: classification, their characteristics.

Thigh muscles: classification, their characteristics.

Muscular and vascular bays, their topography and contents. Femoral triangle. Furrows on the front surface of the thigh. Drive channel. Knee fossa.

Analysis of the basic positions and movements of the human body (standing, walking, running, jumping). Distinctive features of the structure of the human musculoskeletal system, acquired in connection with walking upright.

Age, sex and individual characteristics of skeletal muscles. Influence of sports, work, social factors and environmental factors on the structure of skeletal muscles, torso and limbs.

**Theme. Muscles of the leg (shin) and foot.**

Sources of lower extremity muscle development.

Tibial canals: tibial, popliteal, upper and lower tibial canals. Furrows of the sole of the foot. Subcutaneous solution.

Extension muscles holders, flexor muscles holders, tibialis muscle holders. Synovial sacs and synovial sheaths of the lower extremity muscles. Mechanisms that support the arch of the foot: tightening the foot, passive (ligaments) and active (muscles).

**Theme. Final module control on module 1 "The locomotor system".**

## **Module 2. Splanchnology. Central nervous system and sensory organs.**

### **Submodule 5. Anatomy of the digestive system**

#### **Specific goals:**

- To analyze the classification of internal organs;
- To determine the general plan of a structure of tubular bodies and to estimate the organ-specific features of a structure inherent in a tubular body caused by its function.
- To determine the general plan of the structure of parenchymal organs;

- To analyze the development of the digestive system in embryogenesis;
- To analyze anomalies and options for the development of the digestive system;
- To describe and demonstrate the structure of the digestive system;

**Topic. Introduction to splanchnology. Classification of internal organs. General regularities of the structure of tubular organs.**

General laws of structure of parenchymal organs.

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

**Topic. General anatomy of the digestive system. Embryogenesis of the digestive system. Anomalies and options for the development of the digestive system**

Digestive system: organs, functions. Development of the oral cavity and its derivatives. Development of the digestive tract. Development of the liver and pancreas. Primary and secondary body cavities. Sources of development of serous membranes. Peritoneal development. Structural mechanisms of malformations of the oral cavity and its derivatives. Anomalies and variants of development of the digestive tract, liver, pancreas.

**Topic. Anatomy of the oral cavity and its derivatives**

Oral cavity: its parts. The walls of the dorsum of the mouth and the oral cavity, their combination.

Teeth. Parts of the tooth. Crown surfaces. General structure of teeth. Periodontist, periodontist.

Gums. Permanent teeth: their formula, characteristics of each type of teeth. Terms of eruption of permanent teeth. Milk teeth: formula, structure features, terms of eruption. X-ray anatomy of teeth.

Bites. Tooth development. Anomalies and variants of tooth development.

Palate: hard palate, soft palate, their structure. Tonsils.

Language: parts. Features of the structure of the mucous membrane, the muscles of the tongue.

Oral glands: classification, their development. Small salivary glands: classification, topography, structure. Large salivary glands: topography, characteristics, structure, classification.

**Topic. Anatomy of the digestive tract.**

Pharynx, its topography, parts of the message. Zev, its borders. Lymphatic (lymphoid) ring of pharynx. The structure of the pharyngeal wall: mucosa, glodowo-main fascia, the muscles of the pharynx, the outer shell.

Esophagus: topography, parts, structure of wall. Narrowing of the esophagus. X-ray anatomy of the esophagus.

Stomach: topography, parts of the stomach. The structure of the stomach wall: the structural features of the mucosa (topography, gland), muscular membrane and serous membrane. X-ray and gastroscopy characteristics of the mucous membrane of the Relation of the stomach to the peritoneum. Ligaments of the stomach. Options forms of the stomach: anatomical (on the body) and x-ray (a living person). Form of the stomach in the body. Age features of topography and structure of the stomach.

Small intestine, its departments. Duodenum: parts, topography, variations of its shape and position.

X-ray anatomy of the duodenum. The topography of the mesenteric part of the small intestine: empty and ileum. The structure of the wall of the small intestine. The structure of the mucosa of the intestinal villi, glands, folds, lymphatic (lymphoid) nodules. The structural features of the mucosa of the small intestine in its various departments. The structure of the muscle membrane. Relationship to the peritoneum each section of the small intestine. Age features of the structure of the small intestine.

Colon: the departments. The structure of the wall of the large intestine: mucosa (glands, folds, lymphatic (lymphoid) nodules), muscularis, serosa. Relation to the peritoneum of each Department of the colon. Cecum and vermiform Appendix: topography, structure. Variants position of the Appendix and its projection on the anterior abdominal wall. Colon: parts, bends, their topography, peculiarities of the structure of mucous and muscular membranes. Relationship to the peritoneum.

Rectum: parts, bends, topography. Features of the topography of the rectum depending on the sex. Features of the structure of the mucous membrane and muscular tunic. Relationship to the peritoneum. VHDCI channel: topography, structure of the mucosa and muscle membranes. Muscle-contactors of the anus.

Macroscopic differences in structure of small and large intestine.

Age features of the structure of the colon.

X-ray anatomy of the colon. The shape and position of parts of the colon of a living person.

**Topic. Anatomy of large digestive glands: liver and pancreas**

Liver. Topography. External structure: edges, surfaces and their relief. Liver ligaments. Relation to the peritoneum. Internal structure of the liver: lobes, segments, lobes. Liver vessels. Liver function.

Ways of bile secretion. Gallbladder: topography, parts, wall structure, functions. Common bile duct: formation, topography.

Age features of topography and structure of the liver. Age features of the structure of the gallbladder.

Pancreas: parts, topography, structure, functions. Ducts of the pancreas. Pancreatic islets.

Age features of topography and structure of the pancreas.

**Topic. Peritoneal anatomy**

Peritoneum. Abdominal cavity, its contents. Peritoneal cavity, its contents. Parietal peritoneum, visceral peritoneum: their characteristics. Options for the relationship of internal organs to the peritoneum. Peritoneal derivatives: mesentery, caps, ligaments, their structure and functions. Derivatives of the peritoneal cavity: bags (liver, pancreas, omental - their walls, connections), sinuses, canals, nooks, pits, cavities, their function.

**Submodule 6. Anatomy of the respiratory system**

**Specific goals:**

- Analyze the development of the respiratory system in embryogenesis;
- Analyze anomalies and options for the development of the respiratory system;
- Describe and demonstrate the structure of the respiratory system;

**Topic. General anatomy of the respiratory system. Embryogenesis of the respiratory system**

Respiratory system: organs, functions. Upper and lower respiratory tract. Development of respiratory system organs in phylogeny and ontogenesis. Variants and anomalies of the development of the respiratory system.

**Topic. Anatomy of the respiratory system**

Outer nose: parts, structure. Nasal cavity: dorsum, nasal passages, paranasal sinuses. Functional parts of the nasal cavity. Nasal part of the pharynx. Age features of the nasal cavity.

Larynx. Topography. The structure of the larynx: cartilage, ligaments, joints, muscles. Elastic cone, quadrangular membrane. Laryngeal cavity: parts, their boundaries. Vocal folds, parietal folds. Glottis. Mechanisms of voice formation. X-ray anatomy of the larynx, laryngoscopy. Age features of the larynx.

Trachea: parts, topography, wall structure. Main bronchi: topography, wall structure. Bronchial tree. Age features of the trachea and main bronchi.

Lungs: topography, external structure. Gate of the lungs. Lung root and its components. Particles, segments, lobes of the lung. Acinus. The circulatory system of the lungs. X-ray anatomy of the trachea, bronchi, lungs. Age features of the lungs.

Pleura. Parietal pleura and its topographic parts. Internal pleura. Pleural cavity: contents, nooks, their functional value.

Projection of pleural sacs on the walls of the thoracic cavity.

The mediastinum: definitions, boundaries. Organs of the anterior mediastinum. Organs of the posterior mediastinum.

**Submodule 7. Anatomy of the urinary system**

**Specific goals:**

- Analyze the development of the urinary system in embryogenesis;
- Analyze anomalies and variants of development of the urinary system;

- Describe and demonstrate the structure of the urinary system.

**Topic. General anatomy of the urinary system. Embryogenesis of the urinary system. Anomalies and options for the development of the urinary system**

Urinary system: organs, functions. Development of urinary system organs in phylogeny and ontogenesis. Variants and anomalies in the development of the urinary system: kidneys, ureters, bladder and urethra.

**Topic. Anatomy of the urinary system.**

Kidney: topography of the right and left kidney. The external structure of the kidney. The ratio of the kidney to the peritoneum. Kidney shells. Fixing apparatus of the kidney. Topography of the elements of the renal peduncle. The internal structure of the kidney. Kidney segments. The nephron is a structural and functional unit of the kidney. The structure of the circulatory system of the kidney. Urinary tract. Small renal calyces, large renal calyces, renal pelvis, wall structure, functions. X-ray anatomy of the kidney. Age features of topography and structure of a kidney.

Ureter: parts, topography, wall structure, function. Relation to the peritoneum. Narrowing of the ureter.

Bladder: shape, external structure, parts. Features of topography in men and women. The structure of the bladder wall: features of the structure of the mucous membrane, the muscular membrane. Relation to the peritoneum (depending on the functional state).

Female urethra. Male urethra.

X-ray anatomy of the urinary tract (ureters, bladder, urethra). Age features of the bladder.

**Submodule 8. Anatomy of genital systems**

**Specific goals:**

- Analyze the development of the female reproductive system in embryogenesis;
- Analyze anomalies and options for the development of the female reproductive system;
- Analyze the development of the male reproductive system in embryogenesis;
- Analyze anomalies and options for the development of the male reproductive system;
- Describe and demonstrate the structure of internal and external female genitalia on drugs;
- Describe and demonstrate the structure of internal and external male genitalia on drugs.

**Topic. The General anatomy of the male reproductive system. Embryogenesis of organs of the male reproductive system. Variants and anomalies of development of organs of male reproductive system**

Male reproductive system: organs, function. Classification of the organs of the male reproductive system. Internal male sex organs. External male genitals. The development of the organs of the male reproductive system in phylo - and ontogenesis. Variants and anomalies of development of internal male genital organs: testis, nad ACCA, family avenoso duct, seminal vesicle, prostate. Variants and anomalies of development of external male genital organs. The hermaphroditism.

Theme. Anatomy organs of male reproductive system

Internal male sex organs. Egg: topography, structure. Nad ACCO. The process of lowering of testicle. The shell of the egg. VAS deferens duct: parts, their topography, structure wall. Spermatic cord, its component. Seminal vesicle: topography, structure, functions. Family aiportugal Strait. Prostate gland: topography, parts, structure, functions. Tsibulina-Secunia iron. Age features internal male genital organs.

External male genitals. Wicket. Penis, its structure. Male urethra: parts, their topography, structure wall.

**Topic. The General anatomy of the female reproductive system. Embryogenesis of the female reproductive organs. Variants and anomalies of development of organs of the female reproductive system**

Female reproductive system: organs, function. Classification of the female reproductive organs. The internal female genital organs. The external female genitals. The development of the organs of the female reproductive system in phylo - and ontogenesis. Variants and anomalies of development of internal female reproductive organs: ovaries, fallopian tubes, uterus, vagina. Variants and anomalies of development of the external female genitalia.

**Topic. Anatomy of the female reproductive system. Perineum.**

Internal female genitals. Ovary: topography, external structure, internal structure, ovarian ligaments, peritoneal relationship, function. Cyclic changes in the structure of the ovary. Age features of the ovary.

Uterine tube: topography, parts, wall structure, relation to the peritoneum, functions.

Uterus: topography, shape, parts, wall structure. Uterine ligaments, peritoneal relations, functions. Age features of the structure of the uterus and variants of its position.

Vagina: vault, wall structure.

X-ray anatomy of internal female genitals.

External female genitals. Female pubic area: pubic elevation, labia majora, labia minora, vaginal dorsum, dorsal bulb, large parietal glands, small parietal glands. Clitoris. Female urethra.

Perineum: definition, topography. Genitourinary diaphragm: borders, muscles, fascia, sexual intercourse. Pelvic diaphragm: borders, muscles, fascia. Buttock-vaginal fossa: boundaries, contents.

### **Submodule 9. Anatomy of the endocrine system**

#### ***Specific goals:***

- To determine the general patterns of structure and function of the endocrine system;
- To describe and demonstrate the structure of the endocrine system;

#### ***Topic. General anatomy of endocrine organs***

General principles of the structure of endocrine organs. Structural definition of "endocrine function". Structural mechanisms of realization of hormones action. Classification of endocrine organs.

Development of endocrine organs in embryogenesis. Features of functional activity of endocrine organs in the prenatal period of human ontogenesis. Options and defects in the development of endocrine organs.

#### ***Topic. Anatomy of the endocrine system***

Thyroid gland: topography, structure, functions.

Thyroid gland: topography, structure, functions.

Adrenal gland: structure, functions. Topography of the right and left adrenal glands.

Endocrine part of the pancreas: structure, functions.

Pituitary gland: topography, parts, structure, functions.

Pineal gland: topography, structure, functions.

### **Submodule 10. Anatomy of the spinal cord**

#### ***Specific goals:***

- Identify the general principles of structure and function of the CNS;
- Analyze the development of the CNS in phylogeny and ontogenesis;
- Analyze abnormalities and variants of development of the spinal cord and brain;
- Describe and demonstrate the external and internal structure of the spinal cord.

***Theme. Introduction to the CNS. General principles of structure of reflex arcs. Gray and white matter of the CNS. CNS development in onto- and phylogeny***

The role of the nervous system in the body; its importance for the integration of organs, organ systems into a single integral organism, in establishing the relationship of the organism with the external environment. Classification of the nervous system on the topographic principle (on the central nervous system and peripheral nervous system) and on the anatomical and functional principle (on the somatic nervous system and autonomic nervous system). General principle of neuron structure. Morphological and functional classification of neurons. Receptors, their classification. General plan of synapse structure. Reflex arcs. Gray matter of the CNS. Neuroglia. Principles of spatial organization of gray matter of the CNS. Nerve nodes. White matter of the CNS. Nerve fibers, nerve bundles, roots.

Stages of development of the nervous system in phylogeny. Development of the nervous system in ontogenesis. Development of the spinal cord in embryogenesis. Brain development in embryogenesis: stage three and five of the cerebral vesicles and their derivatives. Anomalies of spinal cord development. Anomalies of brain development\*

***Theme. External and internal structure of the spinal cord. The structure of the spinal nerve***

Topography of the spinal cord, its boundaries. External structure of the spinal cord (surfaces, furrows, cords, thickening). Segmental structure of the spinal cord. The relationship between the vertebrae and segments of the spinal cord (Shipo rule). 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 cords of the spinal cord. Own segmental apparatus of the spinal cord. Sensitive node of the spinal nerve. Anterior and posterior roots. The formation of the trunk of the spinal nerve. Age features of the structure of the spinal cord.

**Submodule 11. Anatomy of the brain**

***Specific goals:***

- Analyze the classification of parts of the brain according to anatomical principles and development;

- Describe and demonstrate the external and internal structure of the brain.

***Theme. Brain development in embryogenesis. Anatomy of diamond-shaped brain and midbrain derivatives***

Brain. Departments of the brain: cerebrum, cerebellum, brain stem. Classification of parts of the brain by development. Derivatives of the rhomboid brain: medulla oblongata and hindbrain (bridge and cerebellum).

Cerebellum: boundaries, external structure. Internal structure: gray and white matter.

Bridge: external structure. Internal structure: gray and white matter.

Cerebellum: topography, external structure. Internal structure: gray and white matter. The composition of the legs of the cerebellum.

Rhomboid fossa: formation, boundaries, relief. Projection of cranial nerve nuclei on the surface of a diamond-shaped fossa.

Fourth ventricle: walls, connections.

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

Legs of the brain, their parts, internal structure: gray and white matter. Brain water supply.

***Theme. Anatomy of forebrain derivatives***

Derivatives of the forebrain: diencephalon, terminal brain.

Diencephalon: parts (dorsal - thalamic brain; ventral part - hypothalamus). Parts of the thalamic brain: thalamus, epithalamus,

metathalamus. Thalamus: external structure. Internal structure: nuclei and their functions.

Epithalamus: parts. The pineal gland and its functions. Metalamus: parts and their functions.

Hypothalamus: its components. Pituitary. Hypothalamic nuclei, their functions. Hypothalamic-pituitary system. Third ventricle: walls, connections.

Ultimate brain: the cerebral hemispheres. Corpus callosum, vault, anterior adhesions. Olfactory brain: parts, their components. Basal ganglia: topography, parts, functions. Cloak. Cerebral cortex: cyto- and myeloarchitectonics of the cortex. Works by V.O. Betza. Relief of the cerebral hemispheres: furrows and gyri. Morphological bases of dynamic localization of functions in the cerebral cortex. White matter of hemispheres: classification. Associative fibers: classification, functions. Commissural fibers, their functions. Projection fibers: classification. Inner capsule: parts, topography of the leading paths in each part.

Lateral ventricles: parts, their topography, walls, connections.

Age features of the structure of the brain.

***Theme. Pathways of the central nervous system***

Pathways - definition. Anatomical and functional classification of the leading pathways of the central nervous system: associative pathways (short and long), commissural pathways, projection pathways (ascending and descending). Ascending (afferent) leading ways: exteroceptive, proprioceptive, interoceptive. Descending (efferent) conductive pathways: pyramidal, extrapyramidal, cortical-bridge. Pyramid motor system (centers, conductive paths). Extrapyramidal system (centers, conductive paths).

**Theme. The membranes of the spinal cord and brain. Formation and ways of circulation of cerebrospinal fluid.**

Spinal cord membranes. Interstitial spaces and their content. Meninges. Features of the structure of the dura mater of the brain. Outgrowths of the dura mater, their topography. The sinuses of the dura mater of the brain. Interstitial spaces of the brain and their contents. Formation and ways of circulation of cerebrospinal fluid.

**Submodule 12. Sensory organs**

***Specific goals:***

- Identify the general principles of structure and function of the senses;
- Analyze the development of the senses in phylogeny and ontogenesis;
- Analyze anomalies and options for the development of the senses;
- Describe and demonstrate the structure of the eyeball and additional structures of the eye;
- Describe and demonstrate the structure of the outer ear, middle ear and inner ear.

***Theme. Anatomy of sensory organs***

Anatomical and functional characteristics of the senses. Peripheral receivers, conductors and cortical centers of analyzers, their functional unity. The sense of smell. Olfactory part of the nasal mucosa. Pathways of the olfactory analyzer.

The organ of taste. Taste papillae of the tongue, their topography. Pathways of the taste analyzer. General cover. Skin: functions. Varieties of skin sensitivity. Mammary gland.

***Theme. Eye and structures of its formations.***

Philo- and ontogenesis of the eye. Anomalies and variants of eye development. Topography, structure, functions. Eyeball. The membranes of the eyeball: fibrous, vascular, internal (retina) - their structure. Cameras of the eyeball: anterior, posterior, their walls. Vitreous body, lens. Watery moisture: place of formation, ways of outflow. Accommodation apparatus of the eye. Additional structures of the eye: eyelids, eyebrows, conjunctiva, external muscles of the eyeball, fascia of the orbit. The lacrimal apparatus and its components. Pathways of the visual analyzer. Pathways of the pupillary reflex.

***Theme. Anatomy of the ear***

Ear. Philo- and ontogenesis. Anomalies of ear development. Parts of the ear: outer, middle and inner ear. Outer ear: parts, their structure. Middle ear: parts. Drum cavity: walls, contents. Auditory bones: their structure. Joints, ligaments, muscles of the auditory ossicles. Combination of the tympanic cavity. Auditory tube: parts, structure. Inner ear, parts, topography. Bone labyrinth: dorsum, semicircular canals, curl, their structure. Membrane labyrinth: parietal labyrinth, semicircular ducts, coiled duct, their structure. The mechanism of perception and ways of conducting sound. Pathways of hearing and balance.

***Module 3. Heart. Vessels and nerves of the head, neck, trunk and extremities.***

**Submodule 13. Anatomy of the heart**

***Specific goals:***

- Analyze the development of the heart in phylogeny and ontogenesis;
- Analyze abnormalities and variants of heart development;
- Describe and demonstrate the structure of the heart;
- Describe the large, small circle of blood circulation, blood circulation of the fetus.

**Theme. Anatomy of the heart. Large circle and small circle of blood circulation. Fetal circulation**

Topography of the heart. Shape, position of the heart. The external structure of the heart. Chambers of the heart: their structure. Heart valves. The structure of the heart wall: endocardium, myocardium, epicardium. Leading system of the heart. Arteries and veins of the heart. Core, its structure, pericardial cavity, contents, sinuses. Projection of the boundaries of the heart and valves on the anterior wall of the thoracic cavity. Age anatomy of the heart. Large circle and small circle of blood circulation. Fetal circulation.

**Theme. Development of the heart in embryogenesis. Anomalies and variants of heart development.**

Development of the heart in phylogeny. Stages of heart development in human embryogenesis. Variants and anomalies of heart development. Structural mechanisms of development of heart anomalies.

**Theme. Test control of the content module "Anatomy of the heart".**

**Submodule 14. Vessels of the head and neck.**

**Specific goals:**

- To determine the general principles of structure and function of the cardiovascular system.
- Describe and demonstrate the arterial vessels of the head and neck.
- Describe and demonstrate the veins of the head and neck.
- Identify lymph vessels and nodes of the head and neck.
- Analyze the sources of blood supply and innervation of the head and neck.

**Theme. Introduction to the cardiovascular system**

General principles of structure and function of the cardiovascular system. Components of the vascular part of the cardiovascular system: arteries, veins, vessels of the hemomicrocirculatory tract. Lymphatic vessels, principles of their structure, functions.

**Theme. Arterial vessels of the head and neck**

Aorta, parts of the aorta. The aortic arch and its branches. Common carotid artery: topography, branches. Features of the right and left common carotid artery. External carotid artery: topography, classification of branches. Branches of the external carotid artery: topography, areas of blood supply. Internal carotid artery: parts, their topography. Branches of the internal carotid artery: topography, areas of blood supply. Subclavian artery: parts, their topography. Features of the right and left subclavian artery. Branches of the subclavian artery: topography, areas of blood supply. Blood supply to the brain and spinal cord. Arterial circle of the brain. Intersystemic arterial anastomoses in the head and neck.

**Theme. Venous vessels of the head and neck**

Internal jugular vein: formation, topography, classification of tributaries. Intracranial tributaries, extracranial tributaries of the internal jugular vein.

Pterygoid plexus: topography, formation. 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. Shoulder-main vein: formation (roots), topography, tributaries. Upper vena cava: formation (roots), topography, tributaries.

**Theme. Anatomy of lymphatic trunks and lymphatic ducts.**

Thoracic duct: roots, topography, tributaries, place of confluence with the venous system. Right lymphatic duct: roots, topography, place of confluence with the venous system.

**Theme. Anatomy of lymphatic vessels and nodes of the head and neck**

Jugular trunks: formation, topography, areas of lymph collection, confluence with the lymphatic ducts.

Lymph nodes of the head: classification, topography, areas of lymph collection, lymph outflow tract.

Lymph nodes of the neck: classification, topography, areas of lymph collection, lymph outflow tract.

**Theme. Vascularization of the head and neck.**

Vascularization (arterial blood supply, venous and lymphatic outflow) and innervation of the head and neck: oral mucosa, soft palate, tongue, upper and lower teeth, pharynx, palatine tonsils, parotid gland, pituitary gland, inferior mucous membranes of the nasal cavity, pharynx, larynx, thyroid gland, eyeball, lacrimal gland, external muscles of the eyeball, outer ear, middle ear, inner ear, cerebellum, brain stem, solid olons of the brain, masticatory muscles, facial muscles (facial) muscles, neck muscles, facial skin, temporomandibular joint.

**Theme. Test control of the content module "Vessels of the head and neck" Practical skills in the anatomy of the heart, vessels of the head and neck**

**Submodule 15 «Nerves of the head and neck»**

**Specific goals:**

- Analyze the classification of cranial nerves.
- To determine the general principles of the structure of cranial nerves, different in origin.
- Analyze the general structure of the autonomic nodes of the head.
- Describe and demonstrate the structure of I-XII pairs of cranial nerves.
- Analyze the sources of innervation of the head and neck.

**Theme. Classification of cranial nerves. General anatomy of the autonomic nodes of the head**

General characteristics of cranial nerves. Common features and differences in the structure of the cranial and spinal nerves. Classification of cranial nerves by function (motor, sensory, mixed). Classification of cranial nerves by origin. Development of cranial nerves in connection with the sense organs (I, II, VIII pairs), myotomes of the main somites (III, IV, VI, XII pairs), with gill arches (V, VII, IX, X, XI pairs). Differences in the structure of cranial nerves derived from the brain (I, II pairs) from the rest of the cranial nerves. General plan of the structure of motor, sensory and mixed cranial nerves. General plan of the structure of the vegetative nodes of the head: roots and branches.

**Theme. Anatomy of I-XII pairs of cranial nerves.**

Anatomy of cranial nerves: nuclei, their localization, nerve exit from the brain, from 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, nerve exit from the brain, from the skull, branches, the composition of their fibers, areas of innervation, connection with the autonomic node of the head (ciliary node). V pair of cranial nerves: intracranial part - nucleus, trigeminal node, sensory and motor roots. V-pair branches: fiber composition, exit from the skull, areas of innervation, connections with the vegetative nodes of the head. VII pair and intermediate nerve: nuclei, topography, branches, composition of their fibers, areas of innervation. Connections of the branches of the intermediate nerve with the vegetative nodes of the head (pterygopalatine, mandibular, sublingual). Anatomy of pair VIII: parts, sensitive nodes, topography. IX pair: nuclei, nerve exit from the brain, from the skull, branches, the composition of their fibers, areas of innervation, the connection with the autonomic node of the head (ear node). X pair: nuclei, sensitive nodes, nerve output from the brain, skull, branches, 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 nodes of the head (pterygopalatine, ciliary, mandibular, sublingual, auricular): their roots and branches, areas of innervation.

**Theme. Innervation of the head and neck.**

Innervation of the head and neck: mucous membranes of the mouth, soft palate, tongue, upper and lower teeth, pharynx, tonsils, parotid gland, mandibular gland, sublingual gland, nasal mucosa, pharynx, pharynx, goiter, eyeball, lacrimal gland, outer muscles of the eyeball, outer ear, middle ear, inner ear, cerebellum, brain stem, dura mater, masticatory muscles, facial muscles (facial) m' muscles, muscles neck, skin, face, temporomandibular joint.

**Theme. Test control of the content module "Nerves of the head and neck"**

**Theme. Practical skills in the anatomy of the cranial nerves and vessels of the head and neck.**

**Final control on module 4 «The heart. Vessels and nerves of a head, neck»**

## **Submodule 16. Arteries and veins of the trunk and extremities.**

### **Specific goals:**

- To determine the general principles of structure and function of arterial vessels;
- Analyze the sources and mechanism of arterial development in embryogenesis;
- Analyze anomalies and options for the development of arterial vessels;
- Describe and demonstrate the structure of the arteries of the thoracic cavity, abdominal cavity and pelvic cavity;
- To determine the general principles of structure and function of venous vessels;
- Analyze the sources and mechanism of venous development in embryogenesis;
- To analyze anomalies and variants of development of venous vessels;
- Describe and demonstrate the structure of the veins of the torso;
- Analyze the sources of blood supply to the skin, muscles and joints of the upper extremity;
- Analyze the sources of blood supply to the skin, muscles and joints of the lower extremity;
- Describe and demonstrate the vessels of the upper extremities;
- Describe and demonstrate the vessels of the lower extremities;
- To determine the general principles of structure and function of lymphatic vessels;
- Analyze the sources of blood supply to the organs of the thoracic cavity, abdominal cavity and pelvic cavity.

### **Theme. General anatomy of arterial vessels**

Anatomical classification of arteries (cardiac, main, extraorgan, intraorgan). Classification of arteries by wall structure. Types of arterial branching. Basic patterns of distribution of arteries in the human body. Arterial intersystem and intrasystem anastomoses. Sources and mechanisms of arterial development. Arterial arches and their derivatives. Variants and anomalies of development of main arteries. Works by MA Tikhomirov. Vessels of a hemomicrocirculatory channel, structure of their wall and function. Sources and mechanisms of formation of vessels of a hemomicrocirculatory channel. Works of the Department of Normal Anatomy of Bogomolets National Medical University. Organ-specific vessels of the hemomicrocirculatory tract. The concept of collateral (bypass) blood flow. Age features of arteries.

X-ray anatomy of arteries.

### **Theme. Arteries of the thoracic cavity, abdominal cavity and pelvic cavity**

The aorta, its parts. Thoracic aorta: topography, classification of branches. Branches of the thoracic aorta and areas of their blood supply. Internal thoracic artery (branch of the subclavian artery): topography, branches, areas of blood supply. Intrasystemic and intersystemic arterial anastomoses.

Abdominal aorta: topography, classification of branches. Parietal branches of the abdominal aorta: topography, areas of blood supply. The visceral branches of the abdominal aorta: even and odd. Paired visceral branches of the abdominal aorta: topography and areas of blood supply. Unpaired visceral branches of the abdominal aorta: topography and areas of blood supply. Intrasystemic arterial anastomoses between branches of an abdominal aorta.

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

### **Theme. General anatomy of venous vessels. Body veins. Intrasystemic and intersystemic venous anastomoses**

Anatomical classification of veins (cardiac, main, extraorganic, intraorganic). Classification of veins by wall structure. Roots and tributaries of veins. Superficial veins, deep veins. Venous networks, venous plexuses. Sources and mechanisms of development of main veins. Variants and anomalies of development of main veins. Works by MA Tikhomirov. Age features of veins. X-ray anatomy of veins.

Upper vena cava: roots, tributaries, topography.

Odd vein: formation, topography, classification of tributaries, areas of venous blood collection.

Paired vein: formation, topography, classification of tributaries, areas of venous blood collection. Spinal veins.

Lower vena cava: roots, topography, classification of tributaries. Parietal and visceral tributaries of the inferior vena cava, areas of venous blood collection.

Portal hepatic vein: roots, topography, tributaries. The superior mesenteric vein: topography, tributaries, areas of venous blood collection. Inferior mesenteric vein: topography, tributaries, areas of venous blood collection. Spleen vein: topography, tributaries, areas of venous blood collection. Branching of the portal hepatic vein in the liver.

Common iliac vein: roots, topography. Internal iliac vein: topography, tributaries. Venous plexuses of the pelvic organs.

Venous intrasystem anastomoses. Venous intersystem anastomoses: coffee-caval anastomoses, porto-caval anastomoses and porto-coffee-caval anastomoses.

**Theme. Vascularization of organs and walls of the thoracic cavity, abdominal cavity and pelvic cavity**

Innervation of the walls and organs of the thoracic cavity: anterior, posterior and lateral walls of the thoracic cavity, diaphragm, trachea, bronchi, lungs, pleura, heart, heart, esophagus.

Innervation of the walls and organs of the abdominal cavity: anterior, posterior and lateral walls of the abdominal cavity, spinal cord, liver, gallbladder, stomach, small intestine (duodenum, cavity and ileum), colon, pancreas, kidneys, adrenal glands

Innervation of the walls and organs of the pelvic cavity: walls of the pelvis, perineum, ureters, bladder, urethra, ovaries, uterus, fallopian tubes, vagina, external female genitals, testicles, vas deferens, seminal vesicle, prostate external male genitalia.

**Theme. Vessels of the upper extremity.** Arteries of the upper extremity. 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. Elbow artery: topography, branches, areas of blood supply. Elbow joint network: sources of formation. Posterior carpal tunnel: topography, sources of formation, branches, areas of blood supply. Palmar carpal network: 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 extremity. Projections of the arteries of the upper extremity on the skin.

Upper limb veins: classification. Superficial and deep veins of the upper extremity: their characteristics, patterns of topography and structure. Axillary vein: topography, tributaries

**Theme. Vessels of the lower extremity.**

Arteries of the lower extremity. External iliac artery: topography, branches, areas of blood supply. Femoral artery: topography, branches, areas of blood supply. Knee 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. Articular knee network: sources of formation. Lateral bone network: topography, sources of formation, areas of blood supply. Medial bone network: 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 extremity. Projection of the arteries of the lower extremity on the skin.

Lower limb veins: classification. Superficial and deep veins of the lower extremity: their characteristics, patterns of topography and structure.

**Theme. General anatomy of lymphatic vessels**

Classification of lymphatic vessels. Lymphatic capillaries: wall structure and function. Lymphatic postcapillaries: wall structure and functions. Lymphatic vessels (intraorgan and extraorgan): 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. Development of lymphatic vessels in embryogenesis. Variants and anomalies of lymphatic duct development. Works of the Kyiv Anatomical School. Age features of the structure of lymphatic vessels.

Lymph nodes. Chest lymph nodes: classification. Ways of lymph outflow from the lungs, heart, esophagus. Abdominal lymph nodes: classification. Pelvic lymph nodes. Lymphatic vessels and

regional lymph nodes of the stomach, small intestine, colon, liver, kidneys, uterus, ovaries. Superficial and deep lymphatic vessels of the upper extremity. Lymph nodes of the upper extremity: classification. Ways of lymph outflow from the breast. Superficial and deep lymphatic vessels of the lower extremity. Lymph nodes of the lower extremity: classification.

### **Submodule 17. Innervation of the trunk and extremities.**

#### ***Specific goals:***

- *To determine the general principles of structure and function of the peripheral nervous system;*
- *Describe and demonstrate the structure of somatic nerve plexuses;*
- *Analyze the sources of innervation of the skin, muscles and joints of the upper extremity;*
- *Analyze the sources of innervation of the skin, muscles and joints of the lower extremity.*
- *To determine the general principles of structure and function of the autonomic part of the peripheral nervous system (autonomic nervous system);*
- *Analyze the sources of blood supply and innervation of the thoracic cavity, abdominal cavity and pelvic cavity.*

#### ***Theme. Introduction to the peripheral nervous system. Spinal nerves. General plan for the formation of somatic nerve plexuses***

Components of the peripheral nervous system: nerves, nerve nodes, nerve plexuses, nerve endings. General plan of nerve structure. Vascular and nervous bundles. Classification of nerves. Segmentality of peripheral nerve distribution. Nerve nodes: classification. General plan of the structure of sensitive nodes. Spinal nerve: formation, fiber composition, branches; compliance with segments of the spinal cord. Posterior branches of spinal nerves: fiber composition, topography, general patterns of innervation. Posterior branches of the cervical, thoracic, lumbar, sacral and coccygeal nerves. Anterior branches of spinal nerves: fiber composition. General patterns of formation of somatic nerve plexuses. General patterns of anatomy of the anterior branches of the thoracic nerves. Connection of spinal nerves with autonomic nervous system.

#### ***Theme. Somatic nerve plexuses: cervical, shoulder, lumbar, sacral, coccygeal. Thoracic nerves.***

Cervical plexus: sources of formation, topography, branches, areas of innervation.

Shoulder plexus: sources of formation, topography. Trunks of the humeral plexus. Classification of branches. Supraclavicular part: short branches of the humeral plexus, their topography and areas of innervation. Subclavian part: bundles of the brachial plexus. Long branches of the humeral plexus: formation, topography, areas of innervation. Projection of long branches of the humeral plexus on the skin. Topographic and anatomical relationships between nerves and blood vessels of the upper extremities. Lumbar plexus: sources of formation, topography, branches, areas of innervation. Sacral plexus: sources of formation, topography, classification of branches. Short branches of the sacral plexus: topography, areas of innervation. Long branches of the sacral plexus: topography, areas of innervation. Coccygeal plexus: sources of formation, topography, branches, areas of innervation.

Thoracic nerves: branches. Intercostal nerves: topography, fiber composition, branches, areas of innervation.

#### ***Theme. Vascularization and innervation of organs and walls of the thoracic cavity, abdominal cavity and pelvic cavity***

Vascularization (arterial blood supply, venous and lymphatic outflow) and innervation of the walls and organs of the thoracic cavity: anterior, posterior and lateral walls of the thoracic cavity, diaphragm, trachea, bronchi, lungs, pleura, heart, core, esophagus.

Vascularization (arterial blood supply, venous and lymphatic outflow) and innervation of the walls and organs of the abdominal cavity: anterior, posterior and lateral walls of the abdominal cavity, spinal cord, liver, gallbladder, stomach, small intestine (duodenum, rectum and pelvis), pancreas, kidneys, adrenal glands, spleen

Vascularization (arterial blood supply, venous and lymphatic outflow) and innervation of the walls and organs of the pelvic cavity: pelvic walls, perineum, ureters, bladder, urethra, ovaries, uterus, fallopian tubes, vagina, external genitalia, ulnar duct, seminal vesicle, prostate, external male genitalia.

**Theme. Innervation of the upper and lower extremities. Innervation of the back muscles.**

Vascularization (arterial blood supply and venous outflow) and innervation of the joints of the upper extremity: the joints of the girdle of the upper extremity, the shoulder joint, the elbow joint, the radial wrist joint.

Vascularization (arterial blood supply, venous and lymphatic outflow) and innervation of the muscles of the upper extremity: shoulder girdle muscles, shoulder muscles, forearm muscles, hand muscles.

Vascularization (arterial blood supply and venous outflow) and innervation of the joints of the lower extremity: hip, knee, ankle.

Vascularization (arterial blood supply, venous and lymphatic outflow) and innervation of the skin and muscles of the lower extremity: pelvic muscles, thigh muscles, shin muscles, foot muscles.

Vascularization (arterial blood supply, venous and lymphatic outflow) and innervation of the muscles of the back, chest and abdomen.

**Theme. Anatomy of the autonomic part of the peripheral nervous system**

General patterns of structure and function of the autonomic 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 and parasympathetic parts of the autonomic nervous system: morphological, functional differences, objects of innervation. Centers of the autonomic nervous system in the brain and spinal cord. Peripheral department of the autonomic nervous system: autonomic nodes, nerves, autonomic plexuses. Classification of vegetative nodes, their topography, prenodal and nodal nerve fibers.

Sympathetic part of the autonomic nervous system. Centers in the spinal cord. Sympathetic trunk: topography, classification of nodes, internodal branches. White and gray connecting branches: formation, topography. Branches of cervical nodes of the sympathetic trunk, their topography and areas of innervation. Sympathetic roots of the vegetative nodes of the head. Branches of thoracic nodes of the sympathetic trunk, their topography, areas of innervation. Branches of lumbar nodes of the sympathetic trunk, their topography, areas of innervation. Branches of sacral nodes of the sympathetic trunk, their topography, areas of innervation.

Cranial-cervical part of the visceral plexuses: general carotid plexus, inner carotid plexus, outer carotid plexus, subclavian plexus - their formation, areas of innervation.

Thoracic part of the visceral plexuses: thoracic aortic plexus, cardiac plexus, esophageal plexus, pulmonary plexus - their formation, areas of innervation.

Abdominal part of the visceral plexuses: abdominal aortic plexus: its secondary plexuses, their topography and nodes, areas of innervation. Sources of formation, the composition of the fibers of the abdominal aortic plexus.

Pelvic part of the visceral plexuses: upper hypogastric plexus, peritoneal nerve, lower hypogastric plexus. Lower hypogastric plexus: its secondary plexuses, their topography, areas of innervation. Sources of formation, the composition of the fibers of the lower hypogastric plexus.

**THEMATIC PLAN OF LECTURES**

<b>The 1<sup>st</sup> semester</b>		
<b>№</b>	<b>Theme</b>	<b>Amount of hours</b>
<b>Module 1. The locomotor system.</b>		
1	Introduction to anatomy. Kyiv Anatomical School. The initial stages of human embryogenesis. The doctrine of embryonic sheets.	2
2	General osteology.	2
3	General arthrology.	2
4	General myology.	2
<b>Module 2. Splanchnology. Central nervous system and sensory organs.</b>		

5	Introduction to splanchnology. Anatomy of the oral cavity.	2
6	General anatomy of the digestive system.	2
	<b>Total</b>	<b>12</b>
<b>The 2<sup>nd</sup> semester</b>		
1	General anatomy of the respiratory system.	2
2	General anatomy of the urinary system.	2
3	General anatomy of female and male genital systems.	2
4	General anatomy of the organs of the endocrine system.	2
5	General anatomy of the organs of the immune system.	2
6	Anatomy of front brain derivatives.	2
7	Sensity organs.	2
8	Anatomy of the cranial nerves.	2
	<b>Module 3. Heart. Vessels and nerves of the head, neck, trunk and extremities.</b>	
9	Introduction to the cardiovascular system. Heart anatomy.	2
10	General anatomy of blood vessels.	2
11	General anatomy of organs of the immune system.	2
12	General anatomy of lymphatic vessels.	2
13	General anatomy of the peripheral nervous system.	2
14	Anatomy of the autonomic part of the peripheral nervous system.	2
	<b>Total</b>	<b>28</b>

### THEMATIC PLAN OF PRACTICAL CLASSES

<b>The 1<sup>st</sup> semester</b>		
№	Theme	Amount of hours
<b>Module 1“The locomotor system”.</b>		
<b>Submodule “Osteology”</b>		
1.	Anatomic nomenclature and terminology. Axes and planes of the human body.	2
2.	Vertebrae. General features, signs of vertebrae in different parts of vertebral column. Sacrum, coccyx. Anomalies.	2
3.	Ribs, sternum, clavicle, scapula.	2
4.	Bones of shoulder and forearm: humerus, ulna, radius.	2
5.	Bones of the hand.	2
6.	Hip bone, femur.	2
7.	Bones of the foreleg (shin) and foot.	2
8.	Bones of the skull: frontal, parietal, occipital.	2
9.	Sphenoid and ethmoid bones.	2
10.	Temporal bone: structure, parts. Canals, tympanic cavity of temporal bone.	2
11.	Bones of facial skull.	2
12.	External, internal base of the skull. Skull as a whole.	2
13.	Orbital fossa. Bone basis of nasal cavity. Bone palate. Malformations. Temporal, infratemporal, pterygo-palatine fossae, its connections, clinical significance.	2
14.	Control on submodule “Osteology”.	2

	<b><i>Submodule "Syndesmology"</i></b>	
15.	General syndesmology. Types of the connections. Classification of the articulations. Connections between vertebrae. Vertebral column as a whole.	2
16.	Connections of vertebral column with the skull. Atlanto-occipital and atlanto-axial joints. Connections of the bones of the skull. Temporomandibular joint.	2
17.	Connections between ribs and vertebral column, ribs and sternum. Thorax. Connections of the bones of the girdle of upper extremity.	2
18.	Shoulder joint, elbow joint. Connections of the bones of forearm and hand.	2
19.	Connections of the bones of pelvic girdle. Pelvis as a whole. Hip joint.	2
20.	Knee-joint. Connections of the bones of leg (shin) and foot.	2
21.	Control on submodule "Syndesmology".	2
	<b><i>Submodule "Myology"</i></b>	
22.	General myology. Muscles and fascias of the back. Topography.	2
23.	Muscles and fascias of the chest. Diaphragm.	2
24.	Muscles and fascias of the abdomen. Vagina of rectus abdominis. Inguinal canal. White line of abdomen. Topography of the anterior wall of the abdominal cavity.	2
25.	Muscles and fascias of the neck. Topography of the neck: triangles of the neck.	2
26.	Muscles and fascias of the head. Muscles of mastication, mimic muscles.	2
27.	Muscles and fasciae of the shoulder girdle. Axillar cavity. Muscles and fascias of the shoulder. Topography of the shoulder.	2
28.	Muscles and fascias of the forearm and hand. Synovial sheaths.	2
29.	Muscles and fascias of the pelvic girdle. Muscles and fascias of the thigh. Femoral canal. Muscular and vascular lacunas.	2
30.	Muscles of the leg (shin) and foot.	2
	<b>Module 2. Splanchnology. Central nervous system and sensory organs.</b>	
	<b><i>Submodule "Anatomy of the digestive system"</i></b>	
31.	Oral cavity. Palate.	2
32.	Tongue. Salivary glands.	2
33.	Teeth.	2
34.	Pharynx. Esophagus. Stomach.	2
35.	Small intestine.	2
36.	Large intestine.	2
37.	Liver. Pancreas.	2
38.	Peritoneum.	2
39.	Diff.credit	2
	<b>Total</b>	<b>78</b>
	<b>The 2<sup>nd</sup> semester</b>	
	<b><i>Submodule "Anatomy of the respiratory system"</i></b>	
1.	Nose. Larynx.	2
2.	Trachea, bronchi, lungs.	2
3.	Pleura. Mediastinum. The review of the serous membranous of the inner organs.	2
	<b><i>Submodule "Anatomy of the urinary system"</i></b>	

4.	Kidney: external structure, the topography.	2
5.	Internal structure of the kidney. The segments of the kidney. Malformations.	2
6.	Ureters, urinary bladder. Male and female urethrae. X-ray anatomy of the urine voiding organs.	2
	<b><i>Submodule "Anatomy of the reproductive systems".</i></b>	
7.	Internal male genital organs. External male genital organs. Malformations.	2
8.	Female genital organs. Malformations. Perineum.	2
	<b><i>Submodule "Anatomy of the endocrine system".</i></b>	
9.	The general principle of the structure of the endocrine glands. Central part of the endocrine system. The pineal gland. The pituitary gland.	2
10.	Peripheral part of endocrine system (the thyroid gland, the parathyroid gland, the pancreatic islets, the suprarenal gland, the endocrine part of gonads).	2
11.	Final control on module 2	2
	<b><i>Submodule "Anatomy of the spinal cord".</i></b>	
12.	Introduction in nervous system. Basic principles of the structure of the reflex arc. White and grey matters of the central nervous system. Development of the central nervous system. External structure of the spinal cord. Meninges and blood vessels of the spinal cord.	2
13.	Internal structure of spinal cord. White and grey matters of the spinal cord.	2
	<b><i>Submodule "Anatomy of the brain".</i></b>	
14.	Medulla oblongata, pons. Cerebellum. The isthmus of the rhombencephalon.	2
15.	The fourth ventricle, the rhomboid fossa. Midbrain.	2
16.	Diencephalon, the third ventricle. External structure of cerebral hemispheres.	2
17.	The rhinencephalon. Limbic brain. The basal nuclei.	2
18.	Structure of grey matter and cortex of cerebral hemispheres. Functional arrangement of the cerebral cortex.	2
19.	The lateral ventricles. The white matter of the cerebral hemispheres. The meninges of the brain. Circulation of cerebrospinal liquid.	2
	<b><i>Submodule "Anatomy of sensory organs".</i></b>	
20.	General esthesiology. Visual analyzer. Eyeball: layers, chambers, refracting medias.	2
21.	Accessory structures of visual analyzer. Nervous pathway of visual analyzer.	2
22.	General characteristic of organ for hearing. External and middle ears. Bones of middle ear, tympanic cavity, its walls.	2
23.	Internal ear. Periotic and otic labyrinths. The eights pair of cranial nervous.	2
24.	Olphactory and taste analyzers. Nervous pathways of taste and smell.	2
25.	The integumentary system. Derivates of the skin. Mammary gland.	2
26.	Afferent nervous pathways of cortical direction. Medial lemniscus. Afferent nervous pathways of cerebellar direction.	2
27.	Efferent pyramidal nervous pathways. Efferent extrapyramidal nervous pathways.	2
28.	Final control on module 2	2

	<b>Module 3. «Heart. Vessels and nerves of the head, neck, trunk and extremities».</b>	
	<b><i>Submodule “The heart.”</i></b>	
29.	Anatomy of the heart: external structure, the cardiac chambers, wall structure of the heart.	2
30.	Anatomy of the heart: vessels and nerves of the heart, the conducting system of the heart.	2
31.	Circles of blood circulation. The pericardium. Topography of the heart.	2
	<b><i>Submodule “Vessels of the head, the neck”</i></b>	
32.	The aorta. The branches of aortic arch. The common carotid artery. The internal carotid artery.	2
33.	The external carotid artery. The subclavian artery. The axillary artery.	2
34.	Blood supply of the brain and spinal cord. Anastomoses. Clinical aspects.	2
35.	General characteristic of venous system. System of vena cava superior. Veins of head and neck.	2
36.	Lymphatic vessels and nodes of the head and neck.	2
	<b><i>Submodule “Nerves of the head, the neck»</i></b>	
37.	Cranial nerves. The origination, the general features, the featured nuclei, the point of arise, the escape point, the related branches and the responsibility areas of the oculomotor, trochlear and abducent nerves.	2
38.	The origination, the general features, the featured nuclei, the point of arise, the escape point, the related branches and the responsibility areas of the trigeminal nerve. Nervous pathway of the trigeminal nerve.	2
39.	The facial nerve. The intermediate nerve. The origination, the general features, the featured nuclei, the point of arise, the escape point, the related branches and the responsibility areas.	2
40.	The glossopharyngeal nerve. The related branches and the responsibility areas.	2
41.	The vagus nerve. The origination, the general features, the featured nuclei, the point of arise, the escape point, the related branches and the responsibility areas. The vagus nerve. The origination, the general features, the featured nuclei, the point of arise, the escape point, the related branches and the responsibility areas.	2
42.	The accessory, hypoglossal nerves. The related branches and the responsibility areas.	2
	<b><i>Submodule “Arteries and veins of the trunk and extremities”.</i></b>	
43.	Arteries of upper extremity. Thoracic aorta. Parietal and paired visceral branches of abdominal aorta.	2
44.	Unpaired visceral branches of abdominal aorta.	2
45.	Iliac arteries. Arteries of the thigh.	2
46.	Arteries of a lower extremity.	2
47.	System of vena cava superior. System of vena cava inferior. Veins of lower extremities, pelvis and abdominal cavity. System of portal vein.	2

<i>Submodule "Innervation of the trunk and extremities".</i>		
48.	General characteristics of the peripheral nervous system. The spinal nerves. The posterior rami of the spinal nerves. The anterior rami of the spinal nerves. The cervical plexus. The brachial plexus.	2
49.	The intercostal nerves. The lumbar plexus. The sacro-coccygeal plexus.	2
50.	Autonomic innervation of organs. Autonomic ganglions of pelvis, abdomen.	2
51.	Final control on module №3	2
<b>Total</b>		<b>102</b>

### THEMATIC PLAN OF INDEPENDENT WORK OF STUDENTS

<b>The 1<sup>st</sup> semester</b>		
№	Theme	Amount of hours
<b>Module 1 "The locomotor system".</b>		
1.	The main stages of the development of anatomy in ancient times, in the Renaissance, in the XVII - XIX centuries.	3
2.	Development of Ukrainian Anatomical Schools.	3
3.	Anatomic nomenclature and terminology. Axes and planes of the human body.	3
4.	Anatomy of bones of the trunk.	3
5.	Anatomy of skull bones.	3
6.	Anatomy of bones of upper and lower extremities.	3
7.	X-ray, CT, MRI scan analysis of skeletal bones.	3
8.	Anatomy of continuous and discontinuous bone joints. Development of connections between bones in ontogenesis.	3
9.	Connections between bones of the trunk and between the bones of the skull.	3
10.	Connections between bones of upper and lower extremities.	3
11.	Analysis of X-rays, CT, MRI connections of upper limb bones.	3
12.	X-ray, CT, MRI analysis of lower limb bone joints.	3
13.	Development of the muscle. Auxiliary apparatus of the muscle. Features of the synovial vagina of the limb muscles.	3
14.	Anatomy of muscles and fasciae of the body.	2
15.	Anatomy of muscles and fasciae of the head and neck. Topography of the neck.	2
16.	Anatomy of muscles and fasciae of upper and lower extremities. Topography of upper and lower extremities.	2
<b>Total</b>		<b>45</b>
<b>The 2<sup>nd</sup> semester</b>		
<b>Module 2. Splanchnology. Central nervous system and sensory organs.</b>		
<i>Submodule. Anatomy of the digestive system.</i>		
1.	Anatomy of the oral cavity and its derivatives	2
2.	Anatomy of digestive organs	2
3.	Anatomy of large digestive glands: liver and pancreas	2

4.	Anatomy of the peritoneum. Development of the abdominal cavity and peritoneum (derivatives of ventral and dorsal mesenteries). The peritoneum – topography, derivatives, relation to organs. Cavities and peritoneum recesses.	2
5.	CT analysis, MRI of digestive system organs.	2
	<i>Submodule. Anatomy of the respiratory system.</i>	
6.	Anatomy of respiratory system organs.	2
7.	CT analysis, MRI of the respiratory system	2
	<i>Submodule. Anatomy of the urinary system.</i>	
8.	Review of organs of urinary apparatus. Development of the urinary system.	1
9.	Anatomy of the urinary system organs.	1
	<i>Submodule. Anatomy of the genital systems.</i>	
10.	Development of genital organs.	1
11.	Anatomy of the male reproductive system organs.	2
12.	Development, anatomy, topography and function of genital glands.	1
13.	Anatomy of the female genital organs. Perineum. The structure, topography and function of the external female genital organs.	2
14.	CT, MRI of the organs of the small pelvis.	1
	<i>Submodule. Anatomy of organs of immune and endocrine systems.</i>	
15.	Classification, anatomy, function of endocrine glands.	1
	<i>Submodule. Anatomy of spinal cord.</i>	
16.	Introduction in the central nervous system. General principles of the structure of reflex arches. Gray and white matter of the central nervous system. Development of the central nervous system in onto- and phylogeny.	2
17.	External and internal structure of the spinal cord. The structure of the spinal nerve.	1
18.	CT, MRI of the spinal cord	1
	<i>Submodule. Anatomy of brain.</i>	
19.	Development of the brain in embryogenesis. Anatomy of the derivatives of the rhomboid brain and the middle brain.	2
20.	Anatomy of the meninges of the brain. Formation and ways of the circulation of cerebrospinal liquid.	1
21.	CT, MRI of the brain.	2
	<i>Submodule. Sensory organs.</i>	
22.	Visual analyzer. Eyeball: layers, chambers, refracting medias.	1
23.	Accessory structures of visual analyzer. Nervous pathway of the visual analyzer.	2
24.	Anatomy of the ear.	1
25.	Nervous pathway of the taste and smell. Skin, its derivatives.	2
26.	Skin, its derivatives. Mammary gland. Nervous pathways of the skin sensitivity.	1
27.	Projection pathways of the brain and spinal cord (afferent and efferent).	2
	<b>Module 3. «Heart. Vessels and nerves of the head, neck, trunk and extremities».</b>	
	<i>Submodule. Heart anatomy.</i>	
28.	Introduction to the cardiovascular system. Anatomy of the heart. Systemic and pulmonary blood circulations. Fetal circulation.	1
29.	Development of the heart in embryogenesis. Anomalies and variants of heart development.	2

30.	CT analysis, MRI of the heart.	1
	<b><i>Submodule. Vessels of the head and neck.</i></b>	
31.	Distributional regularities of arteries for P.F. Lesgaft.	2
32.	Arterial vessels of the head and neck. Arteries of the orbital cavity, nasal cavity and mouth. Anastomosis between the external and internal carotid arteries.	2
33.	Arteries and veins of the cranial cavity. Anastomosis between the internal carotid and subclavian arteries.	2
34.	Venous vessels of the head and neck. Formation of internal, external and jugular veins.	2
	<b><i>Submodule. Cranial and spinal nerves.</i></b>	
35.	Classification of cranial nerves. General anatomy of vegetative nodes of the head. Anatomy of the I-XII pairs of cranial nerves.	2
36.	Parasympathetic innervation of the organs of the head and neck.	2
37.	Sympathetic innervation of the organs of the head and neck.	2
38.	Arteries of the thoracic cavity, abdominal cavity and pelvic cavity.	2
39.	General anatomy of venous vessels. Veins of the trunk. Intrasystem and intersystem venous anastomosis.	2
40.	Vessels of the upper limb. Anastomoses of the upper limb vessels.	2
41.	Vessels of the lower limb. Anastomoses of the lower limb vessels.	2
42.	Topography of major vessels of extremities.	2
43.	Anatomy of the immune system organs.	2
44.	Lymph nodes of the chest, abdominal cavity and small pelvis.	2
45.	Status of «thymico-lymphatic drainage», clinical aspects.	2
46.	Formation of the spinal nerve. Posterior branches of the spinal nerves.	2
47.	Somatic nerve plexuses: cervical, brachial, lumbar, sacral, coccygeal. Thoracic nerves.	2
48.	Innervation of the upper extremity muscles.	2
49.	Innervation of the lower limb muscles.	2
50.	Parasympathetic innervation of the organs of the chest cavity, abdominal cavity, pelvic cavity.	2
51.	Sympathetic innervation of the thoracic cavity, abdominal cavity, pelvic cavity.	2
	<b>Total</b>	<b>65</b>
	<b>Total for the course</b>	<b>110</b>

**THE LIST OF THEORETICAL QUESTIONS FOR PREPARATION OF STUDENTS FOR THE FINAL MODULAR CONTROL.**

1. Subject, object and content of anatomy, modern directions and methods of research.
2. The early stages of human embryogenesis. The doctrine of embryonic layers.
3. Short information about the history of anatomy (Hippocrates, Galen, Vesalius, Garvey, Malpighiy, etc.).
4. The bones of the cranium, their development. The cranial bones of a newborn child.
5. The bones of the facial skull.
6. Cranial base and calvaria. Foramens in skull. Joints of skull bones.
7. Orbita, its connection and structure. Vessels and nerves that pass through the superior orbital fissura and the optic canal.

8. The nasal cavity, its walls. Additional nasal cavities, connection with the nasal cavity.
9. The temporal and infratemporal fossa, their borders and contents.
10. The pterygopalatine fossa, its borders, connection and structure.
11. Classification of joints.
12. The structure of the joint. Classification of joints based by the form of articulating surfaces and by the function.
13. Temporomandibular joint, its shape. The structure of the muscle that acts on it. Blood supply of the joint.
14. The vertebral column: its structure, connections, movements. The muscles that provide movements.
15. The thorax, structure of the joints of the ribs with vertebrae and the sternum.
16. The development and the structure of the skeleton of the upper limb. Abnormalities of the development of the upper limb.
17. Joints of the shoulder bones. The muscles that act on them. Blood supply of the shoulder joint.
18. Elbow joint and joints of the forearm bones. Muscles that provide movements in the elbow joint, its innervation and blood supply.
19. The wrist joint, its structure, shape, movements. The muscles that perform these movements. Blood supply and innervation of the joint.
20. Hand, its bones, joints, muscles.
21. Development and structure of the skeleton of the lower limb.
22. The pelvic bones, their joints. The sizes of the female pelvis.
23. The hip joint, structure, shape, movements, muscles that perform them. Innervation and blood supply of the joint.
24. Knee joint, structure, shape, movements, muscles that perform them. Innervation and blood supply of the joint.
25. Bones of the leg and the foot, their joints and muscles.
26. The foot bones, joints, muscles that act on them. Arches of foot.
27. General anatomy of the muscles. Classification, structure of the muscles as an organ. Development of skeletal muscles.
28. Muscles of the back. Topographical and embryological classification. The superficial muscles of the back, their characteristic, innervation and blood supply.
29. Muscles of the back. Topographical and embryological classification. Deep muscles of the back, characteristic, innervation and blood supply.
30. Muscles of the thorax. Classification, characteristic, innervation and blood supply.
31. Respiratory muscles. Diaphragm: structure, innervation and blood supply.
32. Abdominal muscles: classification, characteristic, innervation and blood supply. The vagina of rectus muscle of the abdomen.
33. The inguinal canal, its walls, the deep and superficial ring, the contents of the inguinal canal.
34. Muscles and neck, fascia, classification. Superficial muscles of the neck, muscles of the hyoid bone: characteristic, innervation and blood supply.
35. Muscles and neck, fascia, classification. Deep neck muscles: characteristic, innervation and blood supply. Topography of the neck.
36. Masticating muscles: development, characteristics, innervation and blood supply.
37. Facial muscles: development, characteristics, innervation and blood supply. The difference between facial muscles from other skeletal muscles.
38. Muscles of the shoulder girdle: characteristics, innervation and blood supply.
39. Shoulder muscles: characteristics, innervation and blood supply.
40. Axillary fossa and cavity, its walls, triangles, openings and contents.
41. Muscles of the forearm: their group characteristics, innervation and blood supply.
42. Muscles of hand: characteristics, innervation and blood supply. Bone-fibrous canals, synovial vagina.
43. Pelvic muscles: group, characteristics, innervation and blood supply.

44. Muscles and fascia of the thigh: their characteristics, innervation and blood supply. Adductor canal.
45. Muscular and vascular lacuna. Femoral canal.
46. Muscles and fascia of the leg: their characteristics, innervation and blood supply.
47. Muscles and fascia of the foot: their characteristics, innervation and blood supply.
48. The oral cavity. The walls, palate, their structure, innervation and blood supply.
49. Teeth: parts, substance, formula. Terms of teeth protrusion. Innervation and blood supply.
50. Tongue: development, function, structure, innervation and blood supply.
51. Salivary glands. Classification. Parotid gland, topography, structure, excretory duct, innervation and blood supply.
52. Sublingual and submandibular salivary glands, topography, structure, excretory ducts, innervation and blood supply.
53. Pharynx: topography, parts, structure, lymphoepithelial ring, innervation and blood supply.
54. Esophagus: its topography, parts, structure, innervation and blood supply.
55. Stomach: development, topography, parts, structure, relation to the peritoneum, ligaments, innervation and blood supply.
56. Small intestine: departments, their topography, structure, perineum relation, innervation and blood supply.
57. Duodenum: development, topography, parts, structure, position within the peritoneum, innervation and blood supply.
58. Colon: their topography, parts, structure, position within the peritoneum, innervation and blood supply.
59. Caecum and appendix: their topography, structure, innervation and blood supply.
60. Rectum: topography, parts, structure, innervation and blood supply.
61. Development of the alimentary tract. General structure of the digestive system, characteristic of the layers of the oesophagus, stomach, intestine.
62. Liver, its development, structure, topography, gallbladder. Bile tracts, innervation and blood supply of the liver.
63. Pancreas: development, structure, topography, innervation and blood supply.
64. Peritoneum: development, anatomic structure, layers, ligaments, mesenteries.
65. The peritoneal bags. The lesser omentum, its layers and connections.
66. The nose. Nasal cavity, its development, structure, innervation and blood supply.
67. Larynx: cartilages, connections, muscles, their functions, innervation and blood supply.
68. Laryngeal cavity: parts and their walls.
69. Trachea and bronchi: development, topography, structure, innervation and blood supply.
70. Lungs: development, structure, topography, innervation and blood supply.
71. Lobes, segments, lobules, acinus of the lungs, innervation and blood supply.
72. Lungs: bronchial tree and alveolar structures, functions of the lungs.
73. The root of the lungs, its structures, topography.
74. Pleura: development, layers, recessus, topography.
75. Mediastinum: borders and regions. Organs of the anterior mediastinum.
76. Mediastinum: borders and regions. Organs of the posterior mediastinum, their topography.
77. Classification of the glands of internal secretion. Suprarenal glands: topography, structure, innervation and blood supply.
78. Branchiogenic glands of internal secretion: thyroid, parathyroid and thymus, their development, topography, structure, functions, innervation and blood supply.
79. Organs of haemopoiesis, classifications. Spleen: development, anatomic structure, topography, innervation and blood supply.
80. Kidneys: development, structure, topography, innervation and blood supply.
81. Ureter, urinary bladder: development, structure, topography, innervation and blood supply.
82. Male and female urethra: development, structure, topography, innervation and blood supply.
83. Testicles, epididymis. Descending of testicles into the scrotum. Abnormalities of the testicles position, spermatic cord, its parts, topography.

84. Layers of the testicle. Scrotum: its development and structure.
85. Seminal vesicles, the prostate gland, bulbo-urethral glands, their position relating to urethra.
86. Male genitalia: development, structure, abnormalities of the development.
87. Ovary: topography, structure, relation to peritoneum, innervation, blood supply.
88. Uterus: development, structure, parts, topography, relation to peritoneum, innervation, blood supply.
89. Uterine tube: development, parts, structure, relation to peritoneum, innervation, blood supply.
90. Female external genitalia: development, structure. Mammary gland: structure, innervation, blood supply.
91. Perineum: definition, female and male perineal muscles and fasciae, innervation, blood supply.
92. Heart: development, external structure. The structure of the right atrium.
93. Heart: topography, projection of its borders on the front thoracic wall. The structure of the left atrium.
94. Heart: arteries and veins.
95. Heart: structure of wall, myocardium of atria and ventricles. Conducting system of the heart.
96. Heart valves: topography, structure.
97. Heart chambers and vessels, which are related to them. The innervation of the heart.
98. Pericardium: parts, topography, structure.
99. Aorta: parts, their topography. Aortic arch and its branches.
100. Aorta: its parts. Abdominal aorta and its branches.
101. The common carotid artery. The internal carotid artery. Topography, branches. The blood supply of the brain and spinal cord.
102. The external carotid artery: its topography, branches, areas of blood supply.
103. Subclavian artery: its topography, branches, areas of blood supply.
104. Pulmonary circulation.
105. Larger ring of blood circulation.
106. Blood circulation of the fetus.
107. Axillary and brachial arteries: topography, branches, areas of blood supply.
108. The arteries of forearm and hand: topography, branches, areas of blood supply.
109. Arterial plexus of the elbow and wrist joints.
110. Common iliac artery. Internal iliac artery: areas of blood supply.
111. Femoral artery. Popliteal artery: topography, branches, areas of blood supply.
112. Blood supply and innervation of the knee and ankle joints.
113. Calf arteries, topography, branches, regions of their blood supply.
114. Foot arteries, topography, branches, regions of their blood supply.
115. General anatomy of blood vessels. Extraorganic and intraorganic vessels, microcirculation.
116. Microcirculation. Characteristic of links.
117. Superior vena cava, formation, topography, tributaries. Azygos and hemiazygos veins.
118. Internal jugular vein, topography, tributaries.
119. External and anterior jugular veins. topography, tributaries.
120. Inferior vena cava, formation, topography, tributaries.
121. Cava-caval anastomosis.
122. Portal vein, formation, topography, tributaries.
123. Pelvic veins, porto-caval anastomosis.
124. Veins of limbs, general characteristics.
125. Lymphatic system. General characteristic, links, and their characteristics.
126. Thoracic duct, roots, the place where it drains into the circulatory system.
127. Lymphatic nodes and vessels of head and neck.
128. Spinal cord. Functions and morphology of gray matter.
129. Spinal cord. Topography of tracts on the transverse section of spinal cord.
130. Spinal cord. Development, external view, topography, meninges of spinal cord.
131. Development of central nervous system (brain vesicles and their derivatives). Main stages of nervous system development.

132. Medulla oblongata. Development, structure, connections.
133. Cerebellum. Structure, connections, blood supply.
134. Rhomboid fossa, limits, topography, projection of cranial nerves nuclei.
135. IV ventricle, walls and connections, cerebellar peduncles.
136. Pons. Development, structure, connections.
137. Mesencephalon. Development, structure, connections.
138. Brainstem, parts, characteristics of cranial nerves nuclei of brainstem.
139. Medial lemniscus, formation, composition of fibers, location on the transverse section.
140. Diencephalon. Development, parts, III ventricle.
141. Hypothalamic region: departments, connection with the pituitary gland.
142. III ventricle. Walls, connection.
143. White matter of the cerebral hemisphere. Internal capsule. Topography, parts and pathways of it.
144. Olfactory brain. The I pair of cranial nerves. The ascending ways of the olfactory analyzer.
145. Lateral ventricles of the brain. Parts, their position. choroid plexus, connection with the third ventricle.
146. Subcortical nuclei of the cerebral hemispheres.
147. Layers of the brain. Sinuses of dura mater of the brain.
148. Relief of the dorso-lateral surface of the cerebral hemispheres. Localization of nuclei of analyzers in the cortex of the frontal lobe.
149. Relief of the dorso-lateral surface of the cerebral hemispheres. Localization of nuclei analyzers in the cortex of the parietal lobe.
150. Relief of the medial surface of the cerebral hemispheres. Localization of nuclei of analyzers in this area of the hemispheres.
151. Relief of the inferior surface of the cerebral hemispheres. The structure of the cortex of the cerebral hemisphere.
152. Ascending pathways: proprioceptive pathways of cerebellar direction.
153. Ascending pathways: proprioceptive pathways of the cortical direction (Goll, Burdach).
154. Ascending pathways of touch and pressure.
155. Ascending pathways of pain and temperature sensitivity.
156. Descending pathways. Classification. Corticospinal pathways (pyramidal).
157. Extrapyramidal system. Descending pathways of the extrapyramidal system.
158. External ear, its parts, structure. Tympanic membrane.
159. Anatomy of the middle ear: the walls of the tympanic cavity. Auditory bones, auditory tube.
160. The inner ear: bony and membranous labyrinths.
161. Spiral organ. Ascending pathways of the auditory analyzer.
162. Organ of vision. Eye, layers. The mechanism of accommodation.
163. Refracting eye environment: cornea, liquid chambers of the eye, lens, vitreous body.
164. Retina of the eye, its structure and development. Ascending pathways of the visual analyzer.
165. Additional organs of the eye: their innervation, blood supply.
166. The optic nerve. Ascending pathways of the visual analyzer.
167. The concept of the neuron. Nerve fibers, bundles, roots, nodes, simple and compound reflex arches.
168. Spinal nerve: formation and its branches.
169. Cervical plexus: formation, topography, branches, regions of innervation.
170. Thoracic nerves: topography, branches, regions of innervation.
171. Brachial plexus: formation, topography, short branches, regions of innervation.
172. Brachial plexus: formation, topography, long branches, regions of innervation.
173. Lumbar plexus: formation, topography, branches, regions of innervation.
174. Sacral plexus: formation, topography, short branches, regions of innervation.
175. Sacral plexus: formation. Topography, long branches regions of innervation.
176. Dorsal branches of the spinal nerves, their characteristics and regions of innervation.
177. Cranial nerves: III, IV, VI pairs, formation, topography, branches, regions of innervation.

178. Cranial nerves: V pairs. Intracranial part, I branch. Formation, topography, branches, regions of innervation.
179. Cranial nerves: V pair - II branch, formation, topography, branches, regions of innervation.
180. Cranial nerves: V pair - III branch, formation, topography, branches, regions of innervation.
181. Cranial nerves: VII pair, formation, topography, branches, regions of innervation.
182. Cranial nerves: VIII pair, formation, topography, branches, regions of innervation.
183. Cranial nerves: IX and XI pairs, formation, topography, branches, regions of innervation.
184. Cranial nerves: X pair, formation, topography, branches, regions of innervation.
185. Cranial nerves: XII pairs, formation, topography, branches, regions of innervation.
186. General scheme of structure and functions of the vegetative nervous system. Central and peripheral divisions, pre- and post-ganglionic fibers, vegetative nodes, nerves, plexuses.
187. Vegetative nodes of the head: topography, roots, branches.
188. Cervical part of the sympathetic trunk: topography, nodes, branches.
189. Thoracic part of the sympathetic trunk: topography, nodes, branches.
190. Abdominal aortic plexus: topography, formation, structure, branches.
191. Lumbar and sacral parts of the sympathetic trunk.
192. Vegetative nerve plexus of the abdominal cavity.
193. Upper and lower hypogastric plexuses. formation, structure, branches.

## 6. Course evaluation system

### General course evaluation system

**Current control** is performed based on the control of theoretical knowledge, skills and abilities in practical classes. Independent study students are assessed in practical classes, and is an integral part of the final grade of the student. Current control is performed during the training sessions and aims at checking the assimilation of students learning the material. Forms of current control are:

- a) test tasks with a choice of one correct answer, with the definition of the correct sequence of actions, with determination of the conformity, defining the specific portion of the photo or diagram ("detection");
- b) individual oral questioning, interview;
- c) the solution of typical situational tasks;
- g) identification of pathogens and carriers of pathogens of parasitic diseases in the photographs, macro - and micropreparats;
- d) control of practical skills;
- e) the typical problems of genetics and medical genetics.

Grades on the national scale ("excellent" - 5, "good" - 4, "satisfactory" - 3, "unsatisfactory" - 2), received by students, are displayed in the journals of attendance and academic group performance.

#### **Final control**

The final control is the form of a differentiated credit at the end of the 1st semester and an exam at the end of the 2nd semester upon completion of the course of medical biology.

The semester exam is a form of final control of mastering by the student of theoretical and practical material on

academic discipline. The final control (exam) is carried out at the last control lesson.

Students are admitted to the FC who have attended all the classes provided by the curriculum in the discipline and while studying the module scored the number of points not less than the minimum (**72 points**). A student who, for good or bad reasons, has missed classes, is allowed to rework academic debt for a certain period of time.

**Evaluation of current educational activities.** During the assessment of mastering each topic for the current educational activity of the student scores are set on a 4-point (national) assessment scale. This takes into account all types of work provided by the discipline program. The student must receive a score on each topic. Scores on the traditional scale are converted into points. The final assessment of the current academic activity is the arithmetic mean (the sum of scores for each lesson is divided by the number of lessons per semester) and translated into points according to **Table 2**.

**Table 2. Conversion of the average score for the current activity into a multi-point scale (for disciplines completed by diff.credit, exam)**

4-point scale	120-point scale	4-point scale	120-point scale	4-point scale	120-point scale	4-point scale	120-point scale
5	120	4,45	107	3,91	94	3,37	81
4,95	119	4,41	106	3,87	93	3,33	80
4,91	118	4,37	105	3,83	92	3,29	79
4,87	117	4,33	104	3,79	91	3,25	78
4,83	116	4,29	103	3,74	90	3,2	77
4,79	115	4,25	102	3,7	89	3,16	76
4,75	114	4,2	101	3,66	88	3,12	75
4,7	113	4,16	100	3,62	87	3,08	74
4,66	112	4,12	99	3,58	86	3,04	73
4,62	111	4,08	98	3,54	85	3	72
4,58	110	4,04	97	3,49	84	<3	Not enough
4,54	109	3,99	96	3,45	83		
4,5	108	3,95	95	3,41	82		

*The maximum number of points that a student can collect for current educational activity during semester in order to be admitted to the exam is 120 points.*

*The minimum number of points that a student can collect for current educational activity during semester in order to be admitted to the exam is 72 points.*

Calculating of the number of points is based on obtained marks of student according to traditional scale while learning subject during the semester, by calculating the arithmetic mean (AM) that is rounded to two signs after comma.

**Evaluation of independent work of students.** Independent work of students, which is provided by the

topic of the lesson together with the classroom work, is evaluated during the current control of the topic in the relevant lesson. Assimilation of topics that are submitted only for independent work is checked during the final module control.

**Evaluation of final control.**

The maximum number of points that a student can score during the exam is **80 points**.

The final control is considered credited if the student scored at least 60% of the maximum amount of points (for a 200-point scale - at least **50 points**).

**Determining the number of points that a student scored in the discipline:** the number of points that a student scored in the discipline is defined as the sum of points for the current academic activity (Table 1) and for the final control (diff.credit, exam) (Table 3).

**Table 3. Scale of assessment of differentiated (exam) credit:**

Traditional scale	Points
«5»	70-80
«4»	60-69
«3»	50-59

Requirements for written work The final written work is performed in the form of a test.

Practical classes Classroom work

**The 1st semester**

**Module 1 "The locomotor system".**

Topics 1-13: Classroom work - score from 2 to 5 for each topic.

Topic 14: Control on submodule "Osteology". Test control. Written test control consists of 40 tasks. Evaluation criteria

Score	«3»	«4»	«5»
Number of correct answers	20-29	30-34	35-40

Topics 15-20: Classroom work - score from 2 to 5 for each topic.

Topic 21: Control on submodule "Syndesmology". Test control. Written test control consists of 40 tasks. Evaluation criteria

Score	«3»	«4»	«5»
Number of correct answers	20-29	30-34	35-40

Topics 22-29: Classroom work - score from 2 to 5 for each topic.

Topic 30: Control on submodule "Myology". Test control. Written test control consists of 40 tasks. Evaluation criteria

Score	«3»	«4»	«5»
Number of correct answers	20-29	30-34	35-40

**Module 2. Splanchnology. Central nervous system and sensory organs.**

Topics 31-38: Classroom work - score from 2 to 5 for each topic.

Topic 39: Differentiated credit (semester control) Semester control at the end of the 1st semester is provided in the form of Differentiated credit. (Table 2) Provides a final grade on a 120-point scale as the sum of grades for the current control of knowledge (oral examination, written survey, Practical work, abstracts), the results of 4 content modules.

Semester control includes control of theoretical and practical training.

Semester control is evaluated from 50 to 80 points and consists of:

Test control - 40 tests = 40 points (1 point for the correct answer to 1 test).

Answer to 2 theoretical questions of 20 points for each = 40 points. Amount: 80.

Scale of assessment of differentiated (exam) credit:

Traditional scale	Points
«5»	70-80
«4»	60-69
«3»	50-59

*The 2<sup>nd</sup> semester*

Topics 1-27:

Classroom work - score from 2 to 5 for each topic.

Topic 28: Final module control 2 is evaluated from 50 to 80 points and consists of:

Test control - 40 tests = 40 points (1 point for the correct answer to 1 test).

Answer to 2 theoretical questions of 20 points for each = 40 points. Amount: 80.

Scale of assessment of differentiated (exam) credit:

Traditional scale	Points
«5»	70-80
«4»	60-69
«3»	50-59

**Module 3. «Heart. Vessels and nerves of the head, neck, trunk and extremities».**

Topics 29-50:

Classroom work - score from 2 to 5 for each topic.

Topic 51: Final module control 3 is evaluated from 50 to 80 points and consists of:

Test control - 40 tests = 40 points (1 point for the correct answer to 1 test).

Answer to 2 theoretical questions of 20 points for each = 40 points. Amount: 80.

Scale of assessment of differentiated (exam) credit:

Traditional scale	Points
«5»	70-80
«4»	60-69
«3»	50-59

**At the end of the course there is an exam.**

*The structure of the examination card:*

1. Theoretical question
2. Theoretical question
3. Theoretical question
4. Situational task

**THE CRITERIA FOR EVALUATION  
PRACTICAL SKILLS AND THEORETICAL QUESTIONS**

Number of Situational task	«5»	«4»	«3»	The answer a card to the practical skills	For each answer to the practical skill student receives from 10 to 16 points:
1	16	13	10		«5» - 16 points; «4» - 13 points; «3» - 10 points.
Number of Theoretical question	«5»	«4»	«3»	Oral answer the card on theoretical questions	For each answer to the practical skill student receives from 10 to 16 points:
1	16	13	10		«5» - 16 points; «4» - 13 points; «3» - 10 points.

2	16	13	10
3	16	13	10
<b>The sum of points</b>	<b>80</b>	<b>65</b>	<b>50</b>

Students who have completed all types of work provided by the curriculum and scored the number of points for current success not less than the minimum (72) are admitted to the exam.

The total grade for the module and the discipline consists of a total grade for the activities in the current control and the final control of student knowledge. Current activity is estimated from 72 to 120 points. Thus, the minimum number of points per module should be:  $72 + 50 = 122$  points. Maximum number:  $120 + 80 = 200$  points.

**Rating scale:**

National scale	Points scale
«5»	70-80
«4»	60-69
«3»	50-59

### THE LIST OF EXAM QUESTIONS

1. Subject, object and content of anatomy, modern directions and methods of research.
2. The early stages of human embryogenesis. The doctrine of embryonic layers.
3. Short information about the history of anatomy (Hippocrates, Galen, Vesalius, Garvey, Malpighi, etc).
4. The bones of the cranium, their development. The cranial bones of a newborn child.
5. The bones of the facial skull.
6. Cranial base and calvaria. Foramina in skull. Joints of skull bones.
7. Orbita, its connection and structure. Vessels and nerves that pass through the superior orbital fissure and canal.
8. The nasal cavity, its walls. Additional nasal cavities, connection with the nasal cavity.
9. The temporal and infratemporal fossa, their borders and contents.
10. The pterygopalatine fossa, its borders, connection and structure.
11. Classification of joints.
12. The structure of the joint. Classification of joints based by the form of articulating surfaces and by the type of movement.
13. Temporomandibular joint, its shape. The structure of the muscle that acts on it. Blood supply of the joint.
14. The vertebral column: its structure, connections, movements. The muscles that provide movements.
15. The thorax, structure of the joints of the ribs with vertebrae and the sternum.
16. The development and the structure of the skeleton of the upper limb. Abnormalities of the development of the upper limb.
17. Joints of the shoulder bones. The muscles that act on them. Blood supply of the shoulder joint.
18. Elbow joint and joints of the forearm bones. Muscles that provide movements in the elbow joint, its innervation and blood supply.
19. The wrist joint, its structure, shape, movements. The muscles that perform these movements. Blood supply and innervation of the joint.
20. Hand, its bones, joints, muscles.
21. Development and structure of the skeleton of the lower limb.
22. The pelvic bones, their joints. The sizes of the female pelvis.
23. The hip joint, structure, shape, movements, muscles that perform them. Innervation and blood supply of the joint.
24. Knee joint, structure, shape, movements, muscles that perform them. Innervation and blood supply of the joint.
25. Bones of the leg and the foot, their joints and muscles.
26. The foot bones, joints, muscles that act on them. Arches of foot.
27. General anatomy of the muscles. Classification, structure of the muscles as an organ. Development of the muscles.
28. Muscles of the back. Topographical and embryological classification. The superficial muscles of the back. Their innervation and blood supply.

29. Muscles of the back. Topographical and embryological classification. Deep muscles of the back, their innervation and blood supply.
30. Muscles of the thorax. Classification, characteristic, innervation and blood supply.
31. Respiratory muscles. Diaphragm: structure, innervation and blood supply.
32. Abdominal muscles: classification, characteristic, innervation and blood supply. The vagina of rectus abdominis.
33. The inguinal canal, its walls, the deep and superficial ring, the contents of the inguinal canal.
34. Muscles and neck, fascia, classification. Superficial muscles of the neck, muscles of the hyoid bone: characteristic, innervation and blood supply.
35. Muscles and neck, fascia, classification. Deep neck muscles: characteristic, innervation and blood supply. Topography of the neck.
36. Masticating muscles: development, characteristics, innervation and blood supply.
37. Facial muscles: development, characteristics, innervation and blood supply. The difference between facial muscles from other skeletal muscles.
38. Muscles of the shoulder girdle: characteristics, innervation and blood supply.
39. Shoulder muscles: characteristics, innervation and blood supply.
40. Axillary fossa and cavity, its walls, triangles, openings and contents.
41. Muscles of the forearm: their group characteristics, innervation and blood supply.
42. Muscles of hand: characteristics, innervation and blood supply. Bone-fibrous canals, synovial vagina.
43. Pelvic muscles: group, characteristics, innervation and blood supply.
44. Muscles and fascia of the thigh: their characteristics, innervation and blood supply. Adductor canal.
45. Muscular and vascular lacuna. Femoral canal.
46. Muscles and fascia of the leg: their characteristics, innervation and blood supply.
47. Muscles and fascia of the foot: their characteristics, innervation and blood supply.
48. The oral cavity. The walls, palate, their structure, innervation and blood supply.
49. Teeth: parts, substance, formula. Terms of teeth protrusion. Innervation and blood supply.
50. Tongue: development, function, structure, innervation and blood supply.
51. Salivary glands. Classification. Parotid gland, topography, structure, excretory duct, innervation and blood supply.
52. Sublingual and submandibular salivary glands, topography, structure, excretory ducts, innervation and blood supply.
53. Pharynx: topography, parts, structure, lymphoepithelial ring, innervation and blood supply.
54. Esophagus: its topography, parts, structure, innervation and blood supply.
55. Stomach: development, topography, parts, structure, relation to the peritoneum, ligaments, innervation and blood supply.
56. Small intestine: departments, their topography, structure, peritoneum relation, innervation and blood supply.
57. Duodenum: development, topography, parts, structure, position within the peritoneum, innervation and blood supply.
58. Colon: their topography, parts, structure, position within the peritoneum, innervation and blood supply.
59. Caecum and appendix: their topography, structure, innervation and blood supply.
60. Rectum: topography, parts, structure, innervation and blood supply.
61. Development of the alimentary tract. General structure of the digestive system, characteristic of the large intestine, oesophagus, stomach, intestine.
62. Liver, its development, structure, topography, gallbladder. Bile tracts, innervation and blood supply.
63. Pancreas: development, structure, topography, innervation and blood supply.
64. Peritoneum: development, anatomic structure, layers, ligaments, mesenteries.
65. The peritoneal bags. The lesser omentum, its layers and connections.
66. The nose. Nasal cavity, its development, structure, innervation and blood supply.
67. Larynx: cartilages, connections, muscles, their functions, innervation and blood supply.
68. Laryngeal cavity: parts and their walls.
69. Trachea and bronchi: development, topography, structure, innervation and blood supply.
70. Lungs: development, structure, topography, innervation and blood supply.
71. Lobes, segments, lobules, acinus of the lungs, innervation and blood supply.

72. Lungs: bronchial tree and alveolar structures, functions of the lungs.
73. The root of the lungs, its structures, topography.
74. Pleura: development, layers, recessus, topography.
75. Mediastinum: borders and regions. Organs of the anterior mediastinum.
76. Mediastinum: borders and regions. Organs of the posterior mediastinum, their topography.
77. Classification of the glands of internal secretion. Suprarenal glands: topography, structure, innervation and blood supply.
78. Branchiogenic glands of internal secretion: thyroid, parathyroid and thymus, their development, topography, structure, functions, innervation and blood supply.
79. Organs of haemopoiesis, classifications. Spleen: development, anatomic structure, topography, innervation and blood supply.
80. Kidneys: development, structure, topography, innervation and blood supply.
81. Ureter, urinary bladder: development, structure, topography, innervation and blood supply.
82. Male and female urethra: development, structure, topography, innervation and blood supply.
83. Testicles, epididymis. Descending of testicles into the scrotum. Abnormalities of the testicles position and topography.
84. Layers of the testicle. Scrotum: its development and structure.
85. Seminal vesicles, the prostate gland, bulbo-urethral glands, their position relating to urethra.
86. Male genitalia: development, structure, abnormalities of the development.
87. Ovary: topography, structure, relation to peritoneum, innervation, blood supply.
88. Uterus: development, structure, parts, topography, relation to peritoneum, innervation, blood supply.
89. Uterine tube: development, parts, structure, relation to peritoneum, innervation, blood supply.
90. Female external genitalia: development, structure. Mammary gland: structure, innervation, blood supply.
91. Perineum: definition, female and male perineal muscles and fasciae, innervation, blood supply.
92. Heart: development, external structure. The structure of the right atrium.
93. Heart: topography, projection of its borders on the front thoracic wall. The structure of the left atrium.
94. Heart: arteries and veins.
95. Heart: structure of wall, myocardium of atria and ventricles. Conducting system of the heart.
96. Heart valves: topography, structure.
97. Heart chambers and vessels, which are related to them. The innervation of the heart.
98. Pericardium: parts, topography, structure.
99. Aorta: parts, their topography. Aortic arch and its branches.
100. Aorta: its parts. Abdominal aorta and its branches.
101. The common carotid artery. The internal carotid artery. Topography, branches. The blood supply of the head and spinal cord.
102. The external carotid artery: its topography, branches, areas of blood supply.
103. Subclavian artery: its topography, branches, areas of blood supply.
104. Pulmonary circulation.
105. Larger ring of blood circulation.
106. Blood circulation of the fetus.
107. Axillary and brachial arteries: topography, branches, areas of blood supply.
108. The arteries of forearm and hand: topography, branches, areas of blood supply.
109. Arterial plexus of the elbow and wrist joints.
110. Common iliac artery. Internal iliac artery: areas of blood supply.
111. Femoral artery. Popliteal artery: topography, branches, areas of blood supply.
112. Blood supply and innervation of the knee and ankle joints.
113. Calf arteries, topography, branches, regions of their blood supply.
114. Foot arteries, topography, branches, regions of their blood supply.
115. General anatomy of blood vessels. Extraorganic and intraorganic vessels, microcirculation.
116. Microcirculation. Characteristic of links.
117. Superior vena cava, formation, topography, tributaries. Azygos and hemiazygos veins.
118. Internal jugular vein, topography, tributaries.
119. External and anterior jugular veins. topography, tributaries.

120. Inferior vena cava, formation, topography, tributaries.
121. Cava-caval anastomosis.
122. Portal vein, formation, topography, tributaries.
123. Pelvic veins, porto-caval anastomosis.
124. Veins of limbs, general characteristics.
125. Lymphatic system. General characteristic, links, and their characteristics.
126. Thoracic duct, roots, the place where it drains into the circulatory system.
127. Lymphatic nodes and vessels of head and neck.
128. Spinal cord. Functions and morphology of gray matter.
129. Spinal cord. Topography of tracts on the transverse section of spinal cord.
130. Spinal cord. Development, external view, topography, meninges of spinal cord.
131. Development of central nervous system (brain vesicles and their derivatives). Main stages of nervous system development.
132. Medulla oblongata. Development, structure, connections.
133. Cerebellum. Structure, connections, blood supply.
134. Rhomboid fossa, limits, topography, projection of cranial nerves nuclei.
135. IV ventricle, walls and connections, cerebellar peduncles.
136. Pons. Development, structure, connections.
137. Mesencephalon. Development, structure, connections.
138. Brainstem, parts, characteristics of cranial nerves nuclei of brainstem.
139. Medial lemniscus, formation, composition of fibers, location on the transverse section.
140. Diencephalon. Development, parts, III ventricle.
141. Hypothalamic region: departments, connection with the pituitary gland.
142. III ventricle. Walls, connection.
143. White matter of the cerebral hemisphere. Internal capsule. Topography, parts and pathways of it.
144. Olfactory brain. The I pair of cranial nerves. The ascending ways of the olfactory analyzer.
145. Lateral ventricles of the brain. Parts, their position. choroid plexus, connection with the third ventricle.
146. Subcortical nuclei of the cerebral hemispheres.
147. Layers of the brain. Sinuses of dura mater of the brain.
148. Relief of the dorso-lateral surface of the cerebral hemispheres. Localization of nuclei of analyzers in the frontal lobe.
149. Relief of the dorso-lateral surface of the cerebral hemispheres. Localization of nuclei analyzers in the parietal lobe.
150. Relief of the medial surface of the cerebral hemispheres. Localization of nuclei of analyzers in this surface of the hemispheres.
151. Relief of the inferior surface of the cerebral hemispheres. The structure of the cortex of the cerebral hemisphere.
152. Ascending pathways: proprioceptive pathways of cerebellar direction.
153. Ascending pathways: proprioceptive pathways of the cortical direction (Goll, Burdach).
154. Ascending pathways of touch and pressure.
155. Ascending pathways of pain and temperature sensitivity.
156. Descending pathways. Classification. Corticospinal pathways (pyramidal).
157. Extrapyramidal system. Descending pathways of the extrapyramidal system.
158. External ear, its parts, structure. Tympanic membrane.
159. Anatomy of the middle ear: the walls of the tympanic cavity. Auditory bones, auditory tube.
160. The inner ear: bony and membranous labyrinths.
161. Spiral organ. Ascending pathways of the auditory analyzer.
162. Organ of vision. Eye, layers. The mechanism of accommodation.
163. Refracting eye environment: cornea, liquid chambers of the eye, lens, vitreous body.
164. Retina of the eye, its structure and development. Ascending pathways of the visual analyzer.
165. Additional organs of the eye: their innervation, blood supply.
166. The optic nerve. Ascending pathways of the visual analyzer.
167. The concept of the neuron. Nerve fibers, bundles, roots, nodes, simple and compound reflex arcs.

<p>5. Grant's atlas of anatomy / Anne M.R., Arthur F. Dalley II, 12th ed. - Baltimore: Wiliams &amp; Wolters, 2009. – 864 p.</p> <p>6. Martini Frederic H. Martini's atlas of the human body, 8th ed. – Pearson Education, 2009. – 250p.</p> <p>7. Atlas of Human Anatomy / Frank H. Netter, M.D. Arthur F. Dalley; 2nd ed. // ILS, Medimedia USA Company, 1997. – 548p.</p>	<p>5. Clinical Anatomy. Applied anatomy students and junior doctors: eleventh edition / // Oxford, UK: Blackwell publishing. – 2006.</p> <p>6. Pocket atlas of Human Anatomy / He Wolfgang Dauber // Thieme, Stuttgart. – 2006.</p> <p><b>Information resources</b>  <a href="https://human.biodigital.com/">https://human.biodigital.com/</a>  <a href="http://anatom.ua/nomina-anatomica/">http://anatom.ua/nomina-anatomica/</a>  <a href="http://www.umsa.edu.ua/kafhome/anatomy/kaf_anatomy_download.html">http://www.umsa.edu.ua/kafhome/anatomy/kaf_anatomy_download.html</a>  <a href="http://anatom.ua/basis/ukr/">http://anatom.ua/basis/ukr/</a>  <a href="http://anatom.ua/basis/rus/">http://anatom.ua/basis/rus/</a>  <a href="https://human.biodigital.com/signin.html">https://human.biodigital.com/signin.html</a></p>
<p><b>Lector</b> <i>Dr. Sokyrenko LM</i></p>	