



**CD 8.5.1 DISCIPLINE CURRICULUM FOR
UNIVERSITY STUDIES**

Edition: 09

Date: 08.09.2021

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FACULTY OF MEDICINE

STUDY PROGRAM 0912.1 MEDICINE

DEPARTMENT OF ANATOMY AND CLINICAL ANATOMY

APPROVED

at the meeting of the Commission for Quality Assurance and Evaluation of the Curriculum in Medicine

Minutes No. 1 of 16.09.21
Chairman, PhD, university professor

Suman Serghei

(signature)

APPROVED

at the Council meeting of the Faculty of Medicine No. 2

Minutes No. 1 of 21.09.21
Dean of the Faculty of Medicine No. 2,
PhD, university professor

Placinta Gheorghe

(signature)

APPROVED

at the meeting of the chair of Anatomy and Clinical Anatomy

Minutes No. 02 of 01.09.2021
Head of chair, PhD, university professor

Catereniuc Ilia

(signature)

SYLLABUS

DISCIPLINE HUMAN ANATOMY

Integrated studies

Type of course: **Compulsory**

Curriculum elaborat de colectivul de autori:

Catereniuc Ilia, PhD of med., professor

Batîr Dumitru, dr. of med., associate professor

Bendelic Anastasia, university assistant

Chisinau, 2021



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I. INTRODUCTION

- **General presentation of the discipline: place and role of the discipline in the formation of the specific competences of the professional / specialty training program**

Human Anatomy is an important component of preclinical education, it is one of the oldest fundamental sciences of medical education, which can also be defined as science about the material substrate of the life and health.

Having as the object of research the living human body, Anatomy is an important component of preclinical education that helps the student with information on the structure of the human body in phylogenesis and ontogenesis, the morphological variability of its structures, development anomalies, age, gender and individual specific features.

The human anatomy course studies the structure of the human body and its component parts at the macro- and mesoscopic levels, as well as their changes conditioned by interaction and interdependence with the other biological systems, which have influenced the formation of the *Homo sapiens* during the evolution.

- **Mission of the curriculum (aim) in professional training**

Human anatomy aims to study the morphofunctional features of organs and organ systems in different periods of postnatal development, and to use this knowledge in the learning of basic and clinical disciplines, prevent various diseases, diagnose and treat them.

It has to become the best tool for learning the structure of the human body for integration of anatomical knowledge into the clinical context, information that would then serve both as a basis for knowledge for students, as well as for residents and young doctors. The discipline is committed to participate actively in the activities of the medical education and research within the “Nicolae Testemitanu” State University of Medicine and Pharmacy supporting the university efforts for the dissemination of medical knowledge both to the academic community and society.

One of the main objectives of the course is to study the anatomy of the living person and its educational role in professional training.

For us, professional integrity and confidence are fundamental values.

For us, the student is in the center of educational attention.

We will support excellence in anatomical education by:

- ✓ development of solid knowledge in the field of anatomy, its integration in the clinical context and consolidating this knowledge into a database;
- ✓ development and use the modern, innovative and efficient teaching methods;
- ✓ teachers with ample experience;
- ✓ active involvement of students in the development of the teaching process by using the high quality methods;
- ✓ substantial improvement of medical education by integrating students in scientific research;
- ✓ promoting the healthy lifestyle and improving the health of the people.

- **Languages of the course:** English.

- **Beneficiaries:** students of the first year, Faculty of Medicine No. 2, specialty *Medicine*.



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II. MANAGEMENT OF THE DISCIPLINE

| | | | |
|---|---|--|---|
| Code of the discipline | | F.01.O.001 / F.02.O.012 | |
| Name of the discipline | | Human Anatomy | |
| Person(s) in charge of the discipline | | PhD, university professor Ilia Catereniuc | |
| Year | I | Semesters | I/II |
| Total number of hours – 330 <i>including:</i> | | | Sem. I – 180 Sem. II – 150 |
| Lectures | Sem. I – 30 Sem. II – 30 | Practical hours | Sem. I – 40 Sem. II – 40 |
| Seminars | Sem. I – 35 Sem. II – 35 | Self-training | Sem. I – 75 Sem. II – 45 |
| Clinical internship | | | - |
| Form of assessment | E/E | Number of credits | Sem. I – 6 Sem. II – 5 |



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III. TRAINING AIMS WITHIN THE DISCIPLINE

At the end of the discipline study the student will be able to:

✓ at the level of knowledge and understanding:

- form clear and accurate ideas about the human anatomy, its evolution and branches, its role and place among the basic and clinical medical disciplines and about anatomy on a living person;
- know traditional and modern methods of anatomical examination;
- possess and reproduce information about the human body as a whole unit, its relationships with the environment, its constituent elements (tissues, organs, systems of organs, apparatuses);
- demonstrate knowledge about the essential stages of development of the body, ontogenesis and phylogenesis of organs and systems of organs apart;
- comprehend and reproduce general definitions about the norm, individual anatomical variants, abnormalities and their applied significance;
- possess and reproduce information about the human body proportions, constitutional types, their applied significance; about the general structural features of the organs and organ systems, the individual, age, and gender particularities of all anatomical formations;
- possess and reproduce information about individual, age and gender features of all anatomical formations at the macro- and mesoscopic levels; about their function, topography, radiography, ultrasound, MRI, endoscopic projection and aspect on a living person
- know International Anatomical Terminology elaborated by FICAT (Federative International Committee on Anatomical Terminology, 1998).

✓ at the application level:

- identify anatomical formations and arrange them into standard anatomical position;
- demonstrate the structural aspects of the body regions (on the dissected corpse), anatomical samples, molds, etc.;
- identify anatomical structures on radiological (radiograms, tomography) and sonographic images, images obtained by RMN;
- determine the bony, muscle, joint, vascular and nervous landmarks of various body regions on a living person;
- demonstrate on a living person the projection of viscera, blood vessels and nerves;
- palpate on a living person the prominent formations of bones, muscles, joints;
- palpate the pulse on the arteries of the head, neck and extremities and indicate their points of compression in order to stop the bleeding;
- reproduce schemes referring to the structure, topography, projection, classification of anatomical formations etc.;
- solve case based problems and tests on the structure, topography, functions, and aspects of anatomical formations on alive person;
- possess abilities of dissection.

✓ at the integration level:

- evaluate the place and role of human anatomy in the preclinical training of the future physician;
- appreciate the importance of knowledge in the field of human anatomy in order to acquire clinical disciplines and to become aware of their applicability in the diagnosis and treatment of diseases;
- use information technologies to obtain, evaluate, store, produce, present and exchange information with colleagues in individual and group work;
- implement the gained knowledge in the research activity;
- be able to learn learning, that will contribute to the management of the professional activity.



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IV. PROVISIONAL TERMS AND CONDITIONS

Anatomy is a fundamental science in medical education, studying the human body and its ontogenetic development, which is closely related to the environmental changes and daily activities of each person.

Anatomy becomes the science of all living forms by using the methods, which come to support each physician (palpation, percussion, radiological, endoscopic, CT, ultrasound, ultrasonic methods and others), and the basis for other disciplines in medical education, including the vocabulary of over 5000 terms, on which all the other sciences in medical education are based.

Modern medicine does not require from today's anatomy an abstract human structure and form, but real data about individual structure. Therefore, Anatomy is the science of living forms, of changing and reorganization of the human body. It includes systematization and integration of knowledge about the mutual connection and influence of somatic and visceral systems, about the influence of various external environmental factors on musculoskeletal and visceral activity and on the central nervous system.

Student of the first year needs the following skills for a good comprehension of the discipline:

- knowledge of the language of instruction;
- confirmed competences in the sciences studied at lyceum (biology, chemistry, physics);
- digital competences (use of the Internet, document processing, electronic tables and presentations, use of graphics programs);
- ability to communicate and to work in team;
- qualities - tolerance, compassion, creativity, initiative, autonomy.



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V. THEMES AND ESTIMATE ALLOCATION OF HOURS

The first semester

| No | THEME | Number of hours | | |
|--------------|--|-----------------|--------------------|-------------------|
| | | Lec- tures | Practical hours | Self- training |
| 1. | <i>Human anatomy. Introductory course. Functional anatomy of the locomotor apparatus. General osteology.</i> Skeleton of the trunk. Vertebral column. General, regional and individual features of the vertebrae. Intervertebral joints. The vertebral column as a whole, the age and gender features, examination on a living person, clinical correlations. Bones of the thorax. Joints of the thorax. The thorax as a whole, variants of the shape, examination on a living person, clinical correlations. | 2 | 5 | 5 |
| 2. | <i>General arthrosyndesmology. General data about the joints and their biomechanics.</i> Skeleton of the upper limb (bones of the shoulder girdle and of the free part of the upper limb). Joints of the shoulder girdle and of the free part of the upper limb – features, functions, examination on a living person, clinical correlations. Skeleton of the lower limb (bones of the pelvic girdle and of the free part of the lower limb). Joints of the pelvic girdle and of the free part of the lower limb – features, functions, examination on a living person. The pelvis as a whole, the gender features, clinical correlations. The foot as a whole, the arches of the foot, clinical correlations. | 2 | 5 | 5 |
| 3. | <i>Functional anatomy and topography of the cranium.</i> Cranium – generalities. Bones of the neurocranium – features, examination on a living person, clinical correlations. Bones of the viscerocranium – features, examination on a living person, clinical correlations. | 2 | 5 | 5 |
| 4. | <i>General myology. Functional anatomy and topography of the muscles of the head, neck and trunk.</i> The skull as a whole. The individual, age and gender specific features of the skull, examination on a living person. Joints of the skull. Muscles and fasciae of the thorax, diaphragm. Muscles and fasciae of the shoulder girdle and arm – features, topography, functions, examination on a living person. | 2 | 5 | 2 |
| 5. | <i>Functional anatomy of the vertebral column.</i> Muscles and fasciae of the forearm and hand – features, topography, functions, examination on a living person, clinical correlations. General notions regarding the topography of the upper limb. Muscles and fasciae of the abdomen – features, topography, functions, examination on a living person. Topography of the abdomen. Muscles, fasciae and topography of the back, examination on a living person, clinical correlations. | 2 | 4 | 6 |
| 6. | <i>Functional anatomy and topography of the muscles of the upper and lower limbs. Critical periods and some morphofunctional features of postnatal ontogenesis.</i> Muscles and fasciae of the pelvis and the free part of the lower limb – features, topography, functions, examination on a living person, clinical correlations. Topography of the lower limb. Muscles and fasciae of the head and neck – features, topography, functions, examination on a living person, clinical correlations. Topography of the neck. TEST I. ASSESSMENT. LOCOMOTOR APPARATUS | 2 | 6 | 5 |
| 7. | <i>General splanchnology.</i> Oral cavity – compartments, walls, communications, contents. Tongue, salivary glands, teeth – features, functions, examination on a living person. | 2 | 5 | 5 |
| 8. | <i>Functional anatomy of the digestive system. Development and abnormalities of the internal organs.</i> Pharynx and oesophagus – features, topography, functions. Swallowing. Regions of the abdomen, abdominal and peritoneal cavities. Stomach – features, topography, functions, the individual and age features, development, anomalies, examination on a living person, clinical correlations. | 2 | 5 | 5 |
| 9. | <i>Functional anatomy of the peritoneum.</i> Small intestine – parts, features, topography, functions, the age features, examination on a living person, clinical correlations. Large intestine – parts, features, topography, functions, the age features, examination on a living person, clinical correlations. | 2 | 5 | 5 |
| 10. | Liver, pancreas, spleen – features, topography, functions, examination on a living person, clinical correlations. Peritoneum – features, functions, derivatives. Peritoneal cavity, extraperitoneal spaces. Examination on a living person, clinical correlations. TEST II. ASSESSMENT. DIGESTIVE SYSTEM | 2 | 6 | 6 |
| 11. | <i>Functional anatomy of the respiratory system.</i> Nose and larynx – features, topography, functions, examination on a living person. Thyroid and parathyroid glands. Trachea, bronchi, lungs, pleura – features, topography, functions, examination on a living person. Topography of the lungs and pleura. Thymus. Mediastinum | 2 | 5 | 5 |
| 12. | <i>Heart – functional anatomy, abnormalities.</i> Heart – compartments, external, internal and individual features, abnormalities. Topography of the heart, examination on a living person, clinical correlations. Pericardium – features, topography. | 2 | 5 | 5 |
| 13. | <i>Functional anatomy of the urinary system. Functional anatomy of the reproductive organs.</i> Urinary organs (kidneys, ureters, urinary bladder) – features, topography, functions, abnormalities, examination on a living person, clinical correlations. Suprarenal glands (adrenal cortex and adrenal medulla), paraganglia. Male genital system – features, topography, functions, abnormalities, examination on a living person, clinical correlations. Male urethra – parts, trajectory, features, topography, functions, abnormalities, examination on a living person. | 2 | 4 | 5 |
| 14. | <i>Functional anatomy of the endocrine glands.</i> Female genital system – features, topography, functions, abnormalities, examination on a living person, clinical correlations. Female urethra. Perineum – features, topography, the gender features, examination on a living person. Endocrine glands – classification, features, topography, functions, examination on a living person. | 2 | 4 | 6 |
| 15. | ASSESSMENT. RESPIRATORY, URINARY AND GENITAL SYSTEMS. | 2 | 6 | 2 |
| Total | | 30 | 40/35 | 75 |
| TOTAL | | 180 | | |



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The second semester

| No | THEME | Number of hours | | |
|--------------|--|-----------------|-----------------|---------------|
| | | Lectures | Practical hours | Self-training |
| 1. | <i>Functional anatomy of spinal cord and brain. Reticular formation. Limbic system.</i> Spinal cord and spinal meninges – features, topography, examination on a living person. Rhombencephalon (medulla oblongata, pons, cerebellum, rhomboid fossa, isthmus rhombencephali) – external and internal features. Fourth ventricle – walls, communications. | 2 | 5 | 3 |
| 2. | <i>Functional anatomy of the spinal and cranial meninges. Cerebrospinal fluid.</i> Mesencephalon and diencephalon – components, external and internal features. Third ventricle – walls, communications. Epiphysis and hypophysis – features, functional role. Cerebral hemispheres, relief of the cerebral cortex. Localization of functions in the cerebral cortex. Limbic system. | 2 | 4 | 3 |
| 3. | <i>Conductive pathways of the central nervous system.</i> White substance of the hemispheres. Basal nuclei and related structures. Lateral ventricles, communications. Cranial meninges and cerebrospinal fluid. Examination of the brain and its blood vessels on a living person. TEST. ASSESSMENT. | 2 | 6 | 3 |
| 4. | <i>Functional anatomy of the autonomic nervous system (ANS). Generalities. Central and peripheral levels. Sympathetic, parasympathetic and metasympathetic parts of the ANS.</i> Autonomic (vegetative) nervous system – generalities, components. | 4 | 5 | 3 |
| 5. | <i>Functional anatomy of sensory systems.</i> Visual system (analyzer) – generalities. Eye and related structures. Eyeball and accessory organs of the eye. Cranial nerves II, III, IV, VI. Visual pathway, clinical correlations. Organ of hearing (external, middle and internal ear). Cranial nerve VIII. Auditory and vestibular pathways, clinical correlations. | 2 | 5 | 3 |
| 6. | <i>Functional anatomy of the cranial nerves.</i> Trigeminal nerve – generalities. Branches of the trigeminal nerve (V ₁ , V ₂ , V ₃), areas of innervation, conductive pathway, examination on a living person. Facial nerve – fiber components, areas of innervation, connections, conductive pathway, examination on a living person. | 4 | 5 | 3 |
| 7. | Vagus and glossopharyngeal nerves – segments, nuclei, types of fibers, branches, areas of innervation, connections. Olfactory and terminal nerves. Olfactory and gustatory systems. Conductive pathways, examination on a living person. Cranial nerves XI and XII – branches, areas of innervation, connections, examination on a living person. Innervation of the tongue. TEST. ASSESSMENT | | 5 | 4 |
| 8. | Spinal nerves, their branches. Cervical plexus – formation, branches, areas of innervation. Innervation of the skin of the head and neck. Examination of the cervical plexus on a living person. | | 5 | 2 |
| 9. | <i>Vasculature and innervation of the heart. Functional anatomy of the cardiovascular system.</i> Common, external and internal carotid arteries, – topography, branches, areas of irrigation, examination on a living person. Sinocarotid reflexogenic zone. Subclavian artery and its branches – topography, areas of irrigation, examination on a living person. Cervical ganglia of the sympathetic trunk – rami, connections. | 2 | 5 | 3 |
| 10. | <i>Functional anatomy of the vascular system of the head and neck.</i> Veins and lymphatics of the head and neck – topography, examination on a living person. Neurovascular bundle of the neck. Blood vessels, lymphatics and nerves of the thorax. Vasculature, innervation and lymph drainage of thoracic cavity organs. Innervation of the walls of the thoracic cavity and of the mammary gland. Blood vessels, lymphatics and nerves of the heart, cardiac plexuses. | 2 | 5 | 3 |
| 11. | <i>Functional anatomy of the blood vessels of the limbs.</i> Brachial plexus – formation, topography. Branches of the brachial plexus – trajectory, areas of innervation, examination on a living person. Innervation of the skin of the upper limb. Blood vessels and lymphatics of the upper limb – topography, examination on a living person. ASSESSMENT | 2 | 6 | 4 |
| 12. | <i>Functional anatomy of the blood vessels of the trunk.</i> Abdominal aorta – topography, branches, examination on a living person. Vasculature of the abdominal viscera. | 2 | 4 | 2 |
| 13. | <i>Functional anatomy of the lymphoid system.</i> Blood vessels of the pelvis. Veins of the abdominal cavity, their tributaries, examination on a living person. Portacaval and cavo-caval anastomoses. Lymphatics of the abdomen and pelvis, their applied relevance. Lumbar and sacral ganglia of the sympathetic trunk, autonomic plexuses of the abdominal and pelvic cavities. Innervation of the abdominal and pelvic viscera. | 2 | 5 | 3 |
| 14. | <i>Microcirculation and collateral circulation.</i> Blood vessels and lymphatics of the lower limb, examination on a living person. Blood supply of the joints and muscles of the lower limbs. Lumbar plexus – formation, branches, areas of innervation, examination on a living person. Innervation of the abdominal walls. | 2 | 5 | 4 |
| 15. | <i>Peculiarities of innervation of the viscera and somatic structures.</i> Sacral and coccygeal plexuses – formation, branches, areas of innervation, examination on a living person. Innervation of the joints, muscles and skin of the lower limb. Innervation of the perineum and external genitalia. ASSESSMENT | 2 | 5 | 2 |
| Total | | 30 | 40/35 | 45 |
| TOTAL | | 150 | | |



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VI. OBJECTIVES AND CONTENT UNITS

| Objectives | Content units |
|--|--|
| Chapter 1. LOCOMOTOR APPARATUS | |
| <ul style="list-style-type: none"> • to define the basic concepts of anatomy; • to know: <ul style="list-style-type: none"> ✓ anatomy research methods; ✓ anatomical terminology; ✓ classification, structure and anatomic features of the bones, joints and muscles; ✓ the axes around which movements are performed and the movements produced in the joints by muscular contraction; ✓ muscular labor and muscular levers; ✓ fasciae and intermuscular spaces of the human body and their applicative importance; ✓ bony, osteofibrous, osteomuscular and intermuscular canals, retinacula, fasciae (on the dead body) and their applied relevance; ✓ bony, articular and muscular landmarks. • to demonstrate: <ul style="list-style-type: none"> ✓ abilities for analysis and systematization of knowledge; ✓ bony, articular and muscular landmarks on cadaveric material, radiograms and on a living person; • to apply the criteria for differentiation of the anatomical structures on the corpus and parts of the body, radiograms and on a living person via: <ul style="list-style-type: none"> ✓ identification of the human body planes, axes and orientation lines; ✓ identification of individual and regional specific features of the bones of the trunk; ✓ identification of bony, articular, and muscular landmarks on cadaveric material and on a living person; ✓ identification of bony structures, fractures, variants and developmental abnormalities of the trunk, limbs and skull bones on radiograms. • to integrate gained knowledge and apply it in practice. | <ol style="list-style-type: none"> 1. <i>Anatomical terminology</i> 2. <i>Orientational elements of the human body.</i> 3. <i>General osteology.</i> Regional features of the bones of the human skeleton: bones of the skull, bones of the trunk, bones of the limbs 4. <i>General arthrology.</i> Joints of the trunk, limbs and skull. 5. <i>General myology.</i> Muscles of the topographical regions of the body: muscles of the back, muscles of the thorax and muscles of the abdomen; muscles of the girdles and muscles of the free part of the limbs; muscles of the head and neck. |
| Chapter 2. ALIMENTARY (DIGESTIVE) SYSTEM | |
| <ul style="list-style-type: none"> • to define: <ul style="list-style-type: none"> ✓ notions of organ, system of organs and apparatus; ✓ derivatives of the primary gut; ✓ notions of tubular organ and parenchymal organ. • to know: <ul style="list-style-type: none"> ✓ anatomical terminology and principles of classification, structure and topography of internal organs; ✓ individual and regional features of the organs of the alimentary system. • to demonstrate: <ul style="list-style-type: none"> ✓ anatomical structures on cadavers, molds, radiograms and on a living person; ✓ ability to identify the landmarks necessary to determine the boundaries and projection of the internal organs; • to apply the criteria for differentiation of the anatomical structures on anatomical samples, cadavers, radiograms and on a living person. • to integrate anatomical knowledge with clinical disciplines by: <ul style="list-style-type: none"> ✓ concluding on the studied subject; ✓ developing of own opinions about the individual, age and gender features of the organs of the alimentary system. | <ol style="list-style-type: none"> 1. Generalities regarding the structure, classification and topography of the internal organs. 2. Organs of the gastrointestinal tract and adjacent glands: oral cavity, tongue, teeth and salivary glands; pharynx, oesophagus, stomach; small intestine, large intestine; liver and pancreas. 3. Regions of the abdomen, abdominal and peritoneal cavities. 4. Organs of other systems located in the abdominal cavity. 5. Peritoneum and extraperitoneal spaces. |



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Chapter 3.

RESPIRATORY SYSTEM. HEART. URINARY SYSTEM. REPRODUCTIVE ORGANS.

- **to define:**
 - ✓ notions of respiratory system and of respiratory apparatus;
 - ✓ concept of urinary system;
 - ✓ notions of genital systems.
- **to know:**
 - ✓ individual and regional features of respiratory system organs;
 - ✓ individual and regional features of urinary system organs;
 - ✓ individual and regional features of the reproductive organs.
- **to demonstrate:**
 - ✓ anatomical structures of the subject matter on cadavers, castings, radiograms and on a living person;
 - ✓ ability to identify the landmarks necessary to determine the boundaries and projection of the internal organs;
- **to apply** the criteria for differentiation of the anatomical structures on anatomical samples, cadaver, radiograms and on a living person;
- **to integrate** anatomical knowledge with clinical disciplines by:
 - ✓ concluding on the studied subject;
 - ✓ developing of own opinions on the individual, age and gender specific features of the studied organs.

- Respiratory system organs.*
1. Upper and lower airways: nose, nasal cavity, larynx, trachea, main bronchi.
 2. Thyroid and parathyroid glands, thymus.
 3. Respiratory organs: lungs and pleura.
 4. Mediastinum.
- Heart and pericardium.*
- Urinary organs.*
5. Kidneys, ureters, urinary bladder.
 6. Suprarenal glands and paraganglia.
 7. *Male reproductive organs* and male urethra.
 8. *Female reproductive organs* and female urethra.
 9. *Perineum.*

Chapter 4.

CENTRAL NERVOUS SYSTEM.

- **to define:**
 - ✓ concepts related to the central nervous system (CNS);
 - ✓ derivatives of primary and secondary cerebral vesicles;
 - ✓ notions of CNS variants and anomalies.
- **to know:**
 - a) anatomical terminology and principles of classification, structure and topography of CNS components;
 - b) the individual and regional peculiarities of CNS.
- **to demonstrate:**
 - ✓ anatomic structures of CNS on anatomical samples, castings, radiograms.
- **to apply** the criteria for distinguishing anatomical structures on the anatomical samples, on the body, on radiograms with transfer of knowledge to a living person:
- **to integrate** anatomical knowledge with clinical disciplines by:
 - ✓ concluding on the studied subject;
 - ✓ developing own views on the individual, age and gender specific features of CNS components.

1. Spinal cord and spinal meninges.
2. Brainstem, components. Fourth ventricle.
3. Diencephalon. Third ventricle.
4. Cerebral hemispheres. Localization of functions in the cerebral cortex. Limbic system.
5. White substance of the cerebral hemispheres. Basal nuclei. Lateral ventricles.
6. Cranial meninges and cerebrospinal fluid.
7. Conductive pathways of the central nervous system.

Chapter 5.

AUTONOMIC NERVOUS SYSTEM. SENSE ORGANS AND CRANIAL NERVES.

- **to define:**
 - ✓ autonomic nervous system and its components;
 - ✓ notion of sensory system;
 - ✓ notion of conducting pathway.
- **to know:**
 - ✓ anatomical terminology and principles of classification, structure and topography of cranial nerves and autonomic nervous system;
 - ✓ individual and regional peculiarities of the sense organs and of the cranial nerves.
- **to demonstrate:**
 - ✓ anatomical structures on cadavers, molds, radiograms with the transfer of knowledge on a living person;

1. Autonomic nervous system – generalities, components.
2. Sense organs.
3. Conductive pathways of sensory systems.
4. Cranial nerves, conductive pathways.



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- ✓ components of sense organs;
- ✓ cranial nerves on the anatomical samples.
- **to apply** criteria for differentiation of the anatomical structures on anatomical samples, cadavers and radiograms.
- **to integrate** anatomical knowledge with clinical disciplines by:
 - ✓ concluding on the studied subject;
 - ✓ developing own opinions about the individual, age and gender peculiarities of the autonomic nervous system, of the sense organs and of the cranial nerves.

Chapter 6. PERIPHERAL NERVOUS SYSTEM, BLOOD VESSELS AND LYMPHATICS OF THE NECK, THORAX AND UPPER LIMB

- **to define:**
 - ✓ notions of spinal nerve, somatic plexus and vegetative plexus;
 - ✓ notions of magistral and collateral vessels, arterial and venous plexuses;
 - ✓ notions of intra- and intersystemic arterial anastomoses.
- **to know:**
 - ✓ anatomical terminology and principles of classification of spinal nerves and blood vessels;
 - ✓ features of formation of the somatic and autonomic plexuses;
 - ✓ features of vasculature of the internal organs, joints and skeletal muscles of the head, neck, thorax and upper limb.
- **to demonstrate:**
 - ✓ anatomical structures on cadavers, molds, radiograms and on a living person;
 - ✓ ability to identify the landmarks necessary to determine the boundaries and projection of the blood vessels and nerves.
- **to apply** criteria for differentiation of the anatomical structures on anatomical samples, cadavers and radiograms.
- **to integrate** anatomical knowledge with clinical disciplines by:
 - ✓ concluding on the studied subject;
 - ✓ developing own opinions on the studied subject.

1. Spinal nerves, their branches.
2. Cervical plexus.
3. Arteries, veins and lymph nodes of the head and neck.
4. Arterial anastomoses.
5. Cervical ganglia of the sympathetic trunk.
6. Blood vessels, lymph nodes and nerves of the mediastinum.
7. Vasculature, innervation and lymph drainage of the thoracic cavity organs.
8. Blood vessels, lymph nodes and nerves of the heart, cardiac plexuses.
9. Thoracic spinal nerves.
10. Brachial plexus.
11. Blood vessels and lymph nodes of the upper limb.
12. Vasculature and lymph drainage of the upper limb joints and muscles.

Chapter 7. PERIPHERAL NERVOUS SYSTEM, BLOOD VESSELS AND LYMPHATICS OF THE ABDOMEN, PELVIS AND LOWER LIMB.

- **to define:**
 - ✓ notions of the cavo-caval and portacaval anastomoses.
- **to know:**
 - ✓ anatomical terminology and principles of classification of spinal nerves and blood vessels;
 - ✓ features of formation of the somatic and autonomic plexuses;
 - ✓ features of vasculature of the viscera, joints and skeletal muscles of the abdomen and pelvis, and of the lower limb.
- **to demonstrate:**
 - ✓ anatomical structures on cadavers, castings, radiograms and on a living person;
 - ✓ ability to identify the topographic landmarks necessary to determine the projection of blood vessels and nerves.
- **to apply** criteria for differentiation of the anatomical structures on anatomical samples, dead body and radiograms.
- **to integrate** anatomical knowledge with clinical disciplines by:
 - ✓ concluding on the studied subject;
 - ✓ developing own opinions on the studied subject.

1. Blood vessels, lymph nodes and nerves of the abdomen.
2. Vasculature, innervation and lymph drainage of the abdominal cavity organs.
3. Lumbar plexus.
4. Sacral plexus.
5. Blood vessels and lymph nodes of the upper limb.
6. Vasculature and lymph drainage of the lower limb joints and muscles.



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VII. PROFESSIONAL (SPECIFIC (SC)) AND TRANSVERSAL (TC) COMPETENCES AND STUDY OUTCOMES

✓ PROFESSIONAL (SPECIFIC) (SC) COMPETENCES

- CP1. Responsible execution of professional tasks with the application of the values and norms of professional ethics, as well as the provisions of the legislation in force.
- CP2. Adequate knowledge of the sciences about the structure of the body, physiological functions and behavior of the human body in various physiological and pathological conditions, as well as the relationships between health, physical and social environment.
- CP3. Promoting a healthy lifestyle, applying prevention and self-care measures.
- CP4. Carrying out scientific research in the field of health and other branches of science.
- CP5. Promoting and ensuring the prestige of the medical profession and raising the professional level.

✓ TRANSVERSAL COMPETENCES (TC)

- CT1. Autonomy and responsibility in the activity.
- CT2. Effective communication and digital skills.
- CT3. Achieving interaction skills and social responsibility.
- CT4. Personal and professional development

✓ STUDY FINALITIES

- to have knowledge about structure, topography and anatomical features of the organs and organ systems;
- to understand the principles of application and transfer of knowledge in medical practice;
- to apply on a living person the theoretical knowledge regarding the determination of limits and projection of the organs to anatomical landmarks;
- to be able to interpret radiological, MRI, endoscopic, sonographic images, etc;
- to be able to deduce possible causes and understand the mechanisms that influence the physiological processes, which can contribute to the appearance of anatomical variants and development anomalies;
- to evaluate the place and role of human anatomy in the preclinical training of the medical student;
- to be able to implement the gained knowledge in the research activity;
- to possess skills to analyze and synthesize acquired knowledge and information and to be able to use information and communication technologies.



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VIII. STUDENT'S SELF-TRAINING

Suggestions for individual activity

The passive listening of the course is one of the less efficient methods of learning, even in the case of being well structured and illustrated.

That is why in order to memorize the material lots of teaching methods related to the delivered material are required.

The practical work is more efficient than reading of how to do it.

Volunteers who desire to succeed in the course of Human Anatomy need to work insistently and actively with the demonstrative material.

Considering the learning methodology the department will propose several pieces of advice to be followed:

1. First of all, it is necessary to make acquaintance with the subjects which should be answered using the necessary practical notes
2. Read attentively the text from the textbook, make notes. Try to formulate yourselves the main moments. Refer to the schemes and images from the textbook and notebook. Use the acquired knowledge to demonstrate on anatomical samples. Answer the questions from your notebooks for practical work.
3. Come to lectures not only for the sake of being present! If you do so, you will not be able to meet all the requirements. At lectures take notes attentively asking yourselves if you understand the things explained, rating your level of knowledge.
4. Mind the following: teachers are more than happy when you ask questions. This means that you try to understand and process the taught material.
5. For a more progressive comprehension of the lecture you are advised to organize yourselves into 2-3 students for regular meetings in order to discuss the theme which was taught at the lesson preparing yourselves for the tests and exams.
As a rule, the material is memorized easier in groups, than when you work in your own.
6. The course of Human Anatomy expects a lot from you. It comprises around 5000 terms, the majority of them are new and need to be memorized. These requirements involve a rational time usage, so, it will be necessary to handle time so as to find the balance between the effort given for an appropriate knowledge feedback and your private life.

Depth of the subject knowledge requires each working hour in direct contact with the teacher be supplemented with at least 1-2 hours of individual student study.

For a successful comprehension of the course in Human Anatomy you need to work individually around 8-10 hours per week.

To do this, use the *Anatomical Study Hall* arranged at the Department of Human Anatomy.



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| No. | Expected product | Implementation strategies | Assessment criteria | Implementation terms |
|-----|--|--|---|----------------------|
| 1. | Working with bibliographic sources and information resources | <p>To study carefully the material in the handbook and the lecture on the subject.</p> <p>To get acquainted with topics that require reflection on the subject matter.</p> <p>To get acquainted with the list of additional information sources on the topic and selecting the most suitable sources for studying the material with the identification of the key of the topic</p> | Ability to extract the essentials; interpretative skills; workload. | During the semester |
| 2. | Working with the notebook for practical work | <p>Before starting work with the book, the student has to get acquainted with the topic and to analyze the information in the manual, lectures, schemes collections and other sources that help him accomplish his tasks.</p> <p>Consecutive solving of the tasks.</p> <p>At the end of each theme, some conclusions have to be made, which can be discussed with the colleagues.</p> <p>Verification of the finalities and appreciation of their achievement.</p> <p>Additional information sources have to be consulted in order to carry out the task of the student.</p> | Workload; completing the notebook and solving the proposed tasks on the topic; ability to formulate conclusions. | During the semester |
| 3. | Work with anatomical samples and cadaveric material in the demonstration room (over program) | <p>The student will benefit from the self-training program after hours. If required, he can contact the professor on duty.</p> <p>Interaction conditions are created with both group colleagues and other students from all faculties.</p> <p>The student is able to work with anatomical preparations himself or in a team.</p> | Workload; ability to demonstrate anatomical structures on samples; formulating conclusions on the applied relevance of the anatomical structures. | During the semester |



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IX. METHODOLOGICAL SUGGESTIONS FOR TEACHING-LEARNING-ASSESSMENT

- **Teaching and learning methods used**

1. The subject Human Anatomy is delivered according to the classical methodology; with lectures and practical classes.
2. The theoretical course is taught in the lectures held by the course holders. An interactive lecture is practiced.
3. Also, the following methods are used:
 - ✓ explanation;
 - ✓ brainstorming;
 - ✓ heuristic conversation and debate;
 - ✓ group work;
 - ✓ individual study;
 - ✓ working with manual, scientific text and the anatomy atlas;
 - ✓ solving the case based problems;
 - ✓ interactive listening.

- **Applied teaching strategies / technologies (specific to the discipline)**

In practical work, together with the group teacher, students study prepared anatomical samples, use planes, molds, tables, complete workbooks, perform anatomical samples on the subject, which are then demonstrated to colleagues.

- **Methods of assessment (including the method of final mark calculation)**

Current: frontal/individual assessment of knowledge by:

- ✓ control works, reports;
- ✓ demonstration of anatomical structures included in the analytical curriculum of the discipline on the anatomical samples;
- ✓ solving the docimological tests in UIMS;
- ✓ graphical representation of the schemes on certain subjects;
- ✓ completion of practical workbooks for individual work;
- ✓ solving the case based problems.

Final: examination.

7/8 assessments and the practical skills assessment are organized at Human Anatomy discipline, during the 2 semesters of the study, as follows:

In the first semester:

Assessment no. 1 - Locomotor apparatus (oral evaluation / practical skills + testing).

Assessment no. 2 - Organs of the digestive system (oral evaluation / practical skills + testing).

Assessment no. 3 - Respiratory system organs. Heart (oral evaluation / practical skills + testing).

Assessment no. 4 - Organs of the urinary and genital systems (oral evaluation / practical skills + testing).

Assessment of practical skills.

In the second semester:

Assessment no. 1 - Central nervous system (oral evaluation / practical skills + testing).

Assessment no. 2 – Autonomic nervous system. Cranial nerves. Sense organs (oral evaluation / practical skills + testing).

Assessment no. 3 - Vasculature and lymphatics of the head, neck, thorax and upper limb. Cervical and thoracic spinal nerves (oral evaluation / practical skills + testing).

Assessment no. 4 - Vasculature, lymphatics and innervation of the organs of the abdomen and pelvis, and of the lower limb (oral evaluation / practical skills + testing).

Assessment of practical skills.



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So, formative assessment consists of 8 assessments, 4 in each semester, and the assessment of practical skills.

Each sample is assessed separately with marks from 0 to 10.

The assessment includes the evaluation of the knowledge gained in the practical work and the theoretical course on a particular study chapter and includes the demonstration and annotation of the natural anatomical samples, the description and the annotation of the various schemes and drawings in the practical workbooks, including the assessment of the practical skills.

At the Human Anatomy Exam (semester and yearly) only students who have obtained a semester mark of 5.0 and higher and have recovered all absences from the practical work are admitted. Students who have absences at lectures will be charged with additional questions discussed at classes.

The assessment of practical skills consists of demonstrating by the respondents of anatomical formations studied in the practical works. Skills assessment is carried out with examination cards containing 10 subjects. Three of them are highlighted and are part of the **minimum level of knowledge for the practice exam** without knowledge of which the student cannot be admitted to the exam through testing.

Demonstration or description by the respondents of anatomical samples begins immediately after he / she has drawn the test, without being given any time for preparation. In order to reflect the answers to the control questions, the examiner receives a special card stating the number of points obtained for each answer as well as the total number of points.

Examination of Human anatomy discipline consists of testing in the UIMS.

The overall score is based on two components: **the half-yearly average score** with the coefficient 0.5 and the **SIMU test** with the coefficient of 0.5.

Assessment of knowledge is appreciated with grades from 10 to 1.0 (with decimals).

Method of mark rounding at different assessment stages

| Intermediate marks scale (annual average, marks from the examination stages) | National Assessment System | ECTS Equivalent |
|--|----------------------------|-----------------|
| 1,00-3,00 | 2 | F |
| 3,01-4,99 | 4 | FX |
| 5,00 | 5 | E |
| 5,01-5,50 | 5,5 | |
| 5,51-6,0 | 6 | |
| 6,01-6,50 | 6,5 | D |
| 6,51-7,00 | 7 | |
| 7,01-7,50 | 7,5 | C |
| 7,51-8,00 | 8 | |
| 8,01-8,50 | 8,5 | B |
| 8,51-8,00 | 9 | |
| 9,01-9,50 | 9,5 | |
| 9,51-10,0 | 10 | A |

The average annual mark and the marks of all stages of final examination (computer assisted, test, oral) - are expressed in numbers according to the mark scale (according to the table), and the final mark obtained is expressed in number with two decimals, which is transferred to student's record-book.

Absence on examination without good reason is recorded as "absent" and is equivalent to 0 (zero). The student has the right to have two re-examinations.



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X. RECOMMENDED LITERATURE:

A. Compulsory:

1. HACINA T. *Guide in anatomy. Locomotor apparatus and viscera*. Chisinau: Tipografia „Print Caro”, 2019.
2. GLOBA L. *Human Anatomy. Neurology with Sense Organs and Angiology*. 2nd edition (revised and completed). Chisinau: Tipografia „Print Caro”, 2018.
3. CATERENIUC I.; LUPAȘCU T.; TAȘNIC M. et al. *Culegere de scheme la anatomia omului / Сборник схем по анатомии человека / Collection of schemes for human anatomy*. Ed. III-VI. Chișinău: Tipografia Sirius SRL, 2011, 2014, 2019.
4. CATERENIUC I. (sub redacția). *Lucrări practice la anatomia omului / Human Anatomy Workbook / Практические занятия по анатомии человека (Ghid pentru autoinstruire / Guide for self-studying / Пособие по самоподготовке)*. Ed. a XIV-a trilingvă (revăzută și completată). I. Aparatul locomotor. Splanhnologia. / I. Locomotor Apparatus. Splanchnology. / I. Опорно-двигательный аппарат. Спланхнология. Chișinău, 2021
5. CATERENIUC I., GLOBA L., BATIR D., BABUCI A., BENDELIC A. *Lucrări practice la Anatomia Omului / Notebook for Practical work at Human Anatomy / Практические занятия по анатомии человека (Ghid pentru autoinstruire / Guide for self-studying / Пособие по самоподготовке)*. Ed. a XIII-a trilingvă (revăzută și completată). II. Sistemul Nervos Central. Sistemele cardiovascular, limfoid, nervos periferic și organele senzoriale. / II. Central Nervous System. The cardiovascular, lymphoid and nervous systems, and sense organs. / II. Центральная нервная система. Сердечно-сосудистая, лимфоидная, периферическая нервная системы и органы чувств. Chișinău, 2021.

B. Additional:

1. СИНЕЛЬНИКОВ Р. Д., СИНЕЛЬНИКОВ Я. Р. *Атлас анатомии человека*. Том I, II, III и IV (oricare ed.).
2. PRIVES M., LYSENKOV N., BUSHKOVICH V. *Human Anatomy*. Vol. I. /The weight-bearing or locomotor apparatus. The science of the viscera. / Translated from the Russian by Ludmila Aksenova. 1985. Mir Publishers, Moscow, 1989.
3. PRIVES M., LYSENKOV N., BUSHKOVICH V. *Human Anatomy*. Vol. II. /The science of the vessels. The science of the nervous system. The science of the sense organs. / Translated from the Russian by Ludmila Aksenova. 1985. Mir Publishers, Moscow, 1989.
4. DRAKE R. L. VOGL A.W., MITCHELL A. W. M. et al. *Gray's Atlas of Anatomy*. Elsevier, 2008.
5. NETTER FRANK H. *Atlas of Human Anatomy*. 4th edition, 2006.
6. ROMANES G.J. *Cunningham's manual and practical anatomy* (in three volumes). Publisher: Oxford University Press; 15th edition, 1986.