

Ministry of Healthcare of Ukraine
Poltava State Medical University

Department of Biology
Department of Histology, Cytology and Embryology
Department of Human Anatomy

«AGREED»
by Guarantor
of the academic
and professional program
in specialty «Dentistry»

August, 29, 2025

«APPROVED»
by Chairman of the
Academic Council
of the Medical Faculty №2

Minutes as of 29.08. 2025 №1

«APPROVED»
by Chairman of the
Academic Council
of the International Faculty

Minutes as of 20.06. 2025 №11

«APPROVED»
by Chairman of the
Academic Council
of the Medical Faculty №1

Minutes as of 29.08. 2025 №1

SYLLABUS

INTEGRATED COURSE OF MORPHOLOGICAL DISCIPLINES

selective discipline

(compulsory / selective discipline)

level of higher education	the second (master's) level
field of knowledge	22 Healthcare
specialty	221 Dentistry
academic qualification	Master of Dentistry
professional qualification	Dentist
academic and professional program	221 Dentistry
mode of study	full-time
course(s) and semester(s) of study of the discipline	III course, Vth semester

«RESOLVED»
at the meeting of the Department of Biology

Minutes as of *August, 22, 2025 №1*

«RESOLVED»
at the meeting of the Department
of Histology, Cytology and Embryology

Minutes as of *June, 17, 2025 №23*

«RESOLVED»
at the meeting of the Department
of Human Anatomy

Minutes as of *August, 29, 2025 №1*

**INFORMATION ABOUT TEACHERS,
WHO TEACH THE ACADEMIC DISCIPLINE**

Last name, first name, patronymic of the teacher, scientific degree, academic title	<p>Yeroshenko Halyna Anatolijivna – Doctor of Medicine, Professor, Head of the Department</p> <p>Perederii Nina Oleksandrivna – PhD in Medicine, Associate Professor;</p> <p>Klepets Olena Viktorivna – PhD in Biology, Associate Professor;</p> <p>Stetsuk Yevhen Valerijiovych – PhD in Medicine, Associate Professor, Head of the Department;</p> <p>Shepitko Volodymyr Ivanovych – Doctor of Medicine, Professor;</p> <p>Boruta Nataliia Volodymyrivna – PhD in Biology, Associate Professor;</p> <p>Svintsytska Nataliia Leonidivna – Candidate of Medical Sciences, Associate Professor</p> <p>Hryn Volodymyr Hryhorovych – Head of the Department, Doctor of Medical Sciences, Professor</p> <p>Piliuhin Andriy Valentynovych – Candidate of Medical Sciences, Associate Professor</p> <p>Ustenko Roman Leonidovych – Candidate of Medical Sciences, Associate Professor</p> <p>Katsenko Andriy Lyuboslavovych – Lecturer</p>
Profile of teacher (s)	<p>https://med-biology.pdmu.edu.ua/team</p> <p>https://histology.pdmu.edu.ua/team</p> <p>https://anatomy.pdmu.edu.ua/team</p>
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Page of the department on the PSMU website	<p>https://med-biology.umsa.edu.ua/</p> <p>https://histology.pdmu.edu.ua/</p> <p>https://anatomy.pdmu.edu.ua/</p>

MAIN CHARACTERISTICS OF THE ACADEMIC DISCIPLINE

The scope of the discipline

Number of credits – **3 / 90** hours, including:

Lectures – **0** hours

Practical classes – **30** hours

Individual work – **60** hours

Type of control – credit

Discipline policy

General principles on which the policy of studying the elective discipline "Integrated Course of Morphological Disciplines" is based: compliance by the subjects of the educational process (students and scientific and pedagogical workers) with the principles of academic integrity, which include the refusal to plagiarize in any form, objective assessment of learning outcomes, mandatory reference to sources of information, etc.; formation of the level of theoretical knowledge, skills, practical skills, ways of thinking necessary for future professional activity; popularization of universal, national and professional values; familiarization of students with the basics of medical ethics and deontology; promotion of a healthy lifestyle; creation of conditions for the subjects of the educational process to maintain a positive image and business reputation of PSMU in the domestic and foreign educational and scientific space; creation of conditions for the personal development of students, the realization of their intellectual and cognitive abilities; formation of a humanistic worldview, tolerance, and multiculturalism.

During practical classes in the elective discipline "Integrated Course of Morphological Disciplines", students must adhere to the following obligations:

- be honest;
- treat teachers, employees and students of the university with respect;
- be responsible for their actions and the consequences they lead to;
- attend all classes according to the schedule, unless there is documentary confirmation of a good reason for missing them;
- come to classes on time and do not leave the classroom without the teacher's permission;
- complete all tasks and work within the specified deadlines;
- actively prepare for classes and participate in work during classes, while giving other students the opportunity to contribute to the educational process;
- comply with legislation, moral and ethical norms of behavior;
- master knowledge, practical skills, professional skills;
- treat the property of the department and educational materials with care;
- comply with sanitary and hygienic standards;
- timely inform the department administration about circumstances that prevent students from performing their duties or make them impossible;
- adhere to the dress code (white coat, medical cap);
- it is strictly forbidden to use a phone in the department premises for photo and video recording without the permission of the department staff.

The policy in the field of assessment of all types of educational achievements of students is based on the principles of transparency, objectivity and openness. The departments adhere to a firm course towards student-centered learning, practical implementation of the principles of individualization and differentiation in education, as well as the eradication of any manifestations of subjectivism and bias in assessment.

When organizing the educational process at PSMU, lecturers and students act in accordance with:

- Regulations on the organization of the educational process at Poltava State Medical University
 - Internal regulations for students of Poltava State Medical University
 - Regulations on the organization of independent work of students at Poltava State Medical University
 - Regulations on the procedure for the formation of individual educational trajectories by applicants for higher education at Poltava State Medical University
- Acquaintance with the above provisions is available at the link: <https://www.pdmu.edu.ua/n-process/department-npr/normativni-dokumenty>.

Description of the discipline. The elective educational component "Integrated Course of Morphological Disciplines" provides generalization and systematization of knowledge of the biological foundations of modern medicine and provides for a comprehensive consideration of the phenomena of norm and pathology in humans at the molecular-genetic, tissue, organ and organismal levels of life organization in the light of classical concepts and the latest achievements of morphological disciplines, the ability to use the acquired knowledge in the further study of other fundamental sciences of medicine and in the practical activities of a dentist.

The discipline is aimed at preparing applicants for higher medical education to pass the unified state qualifying exam "KROK 1".

The study of the elective discipline is carried out by students in the III year in the VIth semester. Classes are held in cycles according to the content modules.

Prerequisites and postrequisites of the academic discipline (interdisciplinary connections)

Prerequisites

The study of the elective discipline is based on the knowledge acquired by students during their study of medical biology, histology, cytology and embryology, human anatomy, biophysics, Latin, ethics, and philosophy, and is integrated with these disciplines.

Postrequisites

The elective discipline "Integrated Course of Morphological Disciplines" lays the foundations for students' study of 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 process of further study of all clinical disciplines and in future professional activities.

Disciplines for the study of which knowledge, skills and abilities are required, which are acquired after completing the study of this discipline:

- Obstetrics and Gynecology
- Internal Medicine
- Surgery
- Pediatrics
- Infectious Diseases

- Therapeutic Dentistry
- Surgical Dentistry
- Pediatric Dentistry
- Orthopedic Dentistry

Sustainable development goals implemented in the teaching of the discipline: good health and well-being, quality education, decent work and economic growth, partnership for sustainable development.

The purpose and objectives of the discipline.

1.1. The purpose of teaching the academic discipline "Integrated Course of Morphological Disciplines" is to repeat and systematize knowledge about the regularities of the structural organization and functions of human organs and systems, to form in future dentists elements of professional competencies and practical skills in the field of regularities of the structure, functioning of organs and systems of the human body, mechanisms of their regulation and adaptation to various environmental conditions, as well as the interpretation of modern research methods.

1.2. The main tasks of studying the discipline are systematic approach to describing the shape, structure of organs, position (topography) of parts and organs of the body in unity with the functions performed, taking into account age, sexual and individual characteristics of a person.

- To explain the regularities of manifestations of the vital activity of the human organism at the molecular-genetic, cellular, tissue, organ and organism levels.
- To determine the manifestations of the action of general biological laws during human ontogenesis.
- To determine the biological essence and mechanisms of the development of diseases that arise as a result of anthropogenic changes in the environment.
- To explain the essence and mechanisms of manifestation in the phenotype of hereditary human diseases.
- To make a preliminary conclusion about the presence of parasitic invasions of humans and determine measures for the prevention of diseases.
- To analyze information about the structure of the human body, its constituent systems, organs and tissues;
- To determine the topographic and anatomical relationships of human organs and systems;
- To interpret the patterns of prenatal and early postnatal development of human organs, variants of organ variability, developmental defects;
- To interpret sexual, age and individual features of the structure of the human body;
- To predict the interdependence and unity of the structures and functions of human organs, their variability under the influence of environmental factors;
- To determine the influence of social conditions and labor on the development and structure of the human body;
- To demonstrate possession of moral and ethical principles of attitude to a living person and his body as an object of anatomical and clinical research.

**Competences and learning outcomes,
the formation of which is facilitated by the discipline
(integral, general, special, matrix of competencies)**

According to the requirements of the Standard, the discipline provides students with the acquisition of competencies:

Integral: The ability to solve complex tasks and problems in the field of healthcare in the specialty "Dentistry" in professional activities or in the process of study, which involves conducting research and/or implementing innovations and is characterized by uncertainty of conditions and requirements.

General:

GC 1. Ability to think abstractly, analyze and synthesize.

GC 2. Knowledge and understanding of the subject area and understanding of professional activity.

GC 3. Ability to apply knowledge in practical activities.

GC 6. Skills in using information and communication technologies.

GC 7. Ability to search, process and analyze information from various sources.

GC 8. Ability to adapt and act in a new situation.

GC 9. Ability to identify, pose and solve problems.

GC 10. Ability to be critical and self-critical.

GC 12. Desire to preserve the environment.

GC 13. Ability to act socially responsible and consciously.

GC 14. The ability to exercise one's rights and obligations as a member of society, to be aware of the values of a civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of man and citizen in Ukraine.

GC 15. The ability to preserve and increase moral, cultural, scientific values and achievements of society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and engineering, to use various types and forms of physical activity for active recreation and leading a healthy lifestyle.

GC 16. The ability to make decisions and act, adhering to the principle of inadmissibility of corruption and any manifestations of dishonesty.

Special:

SC 1. Ability to collect medical information about the patient and analyze clinical data.

SC 2. Ability to interpret the results of laboratory and instrumental studies.

SC 13. Ability to assess the impact of the environment on the health of the population (individual, family, population).

SC 14. Ability to maintain regulatory medical documentation.

SC 15. Processing of state, social and medical information.

SC 17. Ability to legally support one's own professional activities.

***Program learning outcomes,
the formation of which is facilitated by the discipline:***

PLO 1. To identify and identify the leading clinical symptoms and syndromes; according to standard methods, using preliminary data from the patient's history, examination data, knowledge about the person, his organs and systems, to establish a reliable nosological or syndromic preliminary clinical diagnosis of a dental disease.

PLO 2. To collect information about the patient's general condition, to assess the patient's psychomotor and physical development, the condition of the organs of the maxillofacial region, to evaluate information about the diagnosis based on the results of laboratory and instrumental studies.

PLO 3. To prescribe and analyze additional (mandatory and optional) examination methods (laboratory, radiological, functional and/or instrumental), patients with diseases of the organs and tissues of the oral cavity and maxillofacial region for differential diagnosis of diseases.

PLO 8. To determine the approach, plan, type and principle of treatment of a dental disease by making a reasoned decision according to existing algorithms and standard schemes.

PLO 15. Assess the impact of the environment on the health of the population in a medical institution using standard methods.

PLO 20. Organize the necessary level of individual safety (one's own and those cared for) in the event of typical dangerous situations in the individual field of activity.

Learning outcomes of the academic discipline:

Upon completion of the discipline «Integrated Course of Study of Morphological Disciplines» students

must know:

- levels of organization of living things,
- forms of life and its fundamental properties;
- structural and functional organization of the eukaryotic cell;
- molecular foundations of heredity;
- cell cycle and methods of cell division;
- basic laws of heredity;
- variability, its forms and manifestations;
- classification of hereditary diseases, principles of their prenatal diagnosis;
- forms of reproduction of organisms;
- main stages of individual human development and their features;
- classification of congenital malformations; teratogenic factors;
- forms of symbiosis, parasitism as a biological phenomenon; classification of parasites and hosts;
- routes of transmission and the basis of parasitic diseases;
- pathogens of the most common protozoa and helminthiasis;
- microscopic and submicroscopic structure of human cells, tissues and organs at different ages, as well as in conditions of physiological and reparative regeneration;
- basic patterns of embryonic development of tissues and organs;
- form and structure of organs combined into systems;
- form and structure of bones (systema skeletale);
- joints of bones (systema articulare);

- muscles (systema musculare);
- viscera (systema digestorium, respiratorium, urinarium, genitalia);
- central and peripheral nervous system (including the autonomous department of the peripheral nervous system (systema nervorum);
- organs of internal secretion (glandulae endocrinae);
- organs and structures of the immune system;
- lymphoid system (systema lymphoideum);
- sensory organs (systema sensuum);
- common integument (integumentum commune);
- cardiovascular system (systema cardiovasculare);

be able to:

- to differentiate the components of an animal cell on electron micrographs and drawings;
- to identify (schematically) the primary structure of a protein, the number of amino acids, the molecular weight of a polypeptide by the nucleotide sequence of the gene encoding it;
- to predict the genotypes and phenotypes of offspring by the genotypes of the parents;
- to calculate the probability of the birth of a sick child with monogenic diseases with known genotypes of the parents;
- to exclude paternity when determining the blood groups of the parents and the child;
- to calculate the probability of the manifestation of hereditary diseases in offspring depending on the penetrance of the gene;
- to analyze the human karyotype and determine the diagnosis of the most common chromosomal diseases;
- to calculate the frequencies of genes and genotypes according to the Hardy-Weinberg law;
- to distinguish between the concepts of teratogenic and hereditary congenital malformations;
- to determine the place of a biological object (pathogens of parasitic diseases) in the system of living nature;
- to justify the belonging of human parasitic diseases to the group of transmissible and naturally focal;
- to justify the methods of laboratory diagnosis of human parasitic diseases;
- to ground the methods of prevention of parasitic diseases, based on the methods of infection with them;
- to use microscopic instruments;
- to examine histological and embryological specimens under a light microscope;
- to "read" electronic microphotographs;
- to draw up a protocol for describing the object under investigation;
- to master practical skills of working with a light microscope;
- to diagnose histological specimens;
- to study scientific literature and write essays;
- to demonstrate and describe the anatomical structure of organs, systems of human organs;

- to be able to evaluate the features of the structure and function of organs in childhood;
- to determine the topographic and anatomical relationships of organs and systems of human organs on anatomical preparations;
- to be able to evaluate the age, gender and individual features of the structure of human organs;
- to be able to evaluate the influence of social conditions and labor on the development and structure of the child's body;
- to be able to use Latin anatomical terms and their Ukrainian equivalents in accordance with the requirements of the international anatomical nomenclature (San Paulo, 1997; Kyiv, 2001).

Thematic plan of lectures – the discipline program does not provide for lectures

**Thematic plan of practical classes (by content modules),
specifying the basic issues, which are considered at the practical class**

№	Topic	Hours
	<i>Content module 1</i> <i>Medical and biological aspects of the functioning of the dento-maxillary apparatus</i>	
1	<p>Molecular basis of heredity in ensuring the functioning of the dentofacial apparatus.</p> <ol style="list-style-type: none"> 1. Nucleus: structure and functions. Chromosomal and genomic levels of organization of hereditary material. Chromatin: levels of spatial organization, classification. 2. Karyotype. Morphofunctional characteristics and classification of human chromosomes. Chromosomal analysis. The role of the oral cavity in the study of individual features of the human karyotype. 3. Nucleus as a derivative of chromosomes, role in the formation of ribosomes. 4. Characteristics of nucleic acids - DNA, RNA: spatial organization, species specificity, role in the storage and transfer of hereditary information. 5. Replication of the DNA molecule, its role in the regeneration of structures of the oral cavity and dentofacial apparatus. 6. Maintaining genetic stability of cells, repair of the DNA molecule. 7. Gene as a unit of genetic function. Classification of genes: structural genes, regulatory genes, tRNA genes, rRNA genes. 8. The structure of the pro- and eukaryotic gene. Exon-intron organization of the eukaryotic genome. 9. The genetic code, its basic properties. 10. Organization of the flow of information in the cells of the dentofacial organs: transcription, processing, splicing, translation, post-translational modification of proteins. 	2

2	<p>Patterns of heredity and variability in the functioning of the dentofacial apparatus.</p> <ol style="list-style-type: none"> 1. Laws of heredity of G. Mendel. Mono-, di- and polyhybrid crossing. Dominant and recessive types of inheritance of normal and pathological signs of a person, their manifestations at the level of the dento-maxillary apparatus. Extrachromosomal inheritance. 2. Interaction of allelic and non-allelic genes. Polygenic inheritance of signs in humans. Primary and secondary pleiotropy, its influence on the inheritance of signs of the oral cavity and dento-maxillary apparatus. Multiple allelism. Inheritance of human blood groups. Rhesus factor and Rhesus conflict. 3. Linked inheritance. Inheritance of human sex. Signs linked to sex, patterns of their inheritance on the example of the organs of the oral cavity and dento-maxillary apparatus. Signs limited by sex and dependent on sex. 4. Variability, its forms and manifestations. Phenotypic and genotypic variability. Modifications and reaction rate. Phenocopies, their manifestations at the level of the dentofacial apparatus. 5. Combinatorial variability, its sources. 6. Mutational variability in humans, its phenotypic manifestations. Classification of mutations: genomic, chromosomal aberrations, gene. Mutagens: physical, chemical, biological. 	2
3	<p>Problems of medical genetics. Methods of studying human heredity.</p> <ol style="list-style-type: none"> 1. Man as a specific object of genetic analysis. Methods of studying human heredity, their application for the study of hereditary signs of the dento-maxillary apparatus. 2. Classification of hereditary human diseases. Chromosomal diseases: cytogenetic method of diagnosis and manifestations from the dento-maxillary apparatus. Karyotyping. Determination of sex chromatin and the diagnostic role of the oral cavity organs. Molecular cytogenetic methods. 3. Monogenic (molecular) human diseases: examples, mechanism of occurrence. Biochemical and molecular genetic methods of diagnosis. 4. Population-statistical method. Hardy-Weinberg law. 5. Medical-genetic aspects of the family. Medical-genetic counseling. Prevention of hereditary and congenital pathologies, including pathologies of the dento-maxillary apparatus. Prenatal diagnosis of hereditary diseases. 	2
4	<p>Manifestations of parasitism in the organs of the dentofacial system: problems of medical protozoology.</p> <ol style="list-style-type: none"> 1. Parasitism as a form of interspecific interaction and a factor in human pathology. Principles of parasite classification. The role of the oral cavity in the formation of pathways and mechanisms of parasitic invasions. 2. Representatives of the subkingdom Protozoa – human parasites 	2

	<p>(medical geography, morphofunctional features, development cycles, routes of infection, impact on the functioning of the oral cavity organs, laboratory diagnostics, prevention):</p> <ul style="list-style-type: none"> • Phylum <i>Sarcomastigophora</i>. Class True amoebae (Lobosea). Dysenteric, intestinal, oral and other species of amoebae. • Class <i>Zoomastigophorea</i>. Giardia, trichomonads (vaginal, intestinal, oral). Leishmania, trypanosomes. Concept of natural focal and transmissible diseases. • Phylum <i>Apicomplexa</i>. Class <i>Sporozoa</i>. Malaria plasmodia, toxoplasma. • Phylum <i>Ciliophora</i>. Class <i>Rimostomatea</i>. Balantidium. 	
5	<p>Manifestations of parasitism in the organs of the dento-maxillary system: problems of medical helminthology.</p> <p>Helminths as pathogens of human diseases (medical geography, morphofunctional features, development cycles, routes of infection, pathogenic influence, laboratory diagnostics and prevention):</p> <ul style="list-style-type: none"> • Representatives of the phylum <i>Plathelminthes</i>, class <i>Trematoda</i> – causative agents of fascioliasis, opisthorchiasis, clonorchiasis, dicrocoeliasis, paragonimiasis and schistosomiasis. The role of the oral cavity in the formation of transmission routes and mechanisms of infection with trematodes. Specific manifestations of trematodes at the level of the organs of the dentoalveolar system. • Representatives of the phylum <i>Plathelminthes</i>, class <i>Cestoidea</i> – causative agents of taeniasis, cysticercosis, teniarhynchiasis, hymenolepiasis, diphyllbothriasis, echinococcosis and alveococcosis. The role of the oral cavity in the formation of transmission routes and mechanisms of infection with cestodes. Specific manifestations of cestodes at the level of the organs of the dentoalveolar system. • Representatives of the type <i>Nemathelminthes</i>, class <i>Nematoda</i> – causative agents of ascariasis, trichocephalosis, hookworm, necatoriasis, enterobiasis, trichinosis, strongyloidiasis, dracunculiasis, filariasis. The role of the oral cavity in the formation of transmission routes and mechanisms of infection with nematodes. Specific manifestations of nematodes at the level of the organs of the dento-maxillary system. 	2
	<p><i>Content module 2</i></p> <p><i>Actual issues in histology, cytology, human embryology</i></p>	
6	<p>Development of the face and oral cavity organs.</p> <ol style="list-style-type: none"> 1. Sources of development and stages of formation of the face and oral cavity. 2. The process of formation of the primary intestine. 3. Formation of the gill apparatus and its role in the development of the organs of the dento-maxillary system. 4. Formation of gill arches and their components. 5. Derivatives of the gill arches. Development of the face. 6. Development of processes. The role of the frontal process in the 	2

	<p>formation of the upper parts of the face (forehead, eye areas and nose).</p> <ol style="list-style-type: none"> 7. Participation of the nasal processes in the formation of the nose and nasal cavity. 8. Derivatives of the gill pockets and gill gaps. Primordial eyes and outer ear. 9. Possible defects in facial development. 10. Causes of defects in the face and oral cavity. 11. The oral cavity and gill apparatus. 12. Sources of development of the oral cavity organs. 13. Development of the face and primary oral cavity. 14. Stages of development of the definitive (final) oral cavity. 15. Development of the lower jaw. 16. Development of the upper jaw. 17. Development of the secondary palate. 18. Embryogenesis of the oral mucosa. 19. Clinical significance of studying the development of the oral cavity organs and the role of the knowledge gained in the formation of a future dentist. 20. Congenital malformations of the face. Critical periods of facial development. 	
7	<p>Development of temporary and permanent teeth.</p> <ol style="list-style-type: none"> 1. Sources and process of tooth development. Formation of the buccal-labial plate. 2. Formation of the dental plate and dental buds. 3. Formation of tooth primordia. 4. Differentiation of tooth primordia. 5. Formation of the tooth crown. 6. Formation of the tooth root. 7. Features of the formation of temporary and permanent teeth. 8. Development of the dentition system. 9. Main stages of development of deciduous and permanent teeth. 10. Stages of formation of tooth buds. 11. Morphofunctional characteristics of the stage of differentiation of tooth buds. 12. Early stage of tooth development. 13. Dental epithelial organ, its structure, development, derivatives. 14. Dental papilla, its structure, development, derivatives. 15. Dental sac, its structure, development, derivatives. 	2
8	<p>Histological structure of teeth.</p> <ol style="list-style-type: none"> 1. Morphological and functional characteristics of enamel, enamel plates, bundles, spindles. 2. Functions, location and chemical composition of enamel. Permeability of enamel and metabolism in it. 3. Structural and functional units of enamel. Structure and shapes of enamel prisms. Interprismatic substance in enamel. 	2

	<ol style="list-style-type: none"> 4. Non-prismatic enamel, its localisation. Dentin-enamel junction. Characteristics of Schragger lines and Retzius lines. 5. Cuticle and pellicle of the tooth. Age-related changes in tooth enamel. Causes of enamel destruction. 6. Morphofunctional characteristics of dentine. Dentine, types of dentine. Features of the structure of pulpous and mantle dentine. 7. Globular and interglobular dentine. Predentine. Denticles, their location and types. Features of dentine regeneration. 8. Sclerosed dentine. 'Dead pathways' in dentine. Comparative characteristics of bone tissue, dentine and enamel. 9. Primary, secondary and tertiary dentine. Trophic and metabolic processes. Age-related changes in dentine. 10. Morphological characteristics of cementum. Localisation and types of cementum. 11. Histological structure of the cellular composition of cementum. Cementoblasts and cementocytes, their structure and functions. 12. Structure of intercellular substance. Types of cementum (cellular and acellular), their location and structure. 13. Remodelling and regeneration of cementum. Features of the structure of bone tissue and cementum. 14. The role of cementum in tooth root fixation. 15. Age-related changes in cementum. 16. Comparative characteristics of hard tooth tissues. Cementocytes. 17. Morphofunctional characteristics of pulp. The importance of pulp. 18. Functions of pulp and its role in the trophism of tooth tissues and participation in regeneration processes. Features of the structure of pulp zones (peripheral, intermediate and central). 19. Differences in the structure of the coronal and root pulp. Nerve fibres and nerve endings in the dental pulp. 20. General characteristics of the dental supporting apparatus. The role of fibroblasts in the formation of the periodontium. 21. Morphofunctional characteristics of the periodontium. Structure of fibres. периодонта. Location and orientation of periodontal fibres. Characteristics of Sharpey's fibres. 22. Cellular composition of the periodontium. Blood supply to the periodontium. Periodontal gap. 	
<p>9</p>	<p>Features of the structure of the oral cavity organs.</p> <ol style="list-style-type: none"> 1. Structure of the oral mucosa. Functions of the mucous membrane. Structural and histochemical features of the oral mucosa epithelium. 2. Regional features of the structure of the epithelium (stratified non-keratinised and keratinised). Morphological differences between non-keratinised and keratinised epithelium in the organs of the oral cavity. 3. Characteristics of keratinocytes and non-keratinocytes (Merkel cells, melanocytes, Langerhans cells) in the epithelium of the oral cavity organs. 4. Orthokeratosis, parakeratosis, hyperkeratosis and dyskeratosis as types of keratinisation of the epithelium of the mucous membranes. 5. Features of the structure of the lamina propria (type of tissue, height 	<p>2</p>

	<p>and shape of papillae). The submucosa and its role in ensuring the mobility of the mucous membrane.</p> <ol style="list-style-type: none"> 6. Characteristics of the masticatory type mucous membrane. 7. Characteristics of the lining type mucous membrane. 8. Features of the structure of the specialised type of mucous membrane. 9. Sources of development of the digestive tract membranes. General plan of the structure of the digestive tract and its features in different sections. 10. Sources of development and stages of formation of the tongue. Defects in the development of the tongue. Features of the structure of the tongue. Functions of the tongue. 11. Features of the structure of different parts of the tongue. Papillae of the tongue, topography and structural features. The upper and lateral surfaces of the tongue, variety and structure of the papillae of the tongue, grooved papillae of the tongue, filiform papillae of the tongue, fungiform papillae, foliate papillae. Age-related features of the papillae of the tongue. 12. Morphofunctional characteristics of the mucous membrane of the lower part of the tongue. Structure of the muscular foundation of the tongue. 13. Taste organ. Localisation and structure of taste buds. Small salivary glands of the tongue. 14. Morphofunctional characteristics of the lips. Histological characteristics of different areas of the lips. Morphofunctional characteristics of the skin part of the lips. 15. Intermediate part of the lip (red border), features of its structure. External zone of the intermediate part (smooth) and internal (villous). 16. Mucous part of the lip. Features of the structure of the lips in children. 17. Sources of cheek development. Histological characteristics of the cheeks. Structural organisation of the maxillary and mandibular zones of the cheek. Features of the structure of the intermediate zone of the cheek. 18. Comparative characteristics of the cheeks and lips. Age-related features of the structure of the cheek. Histological structure of the gums. Morphofunctional characteristics of the gum zones. 19. Features of the structure of the free (marginal) and attached (alveolar) parts, interdental papillae. 20. Gingival sulcus. Dental-gingival epithelium. The importance of the dental-gingival junction and the consequences of its destruction. 21. Regional features of the structure of the gingival epithelium. Gingival fluid, its participation in protective reactions. Features of the structure of the lamina propria. Composition of alveolar bone tissue. 22. Development of the hard palate. Defects in the development of the hard palate. 23. Types of mucous membranes in the hard and soft palate. Areas of the hard palate, their structure. Soft palate, structure of the mucous 	
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	<p>membrane.</p> <p>24. Differences in the structure of the oropharyngeal and nasopharyngeal surfaces of the soft palate. Structure of the uvula.</p>	
10	<p>Development and structure of small and large salivary glands.</p> <ol style="list-style-type: none"> 1. General characteristics and types of salivary glands. Functions of salivary glands. Composition and functional significance of saliva. 2. Characteristics of the stages of development of large salivary glands (budding, differentiation, formation of excretory ducts, formation of terminal secretory sections, complete formation). 3. Differences in the formation of different salivary glands. 4. Features of the development of small salivary glands. 5. Age-related changes in salivary glands. 6. General characteristics and types of salivary glands. 7. Functions of the salivary glands. 8. Endocrine function of the glands. 9. Types of terminal secretory sections. Main characteristics of mucous and serous cells. 10. Morphological and functional characteristics of myoepithelial cells. 11. Types of salivary gland secretion. General structure of the salivary glands. 12. Characteristics of the terminal secretory sections and the excretory duct system. 13. Features of the histological structure of the parotid gland. Terminal secretory sections and the excretory duct system of the parotid salivary gland. 14. Structure of acini, characteristics of secretory cells (serocytes) and myoepithelial cells. Features of the structure of different types of excretory ducts. 15. Features of the histological structure of the sublingual gland. Terminal secretory sections and excretory duct system of the sublingual salivary gland. 16. Structure of acini, characteristics of secretory cells (serocytes, mucocytes) and myoepithelial cells. Features of the structure of different types of excretory ducts. 17. Morphogenesis and regeneration of salivary glands. Age-related changes in salivary glands. 18. Features of the histological structure of the submandibular gland. Functions of the salivary glands. Terminal secretory sections and the system of excretory ducts of the submandibular salivary gland. 19. Structure of acini, characteristics of secretory cells (serocytes, mucocytes) and myoepithelial cells. Features of the structure of different types of excretory ducts. 20. Morphogenesis and regeneration of salivary glands. Age-related changes in salivary glands. 21. Morphofunctional characteristics of the labial, palatal and buccal salivary glands. 	2

Content module 3. Current issues in Human Anatomy	
11	<p>The Locomotor system. Osteology, syndesmology, myology.</p> <ol style="list-style-type: none"> 1. General characteristics of the skull. X-ray anatomy of the skull. The cerebral section of the skull. Age and gender characteristics of the skull structure. Bones of the facial skull. Orbital fossa, bony base of the nasal cavity, bony palate, paranasal sinuses, their connections. Lateral norm of the skull: temporal, infratemporal, pterygopalatine fossae of the skull, their connections with the topographic formations of the skull. The vault of the skull, the outer and inner surfaces of the skull base. The anterior, middle and posterior cranial fossae. Joints of the skull: temporomandibular joint, structure. Age-related features of the skull joints: fontanelles, their types, structure, ossification terms. Sexual characteristics of the skull. Craniometry. 2. Classification of connections between bones. Types of synarthroses: fibrous connections (syndesmoses), cartilaginous connections (synchondroses) – permanent, temporary, hyaline, fibrous, symphysis. 3. Muscle as an organ – definition. Origin and attachment of muscles: their functional characteristics. Muscles and fasciae of the head: masticatory and facial. Muscles and fasciae of the neck, topography of the neck. Triangles of the neck, their clinical significance.
12	<p>Splanchnology. Endocrine glands.</p> <ol style="list-style-type: none"> 1. Digestive system: organs, functions. Development of the oral cavity and its components. Structural mechanisms of malformation. Oral cavity: its parts. Walls of the vestibule of the mouth and the oral cavity itself, their connections. Palate: hard palate, soft palate, their structure. Tongue: parts. Features of the structure of the mucous membrane, muscles of the tongue. Oral glands: classification, their development. Minor salivary glands: classification, topography, structure. Large salivary glands: topography, characteristics, structure, classification. General characteristics of the anatomical structure of teeth. Development of teeth. Parts of the tooth. Crown surfaces. Primary teeth: formulas, features of anatomical structure, eruption times. Anomalies and variants of primary tooth development. Permanent teeth: their formulas, characteristics of each type of tooth. Eruption times of permanent teeth. Tooth support apparatus (periodontium). Concept of occlusion, types of occlusion. Physiological and pathological bites. 2. Respiratory system: organs, functions. Upper and lower respiratory tract. Variations and anomalies in the development of the respiratory system organs. External nose: parts, structure. Nasal cavity: vestibule, nasal passages, paranasal sinuses.
13	<p>Cardiovascular system. Organs of the haematopoietic and immune systems.</p> <ol style="list-style-type: none"> 1. Internal carotid artery, topography, branches, areas of blood supply.

	<p>External carotid artery, topography, branches. Anterior, middle, posterior and terminal branches of the external carotid artery, areas of blood supply. Topography of the lingual, maxillary, facial and superficial temporal arteries and their branches. Arterial anastomoses in the oral cavity.</p> <ol style="list-style-type: none"> 2. General characteristics of the venous system, its differences from the arterial system, clinical significance. Tributaries of the superior vena cava. Veins of the head and neck: internal jugular vein, intracranial and extracranial tributaries. External jugular vein, tributaries. Anterior jugular vein, tributaries. Facial and submandibular veins: anatomical structure, tributaries, blood drainage basins. Topography of the facial and submandibular veins and their branches. 3. Characteristics of the lymphatic vessels and nodes of the facial and neck regions. Lymph drainage from the upper teeth. Lymph drainage from the lower teeth. Lymph drainage from the tongue. Topography of the lymphatic vessels and nodes of the oral region. 	
14	<p>Central nervous system.</p> <ol style="list-style-type: none"> 1. General characteristics of the nervous system. Classification of the nervous system. Concept of a neuron. Concept of reflex arcs. Development of the spinal cord. External and internal structure of the spinal cord. Localisation of grey and white matter in the spinal cord. Meninges and blood supply of the spinal cord. Topography. Developmental abnormalities and pathology of the spinal cord. Brain stem, general characteristics. Medulla oblongata. Localisation of grey and white matter. Topography. Clinical significance. Pons. Localisation of grey and white matter. Topography. Clinical significance. Fourth ventricle: walls. Rhomboid fossa: projection of cranial nerve nuclei onto the fossa, their general characteristics. Midbrain: topography, localisation of grey and white matter. Cerebral aqueduct. Cerebral peduncles. General characteristics of the diencephalon. Hypothalamus, metathalamus, epithalamus, structures. Localisation of grey and white matter. Topography. Clinical significance. Third ventricle, walls, connections. 2. General characteristics of the telencephalon. Hemispheres: surfaces, lobes. Relief of the telencephalon cortex. Dynamic localisation of functions in the cortex. Concept of cortical centres of analysis. 3. Structures of the olfactory brain. Basal ganglia. Striopallidal system, clinical significance, pathological conditions. Lateral ventricles. White matter of the hemispheres: commissural, associative, and projection pathways of the brain. Meninges. Cerebrospinal fluid: formation, circulation, outflow. Clinical significance and biochemical composition. 	
15	<p>Peripheral nervous system. Esthesiology. Conductive pathways of the brain and spinal cord.</p> <ol style="list-style-type: none"> 1. Characteristics of the peripheral nervous system. 2. Spinal nerves: formation, structure, branches. Posterior branches of 	

	<p>the spinal nerves, areas of innervation. Anterior branches of spinal nerves. Cervical plexus, branches, areas of innervation. Diaphragmatic nerve, topography. Brachial plexus: short and long branches, areas of innervation. Intercostal nerves: topography, areas of innervation. Lumbar plexus, areas of innervation, clinical significance. Sacral plexus, branches, topography, areas of innervation. Sciatic nerve: topography of branches, areas of innervation, clinical significance.</p> <p>3. General characteristics of the cranial nerves: structure, topography, functions. Oculomotor nerve: branches, areas of innervation. Glossopharyngeal nerve: branches, areas of innervation. Abducens nerve: branches, areas of innervation. General characteristics of the trigeminal nerve: formation, areas of innervation. Maxillary nerve: topography, branches, areas of innervation. Innervation of the upper jaw teeth. Mandibular nerve, topography, branches, areas of innervation. Innervation of the lower teeth. Facial nerve. Intermediate nerve: nuclei, characteristics, topography, branches, areas of innervation. Facial nerve proper: areas of innervation. Clinical significance. Characteristics of the vagus nerve: topography, branches, areas of innervation. Branches of the cranial, cervical, thoracic and abdominal divisions of the vagus nerve, their clinical significance. General characteristics of the glossopharyngeal nerve: nuclei, branches, areas of innervation. Accessory and hypoglossal nerves: nuclei, branches, areas of innervation, clinical significance.</p> <p>4. Clinical and anatomical rationale for conduction anaesthesia in dental practice.</p> <p>5. Manifestations of damage to the somatic and vegetative branches of the cranial nerves that innervate the oral cavity.</p>	
Total:	30	

Self-directed work

№	Topic	Hours
	Content module 1	
1	Preparation for practical classes – theoretical preparation and development of practical skills (5×1 hour)	5
2	Work on topics that are not included in the plan of classroom lessons (5×3 hours):	15
2.1	<p>Modern ideas about the phenomenon of life (attributes, forms, levels).</p> <p>1. The essence of life. Fundamental properties and attributes of living systems.</p> <p>2. Forms of life: non-cellular and cellular. General characteristics of non-cellular infectious agents (prions, viroids, viruses).</p> <p>3. General features of pro- and eukaryotic cell organization.</p> <p>4. Strategies of evolutionary development of living organisms.</p>	3

	<p>5. Evolutionarily conditioned structural levels of life organization. Elementary structures of levels and the main biological phenomena characterizing them. The importance of ideas about the levels of organization of living things for medicine.</p> <p>6. The special place of man in the system of the organic world. Human biosocial phenomenon.</p>	
2.2	<p>Structural and functional organization of a eukaryotic cell. Cytological foundations of the functioning of the dento-maxillary apparatus.</p> <ol style="list-style-type: none"> 1. Cytoplasm and cytoskeleton. Cyclosis. Cytoplasmic organelles – membrane and non-membrane, inclusions. The concept of lysosomal storage diseases, mitochondrial and peroxisomal diseases, their significance for the functioning of the dento-maxillary apparatus. 2. Cell membranes, their structure and functions. Cell receptors. Transport of substances through the plasmalemma. 3. The cell as an open system. Assimilation and dissimilation. Stages of energy metabolism, the role of the oral cavity in this process. 4. Organization of the cell in time. Cell cycle. The concept of apoptosis and necrosis. Methods of cell division: mitosis and meiosis, their biological significance. 5. Changes in cells and their structures during the mitotic (cellular) cycle (interphase and mitosis) as the basis for growth and regeneration of tissues of the dento-maxillary apparatus. 6. Mitotic disorders, somatic mutations. Amitosis, endomitosis, polyteny. 7. Regulation of the mitotic cycle. Growth factors. 8. Mitotic activity of tissues. Tumor growth, its manifestations at the level of the dentofacial apparatus.. 	3
2.3	<p>Biological features of individual human development, their manifestations at the level of the dentofacial apparatus.</p> <ol style="list-style-type: none"> 1. Features of human reproduction. Features of the processes of gametogenesis (ovo- and spermatogenesis) and fertilization in humans. 2. Stages of human embryonic development. Cleavage, its disorders (polyembryony, formation of monozygotic twins, developmental defects). 3. Gastrulation. Histo-, organo- and systemogenesis. Embryonic features of the development of the organs of the dento-maxillary apparatus. Provisional organs. 4. Critical periods of development. Teratogenesis. Teratogenic environmental factors. 5. Ontogenetically determined congenital malformations of humans, their classification. Manifestations of congenital malformations at the level of the dento-maxillary apparatus. 6. Periodization of postembryonic human development. Development of the organs of the dento-maxillary system at different stages of 	3

	<p>postnatal ontogenesis.</p> <p>7. Types and ways of regeneration, manifestations of this process at the level of the oral cavity and dentofacial apparatus.</p> <p>8. Types of tissue transplantation in humans, significance for dentistry and maxillofacial surgery.</p>	
2.4	<p>Manifestations of parasitism in the organs of the dentoalveolar system: problems of medical arachnoentomology.</p> <p>1. Phylum <i>Arthropoda</i>: general characteristics, diversity, systematics.</p> <p>2. Representatives of the <i>Arthropoda</i> phylum as pathogens and carriers of pathogens of infections and invasions (medical geography, morphofunctional features, development cycles, routes of infection, pathogenic influence, laboratory diagnostics and prevention), as well as animals dangerous to humans; the relationship of routes of infection and clinical manifestations of damage to the organs of the dentoalveolar system:</p> <ul style="list-style-type: none"> • Class <i>Arachnoidea</i>. Scabies mite, demodex as pathogens of scabies and demodicosis. • Class <i>Arachnoidea</i>. Ixodes, argas, gamas mites as carriers of pathogens of human diseases. • Venomous arachnids (scorpions, spiders). • Class <i>Insecta</i>. Order Cockroaches (<i>Blattoidea</i>). Cockroaches as mechanical vectors of human diseases. • Class <i>Insecta</i>. Order Flies (<i>Diptera</i>). Flies, mosquitoes, mosquitoes, their medical significance. Gnats and their components: characteristics, significance of intermediate hosts of helminths and vectors of human pathogens. • Class <i>Insecta</i>. Orders Lice (<i>Anoplura</i>), Fleas (<i>Aphaniptera</i>), Bedbugs (<i>Hemiptera</i>), their medical significance. 	3
2.5	<p>Evolutionary and ecological aspects of the functioning of the human dentofacial apparatus.</p> <p>1. Features of the action of evolutionary factors in human populations. The doctrine of macro- and microevolution.</p> <p>2. Population structure of humanity. Ideal and real populations.</p> <p>3. Biogenetic law of Haeckel-Muller. Ontophylogenetically determined congenital malformations of human development (atavisms), their manifestations at the level of the dentofacial apparatus.</p> <p>4. Evolution of the dentofacial system. Formation of the dentofacial apparatus. Classification and localization of the most common anomalies of the development of the maxillofacial area.</p> <p>5. Ecology. Environment and environmental factors as an ecological concept. Unity of the organism and the environment.</p> <p>6. The concept of homeostasis. Stress. Functional types of human response to environmental factors (“sprinter”, “stayer”, “mixed”).</p> <p>7. Biological variability of people in connection with biogeographical features of the environment. Adaptive ecotypes of people.</p> <p>8. Man as an ecological factor. Main directions and results of</p>	3

	anthropogenic changes in the environment. Environmental protection. 9. The teachings of academician V.I. Vernadsky about the biosphere and noosphere. Living matter and its characteristics.	
	Content module 2	
1.	Preparation for practical classes – theoretical study and mastering of practical skills (5×1 hour)	5
2.	Study topics that are not included in the schedule of classroom lessons (5×3 hours):	15
2.1	Structure of the cytoplasm. Membranous and non-membranous organelles. 1. Organelles: definition, classification. Organelles for general and special purposes. 2. Endoplasmic reticulum, its types, morphofunctional characteristics. 3. The Golgi complex, structure, functions. 4. Lysosomes, their types. Peroxisomes. 5. Mitochondria, structural features, functions. 6. Ribosomes: structure and functions. 7. Microfilaments. Microtubules. Structure and functions. 8. Centrosome (cell center). 9. Cilia and flagella. 10. Inclusion – definition and meaning.	3
2.2	Cell division. The cell cycle. Aging and death of the cell. 1. The cell cycle and its periods. 2. Types of cells that exit the cell cycle. 3. Cell reproduction: mitosis, meiosis, endomitosis, and amitosis. 4. Interphase, characteristics, values. 5. Mitosis. General characteristics. 6. Restructuring of the structural components of the cell during different phases of mitosis: prophase, metaphase, anaphase, telophase. 7. Atypical mitoses. Amitosis is a direct division. 8. Characterization of meiosis. 9. Cellular adaptation and its importance for the preservation of cell life in changed environments. 10. Apoptosis and its biological and medical significance. 11. Cell aging and death. Necrosis.	3
2.3	Fertilisation. Implantation. Formation of extra-embryonic organs. 1. Characteristics of fertilisation and factors that impact on this process. 2. Characteristics of the capacitation process. 3. Description of the acrosomal reaction. 4. Contact interaction of sperm and egg. 5. Formation of the metaphase plate of the zygote and its preparation for division. 6. General morphofunctional characteristics of the process of human ovum division.	3

	<p>7. Characteristics of the process of compacting and morula formation.</p> <p>8. General characteristics of the implantation process. Characteristics of implantation phases. Anomalies of implantation.</p> <p>9. Histiotrophic and haematotrophic types of embryo nutrition.</p> <p>10. Critical periods of development.</p> <p>11. In vitro fertilisation. Embryo cloning. Multi-fetal pregnancy.</p>	
2.4	<p>Early stages of development of the human embryo itself.</p> <p>1. Gastrulation. Definition and its content. The main gastrulation types in vertebrates. Characteristics of the gastrulation process.</p> <p>2. Presomite and somite periods of embryo development.</p> <p>3. General plan of the placenta structure. Functions of the placenta. Structure of the maternal and fetal parts of the placenta.</p> <p>4. Structure and functions of the umbilical cord.</p> <p>5. Structure and importance of the amniotic membrane for the embryo.</p> <p>6. The structure of the amnion.</p> <p>7. Structure and functions of the yolk sac.</p> <p>8. Structure and functions of allantois.</p>	3
2.5	<p>Endocrine system organs.</p> <p>1. Endocrine system. The hypothalamus. Morphofunctional characteristics of the pineal gland. Classification of organs of the endocrine system.</p> <p>2. Features of the structure of the endocrine glands.</p> <p>3. The pineal gland, sources of development. The structure of the pineal gland. Characteristics of pineal cells.</p> <p>4. Pineal hormones, their effect.</p> <p>5. The hypothalamic-pituitary system.</p> <p>6. Sources and main stages of embryonic development of the pituitary gland. General characteristics of the pituitary gland.</p> <p>7. Thyroid glands. Sources of development and general morphofunctional characteristics of the thyroid gland.</p> <p>8. Structure of the thyroid gland, tissue and cellular composition, structural and functional unit.</p> <p>9. General characteristics of the parathyroid glands. Parathyroid hormone and its role in the regulation of calcium homeostasis.</p> <p>10. Adrenal glands. Origin of the adrenal glands, age-related changes.</p> <p>11. General morphofunctional characteristics of the adrenal gland. Structure of the cortical, glomerular and reticular zones.</p> <p>12. Structure of the adrenal medulla, cellular composition.</p>	3
	Content module 3	
1	Preparation for practical classes – theoretical training and practical skills development (5×1 hour)	5
2	Studying topics not included in the classroom schedule (5×3 hours):	15
2.1	<p>Development and classification of bones.</p> <p>1. General information about the skeleton. Primary and secondary bones. Classification of bones. Compact and spongy bone tissue, their structure. Chemical composition, physical and mechanical</p>	3

	<p>properties of bone.</p> <ol style="list-style-type: none"> 2. Structure of a tubular bone: its parts. Features of bone structure in childhood, adolescence, adulthood, old age and senility. 3. Bones of the axial skeleton: vertebrae, sternum, ribs. 4. Bones of the appendicular skeleton: bones of the girdle and free upper limb; bones of the girdle and free lower limb. 	
2.2	<p>Introduction to Splanchnology.</p> <ol style="list-style-type: none"> 1. General structure of the wall of tubular organs: mucous membrane, muscular membrane, outer membrane. 2. Organ-specific features of the structure of the mucous membrane depending on the function of the organ. 3. Serous membrane: variations in the relationship of organs to the peritoneum. 4. General patterns in the structure of parenchymal organs. 5. Glands: their classification, general principles of structure, functions. 	3
2.3	<p>The human immune system.</p> <ol style="list-style-type: none"> 1. General characteristics of the immune system. Organs of blood formation and the immune system. Central organs of the immune system - red bone marrow, thymus. Structure, topography, functions. Age-related features. Peripheral organs of the immune system: spleen, lymph nodes, tonsils, appendix, etc. 2. General characteristics of the lymphatic system. Characteristics of the lymphatic vessels and nodes of the head and neck. Clinical significance. Lymphatic vessels and nodes of the chest cavity and upper extremities. Right lymphatic duct. Lymphatic vessels and nodes of the lower extremities, pelvis, and abdominal cavity. Thoracic duct, formation, topography, tributaries. 	3
2.4	<p>Concepts of the animal and autonomic (vegetative) nervous systems. Anatomy and functional characteristics of the brain and spinal cord.</p> <ol style="list-style-type: none"> 1. Vegetative nervous system. Clinical aspects. Sympathetic nervous system. Parasympathetic nervous system. Intestinal nervous system. 2. Structure of the reticular formation. Zones of the reticular formation. Nuclei associated with the reticular formation. Conductive pathways of the reticular formation. Functions of the reticular formation. 3. Limbic system. Limbic lobe. Brain stem centres associated with limbic system function. Pathways of the limbic system. Clinical aspects. 	3
2.5	<p>Visual analyzer: peripheral division (eyeball and auxiliary apparatus), conducting pathways, subcortical and cortical centres. Auditory and statokinetic analyzers: peripheral divisions, conducting pathways. Subcortical and cortical centres. Organs of smell and taste. Skin, skin derivatives. Conduction pathways of the central nervous system. Ascending projection pathways of the brain and spinal cord. Descending projection pathways (pyramidal and extrapyramidal).</p>	3

	<ol style="list-style-type: none"> 1. Concept of analysers. Characteristics of the sense organs. 2. General characteristics of the organ of vision. The eyeball: chambers, membranes, refractive media. Auxiliary apparatus of the organ of vision: eyelids, lacrimal apparatus, etc. Conduction pathway of the organ of vision. II pair of cranial nerves 3. General characteristics of the organ of hearing and balance. Outer, middle, inner ear, structure, components. Tympanic cavity: walls, contents, ossicles. VIII pair of cranial nerves. Conduction pathway of the organ of hearing and balance. 4. General characteristics of the pathways of special sensitivity. 5. The olfactory organ. Central and peripheral divisions, their structure, components. The olfactory pathway. The first pair of cranial nerves. The organ of taste: the taste pathway. 6. The skin: structure, functions. Skin appendages. The skin pathway. 7. General characteristics of the pathways of the brain and spinal cord. Ascending conducting projection pathways of the cortical direction. Ascending conducting projection pathways of the cerebellar direction. Descending conducting pathways of the brain and spinal cord. Pyramidal pathways. Descending conducting pathways of the brain and spinal cord. Extrapyramidal pathways. 	
	Total	60

Individual tasks:

- Creation of multimedia presentations with reports at meetings of the scientific student group of the department,
- Participation in the manufacture of macro- and micro-preparations,
- Participation in research work of the department,
- Participation in writing abstracts and articles, reports at student scientific conferences.

The form of the final control of study success is a credit

A list of theoretical questions for the preparation of students for the credit

Content module 1

Medical and biological aspects of the functioning of the dento-maxillary apparatus

1. The essence of life. Fundamental properties and attributes of living systems.
2. Life forms: non-cellular and cellular. General characteristics of non-cellular infectious agents (prions, viroids, viruses).
3. General features of the organization of pro- and eukaryotic cells.
4. Strategies of evolutionary development of living organisms.
5. Evolutionarily determined structural levels of the organization of life. Elementary structures of the levels and the main biological phenomena that characterize them. The human dento-maxillary apparatus in the concept of levels of organization of life. The significance of ideas about the levels of organization of living things for medicine and dentistry.

6. The special place of man in the system of the organic world. The biosocial phenomenon of man.
7. Cytoplasm and cytoskeleton. Cyclosis. Cytoplasmic organelles - membranous and non-membranous, inclusions. The concept of lysosomal storage diseases, mitochondrial and peroxisomal diseases, their significance for the functioning of the dentofacial apparatus.
8. Cell membranes, their structure and functions. Cell receptors. Transport of substances through the plasmalemma.
9. The cell as an open system. Assimilation and dissimilation. Stages of energy metabolism, the role of the oral cavity in this process.
10. Organization of the cell in time. Cell cycle. The concept of apoptosis and necrosis. Methods of cell division: mitosis and meiosis, their biological significance.
11. Changes in cells and their structures during the mitotic (cellular) cycle (interphase and mitosis) as the basis for the growth and regeneration of tissues of the dentofacial apparatus.
12. Disturbances of mitosis, somatic mutations. Amitosis, endomitosis, polyteny.
13. Regulation of the mitotic cycle. Growth factors.
14. Mitotic activity of tissues. Tumor growth, its manifestations at the level of the dentofacial apparatus.
15. Nucleus: structure and functions. Chromosomal and genomic levels of organization of hereditary material. Chromatin: levels of spatial organization, classification.
16. Karyotype. Morphofunctional characteristics and classification of human chromosomes. Chromosomal analysis. The role of the oral cavity in the study of individual features of the human karyotype.
17. Nucleus as a derivative of chromosomes, role in the formation of ribosomes.
18. Characteristics of nucleic acids - DNA, RNA: spatial organization, species specificity, role in the storage and transfer of hereditary information.
19. Replication of the DNA molecule, its role in the regeneration of structures of the oral cavity and dentofacial apparatus.
20. Maintenance of genetic stability of cells, repair of the DNA molecule.
21. Gene as a unit of genetic function. Classification of genes: structural, regulatory genes, tRNA, rRNA genes.
22. Structure of pro- and eukaryotic genes. Exon-intron organization of the eukaryotic genome.
23. Genetic code, its main properties.
24. Organization of information flow in cells of the dentofacial apparatus: transcription, processing, splicing, translation, post-translational modification of proteins.
25. Laws of heredity of G. Mendel. Mono-, di- and polyhybrid crossing. Dominant and recessive types of inheritance of normal and pathological human traits, their manifestations at the level of the dentofacial apparatus.
26. Extrachromosomal inheritance.
27. Interaction of allelic and non-allelic genes. Polygenic inheritance of traits in humans. Primary and secondary pleiotropy, its influence on the inheritance of

- signs of the oral cavity and dentofacial apparatus. Multiple allelism. Inheritance of human blood groups. Rhesus factor and Rhesus conflict.
28. Linked inheritance. Inheritance of human sex. Signs linked to sex, patterns of their inheritance on the example of the organs of the oral cavity and dentofacial apparatus. Signs limited by sex and dependent on sex.
 29. Variability, its forms and manifestations. Phenotypic and genotypic variability. Modifications and reaction rate. Phenocopies, their manifestations at the level of the dentofacial apparatus.
 30. Combinatorial variability, its sources.
 31. Mutational variability in humans, its phenotypic manifestations. Classification of mutations: genomic, chromosomal aberrations, gene. Mutagens: physical, chemical, biological.
 32. Peculiarities of human reproduction. Peculiarities of the processes of gametogenesis (ovo- and spermatogenesis) and fertilization in humans.
 33. Stages of human embryonic development. Cleavage, its disorders (polyembryony, formation of monozygotic twins, developmental defects).
 34. Gastrulation. Histo-, organo- and systemogenesis. Embryonic features of the development of the organs of the dento-maxillary apparatus. Provisional organs.
 35. Critical periods of development. Teratogenesis. Teratogenic environmental factors.
 36. Ontogenetically determined congenital malformations of humans, their classification. Manifestations of congenital malformations at the level of the dento-maxillary apparatus.
 37. Periodization of postembryonic human development. Development of the dentofacial system organs at different stages of postnatal ontogenesis.
 38. Types and pathways of regeneration, manifestations of this process at the level of the oral cavity and dentofacial apparatus.
 39. Types of tissue transplantation in humans, significance for dentistry and maxillofacial surgery.
 40. Human as a specific object of genetic analysis. Methods of studying human heredity, their application for the study of hereditary signs of the dentofacial apparatus.
 41. Classification of hereditary human diseases. Chromosomal diseases: cytogenetic method of diagnosis and manifestations from the dentofacial apparatus. Karyotyping. Determination of sex chromatin and the diagnostic role of the oral cavity organs. Molecular cytogenetic methods.
 42. Monogenic (molecular) human diseases: examples, mechanism of occurrence. Biochemical and molecular genetic diagnostic methods.
 43. Population-statistical method. Hardy-Weinberg law.
 44. Medical-genetic aspects of the family. Medical-genetic counseling. Prevention of hereditary and congenital pathologies, including pathologies of the dentofacial apparatus. Prenatal diagnosis of hereditary diseases.
 45. Parasitism as a form of interspecific interaction and a factor in human pathology. Principles of parasite classification. The role of the oral cavity in the formation of pathways and mechanisms of parasitic invasions.

46. Representatives of the subkingdom Protozoa – human parasites (medical geography, morphofunctional features, development cycles, infection routes, impact on the functioning of the oral cavity organs, laboratory diagnostics, prevention): phylum Sarcomastigophora. Class Lobosea. Dysentery, intestinal, oral and other types of amoebae.
47. Representatives of the subkingdom Protozoa – human parasites (medical geography, morphofunctional features, development cycles, infection routes, impact on the functioning of the oral cavity organs, laboratory diagnostics, prevention): Class Zoomastigophorea. Giardia, trichomonads (vaginal, intestinal, oral).
48. Representatives of the subkingdom Protozoa – human parasites (medical geography, morphofunctional features, development cycles, infection routes, impact on the functioning of the oral cavity organs, laboratory diagnostics, prevention): Class Zoomastigophorea. Leishmania, trypanosomes. Concept of natural focal and transmissible diseases.
49. Representatives of the subkingdom Protozoa – human parasites (medical geography, morphofunctional features, development cycles, infection routes, impact on the functioning of the oral cavity organs, laboratory diagnostics, prevention): Phylum Apicomplexa. Class Sporozoa. Malaria plasmodia, toxoplasma.
50. Representatives of the subkingdom Protozoa – human parasites (medical geography, morphofunctional features, development cycles, infection routes, impact on the functioning of the oral cavity organs, laboratory diagnostics, prevention): Phylum Ciliophora. Class Rimostomatea. Balantididae.
51. Helminths as pathogens of human diseases (medical geography, morphofunctional features, development cycles, infection routes, pathogenic impact, laboratory diagnostics and prevention):
52. Representatives of the phylum Plathelminthes, class Trematoda – pathogens of fasciolosis, opisthorchiasis, clonorchiasis, dicrocoeliasis, paragonimiasis and schistosomiasis. The role of the oral cavity in the formation of transmission routes and mechanisms of infection with trematodes. Specific manifestations of trematodes at the level of the dentofacial system organs.
53. Representatives of the phylum Plathelminthes, class Cestoidea – causative agents of taeniasis, cysticercosis, teniarhynchiasis, hymenolepidosis, diphyllbothriasis, echinococcosis and alveococcosis. The role of the oral cavity in the formation of transmission routes and mechanisms of infection with cestodes. Specific manifestations of cestodes at the level of the organs of the dentoalveolar system.
54. Representatives of the phylum Nematelminthes, class Nematoda – causative agents of ascariasis, trichocephalosis, hookworm, necatoriasis, enterobiasis, trichinosis, strongyloidiasis, dracunculiasis, filariasis. The role of the oral cavity in the formation of transmission routes and mechanisms of infection with nematodes. Specific manifestations of nematodes at the level of the organs of the dentoalveolar system.
55. Phylum Arthropoda (Arthropoda): general characteristics, diversity, taxonomy.
56. Representatives of the phylum Arthropoda as pathogens and carriers of pathogens of infections and invasions, the relationship of infection routes and clinical

- manifestations of damage to the organs of the dento-jaw system: Class Arachnoidea. Scabies mites, demodex as pathogens of scabies and demodicosis.
57. Representatives of the phylum Arthropoda as pathogens and carriers of pathogens of infections and invasions, the relationship of infection routes and clinical manifestations of damage to the organs of the dento-jaw system: Class Arachnoidea. Ixodes, argas, and gamas ticks as vectors of pathogens of human diseases.
 58. Representatives of the phylum Arthropoda as pathogens and carriers of pathogens of infections and invasions, the relationship of clinical manifestations from damage to the organs of the dento-maxillary system: Venomous arachnids (scorpions, spiders).
 59. Representatives of the phylum Arthropoda as pathogens and carriers of pathogens of infections and invasions, the relationship of clinical manifestations from damage to the organs of the dento-maxillary system: Venomous arachnids (scorpions, spiders).
 60. Representatives of the Arthropoda phylum as pathogens and carriers of pathogens of infections and invasions, the connection of the routes of infection and clinical manifestations of damage with the organs of the dento-jaw system: Class Insecta (Insecta). Order Diptera (Diptera). Flies, mosquitoes, mosquitoes, their medical significance. Gnat and its components: characteristics, significance of intermediate hosts of helminths and vectors of pathogens of human diseases.
 61. Representatives of the Arthropoda phylum as pathogens and carriers of pathogens of infections and invasions, the connection of the routes of infection and clinical manifestations of damage with the organs of the dento-jaw system: Class Insecta (Insecta). Orders Lice (Anoplura), Fleas (Aphaniptera), Bedbugs (Hemiptera), their medical significance.
 62. Peculiarities of the action of evolutionary factors in human populations. The doctrine of macro- and microevolution.
 63. Population structure of humanity. Ideal and real populations.
 64. Biogenetic law of Haeckel-Muller. Ontophylogenetically determined congenital malformations of human development (atavisms), their manifestations at the level of the dentofacial apparatus.
 65. Evolution of the dentofacial system. Formation of the dentofacial apparatus. Classification and localization of the most common anomalies of the development of the maxillofacial area.
 66. Ecology. Environment and environmental factors as an ecological concept. Unity of the organism and the environment.
 67. The concept of homeostasis. Stress. Functional types of human response to environmental factors (“sprinter”, “stayer”, “mixed”).
 68. Biological variability of humans in connection with biogeographical features of the environment. Adaptive ecotypes of humans.
 69. Man as an ecological factor. Main directions and results of anthropogenic changes in the environment. Environmental protection.
 70. The doctrine of academician V.I. Vernadsky about the biosphere and noosphere. Living matter and its characteristics.

Content module 2

Actual issues in histology, cytology, human embryology

1. General morphofunctional characteristics of the digestive system. Principles of classification of digestive glands and sections of the digestive tract.
2. Development of the digestive system. Sources of development of the digestive tract wall and digestive glands in its various sections.
3. Oral cavity. General morphofunctional characteristics of the organs of the oral cavity.
4. Oral cavity. General histological and functional characteristics of the oral mucosa. Types of mucous membrane.
5. Lips. Characteristics of the skin, transitional and mucous parts. Lip glands.
6. Cheeks. Characteristics of the mandibular, maxillary and intermediate zones. Cheek glands.
7. Hard palate. Features of the marginal, glandular, fatty and sutural zones of the hard palate. Features of the mucous membrane in different zones.
8. Soft palate. Structure and characteristics of the mucous membrane.
9. Gums. Features of the structure of the gum mucosa. Gingival papillae, their functional significance.
10. Floor of the oral cavity. Boundaries, characteristics of the mucous membrane of the floor of the oral cavity. Glands. Structure of the sublingual fold, upper and lower lip frenula.
11. Tongue, its structure. Features of the structure of the mucous membrane of the back of the tongue, lower and lateral surfaces.
12. Mucous membrane of the back of the tongue. Papillae of the tongue. Taste buds. Salivary glands of the tongue.
13. Major salivary glands of the oral cavity. General characteristics. Classification.
14. General structure of the terminal sections and excretory ducts of the salivary glands. Features of the salivation process in the structural elements of the salivary gland lobule.
15. Features of the structure of the protein, mucous and mixed terminal sections of the salivary glands. Secretory cycle in serocytes.
16. Characteristics of the duct system of the salivary glands. Classification of ducts, cytological characteristics of epithelial cells. The importance of ducts in the formation of final saliva.
17. Minor salivary glands. Localisation, functions, structural features.
18. Parotid salivary glands. Morphofunctional characteristics of the terminal sections and excretory ducts.
19. Sublingual salivary glands. Morphofunctional characteristics of the terminal sections and excretory ducts.
20. Submandibular glands. Morphofunctional characteristics of the terminal sections and excretory ducts.
21. Teeth. General histofunctional characteristics. General structure of teeth.
22. Hard and soft tissues of the tooth. Their importance in the functioning of teeth.
23. Enamel. Enamel prisms and interprismatic substance.
24. Enamel of an erupted tooth. Features of calcification, metabolism and nutrition of enamel.

25. Surface structures of the tooth crown. Cuticle, pellicle, dental plaque and their role in metabolic processes.
26. Dentin, its microscopic and ultramicroscopic characteristics, physical and chemical properties.
27. Dentin tubules (canals), the main substance of dentin. Dentin fibres.
28. Structure of odontoblasts and their importance for the vital activity of dentin.
29. Dentin, features of calcification, types of dentin: globular, interglobular dentin.
30. Dentin, types of dentin: pre-dentin, mantle and pulpous.
31. Primary, secondary, tertiary dentin. Dentin reaction to damage.
32. Sclerosed dentine. Dead spaces in dentine. Their structural characteristics, causes and mechanism of formation.
33. Dentine-enamel junction. Enamel plates, bundles, spindles. Their origin and significance.
34. Morphofunctional characteristics of cementum and its physicochemical properties. Cellular and acellular cementum. Nutrition of cementum.
35. Similarities and differences in the structure of dentine, cementum and bone.
36. Tooth grinding. Its significance for studying the structure of hard tooth tissues.
37. Morphofunctional characteristics and features of the structure of tooth pulp.
38. Pulp. Structure of the peripheral, intermediate and central layers of the pulp.
39. Pulp of the crown and pulp of the tooth root. Reactive properties and regeneration of the pulp. Denticles.
40. The role of odontoblasts in tooth development and in the formed tooth.
41. Structure and comparative characteristics of the soft tissues of the tooth.
42. Supporting apparatus of the teeth. Periodontium. Features of the location of fibres in different parts of the periodontium.
43. Gingival pocket, its role in the physiology of the tooth. Epithelial tooth-gingival attachment.
44. Periodontium. Its structural components, their functional significance.
45. Development of the face and oral cavity. Oral cavity, formation of the primary oral cavity.
46. Gills, their development and prospective significance. Derivatives of pockets, arches, clefts.
47. The significance of the first gill arch for the formation of the face. Derivatives, possible developmental defects. Development of the jaws during facial development in embryogenesis.
48. Formation of the secondary oral cavity. The role of the nasal and palatal processes in this process. Possible developmental defects and their medical significance.
49. The frontal process. Its role in facial formation. Derivatives.
50. Formation of the nasal cavity from the primary oral cavity. The role of the nasal and palatal processes in this process. Possible developmental defects of this part, their medical significance.
51. Formation of the nose from the frontal process, sequence of formation. Possible developmental defects of this part of the face, medical significance.
52. Formation of the upper lip in embryogenesis. Possible developmental defects, their medical significance.

53. Formation of palatal sutures in ontogenesis. Possible defects in embryonic development of the palate.
54. Formation of the lower lip and cheek suture. Possible defects in this area.
55. Sources of development and mechanisms of tongue formation in the embryonic period.
56. Development of the dento-maxillary system in ontogenesis. Formation of the buccal-labial plate.
57. Development of the dentition and jaw system in ontogenesis. Formation of dental plates and dental buds.
58. General characteristics of the stages of tooth formation.
59. Formation of dental primordia. Epithelial dental organ and mesenchymal primordia, their prospective significance.
60. Differentiation of dental primordia. Parts of the enamel organ and their prospective significance in the further development of the tooth.
61. Differentiation of dental primordia. Parts of the dental papilla and their prospective significance in the further development of the tooth.
62. Morphofunctional characteristics of dental papilla cells, their prospective significance.
63. Differentiation of dental primordia. Parts of the dental sac and their prospective significance in further tooth development.
64. Morphofunctional characteristics of dental sac cells, their prospective significance.
65. Histogenesis of dentine. Odontoblasts and their significance in dentine formation.
66. Formation of mantle dentine. Formation of Tompsons' processes, their significance for further tooth function.
67. Formation of periapical dentine. The role of odontoblasts in this process.
68. Predentin. Its formation and significance in the post-embryonic period.
69. Histogenesis of enamel. Enameloblasts, source and mechanism of formation, their role in the formation of enamel prisms.
70. Tooth root development. Sources of development, the role of epithelial root sheaths in tooth root formation.
71. Cementoblasts and their importance in cement formation.
72. Cement formation after tooth eruption. Its importance for the functioning of the dentition and jaw system.
73. Formation of the periodontium. Sources and mechanism of its development.
74. Formation of the blood supply to the periodontal ligament, the role of interdental septa in this process.
75. Development of the dental pulp. Vascularisation and innervation of the developing tooth.
76. Development of the tissues of the dental crown. The role of mesenchyme in the formation of the crown.
77. Development of the tissues of the dental root. The role of the epithelial enamel organ in the formation of roots.
78. Eruption of deciduous teeth. Characteristics of deciduous occlusion.
79. Theories of tooth eruption, their comparative characteristics.
80. Timing of eruption of deciduous and permanent teeth. Formula for tooth eruption.

81. Age-related changes in teeth. Prevention of inflammatory and dystrophic changes in the dentition and jaw system.
82. Age-related changes in the supporting apparatus of the teeth. Prevention of inflammatory and dystrophic changes in the dentition and jaw system.

Content module 3

Current issues in Human Anatomy

1. General characteristics of the skull. X-ray anatomy of the skull.
2. Cerebral section of the skull. Age and gender characteristics of the skull structure.
3. Bones of the facial skull.
4. The eye socket, the bony base of the nasal cavity, the bony palate, the paranasal sinuses, and their connections.
5. The lateral norm of the skull: the temporal, infratemporal, and pterygopalatine fossae of the skull, and their connections with the topographical structures of the skull.
6. The vault of the skull, the outer and inner surfaces of the skull base. The anterior, middle and posterior cranial fossae.
7. The joints of the skull: the temporomandibular joint, its structure. Age-related features of the skull joints: fontanelles, their types, structure, ossification times. Sexual characteristics of the skull. Craniometry.
8. Classification of connections between bones.
9. Types of synarthroses: fibrous connections (syndesmoses), cartilaginous connections (synchondroses) – permanent, temporary, hyaline, fibrous, symphysis.
10. Diarthroses (synovial joints): definition, main features of joints, their characteristics. Additional components of joints.
11. Muscle as an organ – definition. Origin and insertion of muscles: their functional characteristics.
12. Classification of muscles: by development, topography, shape, size, direction of muscle fibres, function, etc. Sources of development of the muscles of the trunk, head, neck, upper and lower limbs.
13. Digestive system: organs, functions. Oral cavity: its parts. Walls of the vestibule of the mouth and the oral cavity itself, their connections.
14. Palate: hard palate, soft palate, their structure.
15. Tongue: parts. Features of the structure of the mucous membrane, muscles of the tongue.
16. Salivary glands: classification, their development. Minor salivary glands: classification, topography, structure. Major salivary glands: topography, characteristics, structure, classification.
17. Teeth. Development of teeth. Parts of the tooth. Crown surfaces. General structure of teeth.
18. Pharynx, its topography, parts, connections.
19. Oesophagus: topography, parts, wall structure. Narrowing of the oesophagus.
20. Stomach: topography, parts of the stomach.
21. Small intestine, its sections. Structure of the small intestine wall. Age-related features of the small intestine structure.

22. Large intestine: sections. Structure of the large intestine wall. Macroscopic differences in the structure of the small and large intestines. Age-related features of the large intestine structure.
23. Liver. Topography, structure. Connections of the liver. Relationship to the peritoneum. Functions of the liver.
24. Pancreas: parts, topography, structure, functions.
25. Peritoneum. Abdominal cavity, its contents. Peritoneal cavity, its contents. Anomalies and variants of development of the digestive tract organs.
26. Respiratory system: organs, functions. Upper and lower respiratory tract. Variants and anomalies of development of the respiratory system organs.
27. External nose: parts, structure. Nasal cavity: vestibule, nasal passages, paranasal sinuses. Functional parts of the nasal cavity. Nasal part of the pharynx. Age-related features of the nasal cavity.
28. Larynx. Topography. Structure of the larynx. Age-related features of the larynx.
29. Trachea: parts, topography, wall structure. Main bronchi: topography, wall structure.
30. Bronchial tree. Age-related features of the trachea and main bronchi.
31. Lungs: topography, structure. Lobes, segments, lobules of the lung. Acinus. Age-related features of the lungs.
32. Pleura. Parietal pleura and its topographical parts. Visceral pleura. Pleural cavity: contents, recesses, their functional significance.
33. Mediastinum: definition, boundaries.
34. Urinary system: organs, functions. Variants and anomalies in the development of the urinary system organs: kidneys, ureters, bladder, and urethra.
35. Kidney: topography of the right and left kidneys. External structure of the kidney. Relationship of the kidney to the peritoneum. Kidney membranes. Kidney fixation apparatus. Topography of the elements of the renal pedicle.
36. Internal structure of the kidney. Kidney segments. Nephron – structural and functional unit of the kidney. Structure of the renal circulatory system.
37. Urinary tract. Minor renal calyces, major renal calyces, renal pelvis, wall structure, functions. Age-related features of the topography and structure of the kidney. Ureter: parts, topography, wall structure, function. Relationship to the peritoneum. Constrictions of the ureter.
38. The urinary bladder: shape, external structure, parts. Features of topography in men and women. Structure of the bladder wall: features of the structure of the mucous membrane, muscular membrane. Relationship to the peritoneum (depending on functional state).
39. Urethra. Sexual characteristics. Clinical significance.
40. Development of the reproductive system. Male reproductive system: organs, functions. Classification of the organs of the male reproductive system. Internal male reproductive organs. Variations and abnormalities in the development of internal male reproductive organs: testicles, epididymis, vas deferens, seminal vesicle, prostate gland. External male reproductive organs. Developmental abnormalities.
41. Female reproductive system: organs, functions. Classification of female reproductive organs. Internal female reproductive organs. Variations and

- abnormalities in the development of internal female reproductive organs: ovaries, fallopian tubes, uterus, vagina. Uterus: topography, shape, parts, wall structure. Age-related features of the structure of the uterus and variations in its position. External female reproductive organs, defects and developmental abnormalities.
42. General principles of the structure of endocrine glands, their differences from exocrine glands. Structural mechanisms of hormone action. Classification of endocrine organs.
 43. Central division of the endocrine system. Pituitary gland. Hypothalamic-pituitary neurosecretory system (hypothalamic-adenohypophyseal and hypothalamic-neurohypophyseal systems). Pineal gland (epiphysis).
 44. Peripheral organs of the endocrine system (thymus gland, thyroid gland, parathyroid glands, adrenal glands, endocrine part of the pancreas, gonads, their structure, topography, clinical significance). Features of the functional activity of endocrine organs in the prenatal period of human ontogenesis.
 45. Heart, structure, chambers, walls. Topography of the heart. Arteries and veins of the heart. The cardiac circle of blood circulation.
 46. Conduction system of the heart: components, clinical significance.
 47. Pericardium, topography, structure, functions. Large and small circles of blood circulation.
 48. Structure of the arterial vessel wall. Vessels of the large circle of blood circulation. Patterns of vessel distribution according to Lesgaft.
 49. Aorta, topography, branches.
 50. Internal carotid artery, topography, branches, blood supply areas.
 51. External carotid artery, topography, branches. Anterior, middle, posterior and terminal branches of the external carotid artery, blood supply areas. Anastomoses.
 52. Subclavian artery, topography, branches, areas of blood supply. Vertebrobasilar basin, Wallenberg-Zakharchenko circle, clinical aspects.
 53. Arteries of the upper limb.
 54. Thoracic aorta, topography, branches, areas of blood supply, anastomoses. Abdominal aorta, topography, branches, areas of blood supply, anastomoses.
 55. Iliac arteries, topography, branches, areas of blood supply, anastomoses.
 56. Arteries of the lower extremities.
 57. General characteristics of the venous system, its differences from the arterial system, clinical significance. Tributaries of the superior vena cava. Veins of the head and neck: internal jugular vein, intracranial and extracranial tributaries. External jugular vein, tributaries. Anterior jugular vein, tributaries.
 58. Veins of the chest cavity, veins of the upper limb. Anastomoses.
 59. System of the inferior vena cava, its tributaries. Anastomoses.
 60. Tributaries of the portal vein of the liver, its formation, clinical significance. Inter-system anastomoses: cava-caval anastomoses, porto-caval anastomoses, their clinical significance.
 61. Features of foetal blood circulation.
 62. General characteristics of the nervous system. Classification of the nervous system. Concept of a neuron. Concept of reflex arcs.
 63. Development of the spinal cord. External and internal structure of the spinal cord. Localisation of grey and white matter in the spinal cord. Membranes and blood supply of the spinal cord. Topography. Developmental abnormalities and pathology of the spinal cord.

64. Development of the brain.
65. Brain stem, general characteristics.
66. Medulla oblongata. Localisation of grey and white matter. Topography. Clinical significance.
67. Pons. Localisation of grey and white matter. Topography. Clinical significance.
68. Pons.
69. Fourth ventricle: walls. Rhomboid fossa: projection of cranial nerve nuclei onto the fossa, their general characteristics.
70. Midbrain: topography, localisation of grey and white matter. Cerebral aqueduct. Cerebral peduncles.
71. General characteristics of the diencephalon. Hypothalamus, metathalamus, epithalamus, structures. Localisation of grey and white matter. Topography. Clinical significance. Third ventricle, walls, connections.
72. General characteristics of the telencephalon. Hemispheres: surfaces, lobes. Relief of the telencephalon cortex. Dynamic localisation of functions in the cortex.
73. Concept of cortical centres of analysers. Structures of the olfactory brain.
74. Basal ganglia. Striopallidal system, clinical significance, pathological conditions.
75. Lateral ventricles. White matter of the hemispheres: commissural, associative, and projection pathways of the brain.
76. Meninges of the brain. Cerebrospinal fluid: formation, circulation, outflow. Clinical significance and biochemical composition.
77. Characteristics of the peripheral nervous system.
78. Spinal nerves: formation, structure, branches. Posterior branches of the spinal nerves, areas of innervation. Anterior branches of the spinal nerves.
79. Cervical plexus, branches, areas of innervation. Diaphragmatic nerve, topography.
80. Brachial plexus: short and long branches, areas of innervation.
81. Intercostal nerves: topography, areas of innervation.
82. Lumbar plexus, areas of innervation, clinical significance.
83. Sacral-coccygeal plexus, branches, topography, areas of innervation. Sciatic nerve: topography of branches, areas of innervation, clinical significance.
84. General characteristics of the cranial nerves: structure, topography, functions.
85. Oculomotor nerve: branches, areas of innervation. Trochlear nerve: branches, areas of innervation. Abducens nerve: branches, areas of innervation.
86. General characteristics of the trigeminal nerve: formation, areas of innervation. Innervation of the upper jaw teeth. Mandibular nerve, topography, branches, areas of innervation.
87. Facial nerve. Intermediary nerve: nuclei, characteristics, branches, areas of innervation. Facial nerve proper: areas of innervation. Clinical significance.
88. Characteristics of the vagus nerve: topography, branches, areas of innervation. Branches of the cranial, cervical, thoracic and abdominal divisions of the vagus nerve, their clinical significance.
89. General characteristics of the glossopharyngeal nerve: nuclei, branches, areas of innervation.
90. Accessory and hypoglossal nerves: nuclei, branches, areas of innervation, clinical significance.

Teaching methods:

- methods that provide perception and assimilation of knowledge by students (lectures, independent work, instruction, consultation);
- methods of applying knowledge and acquiring and consolidating skills and abilities (practical classes, control tasks, performance of practical tasks);
- methods of testing and assessing knowledge, skills and abilities;
- methods of encouragement and punishment.
- business game, presentations, analysis of specific situations (case method).

Assessment forms and methods:

- ***Entrance control*** is carried out at the beginning of the academic discipline in order to determine the readiness of higher education applicants for its assimilation. Control is carried out in test mode.
- ***Current control*** is carried out during practical classes, in order to ensure feedback between a scientific and pedagogical worker and a student of higher education in the process of learning and formation of educational motivation of students of higher education.
- ***The final control*** is carried out in order to evaluate the results of training in the discipline.
- ***Oral survey*** allows to control knowledge and verbal abilities, helps to correct speech errors; reproduction of the material contributes to its better memorization, active use of scientific concepts, which is impossible without sufficient application of them in speech.
- ***A written survey*** helps to find out the level of assimilation of the material, but the possibility of writing off should be excluded and the students should be carefully monitored during this survey.
- ***Testing*** as a standardized assessment method meets the new goals and objectives of higher medical education and promotes individualization and control of the educational process and is designed to ensure the quality of training of the future doctor.
- ***Self-control*** is intended for self-assessment by students of higher education of the quality of assimilation of educational material from the discipline (content module, section, topic). For this purpose, questions (situational problems, test problems) for self-control are provided for each topic (section).

The system of continuous and final control

Control measures for the evaluation of educational activities determine the compliance of the level of acquired knowledge and skills, formed competences with the requirements of the educational program and are carried out in order to determine the level of formation of disciplinary competences and the corresponding learning outcomes provided for by the work program of the educational discipline.

Entrance control is carried out at the beginning of the discipline in order to determine the readiness of higher education students to master it. The control is performed in test mode.

Current control is carried out during practical classes and aims to check the level of readiness of the student to perform a particular job.

Forms of current control during practical classes at the Department of Medical Biology:

1. Checking the tasks performed during independent preparation for practical training.
2. Oral examination.
3. Computer test control on the topic of the lesson.
4. Consideration of situational tasks «Крок 1» with an explanation of the correct answer.

Evaluation of the current educational activity is carried out by scientific and pedagogical staff during practical classes.

The teacher necessarily evaluates the success of each student in each lesson on a four-point (traditional) scale, taking into account the standardized, generalized criteria for evaluating the knowledge of students of higher education. The evaluation of success is integrated (all types of work of a student of higher education are evaluated, both in preparation for classes and during classes) according to criteria that are brought to the attention of students of higher education at the beginning of studying the discipline.

Table 1

Standardized generalized criteria for knowledge assessment applicants for higher education in PSMU

By the 4-point scale	Point EKTS	Evaluation criteria
5 (excellent)	A	The student is fluent in the studied amount of material, applies it in practice, freely solves exercises and problems in standardized situations, independently corrects errors, the number of which is insignificant, has at least 85% knowledge of the topic as during the survey, and all types of control
4 (good)	B	The student is fluent in the studied amount of material, applies it in practice, freely solves exercises and problems in standardized situations, independently corrects errors, the number of which is insignificant, has at least 85% knowledge of the topic as during the survey, and all types of control .
	C	The student is able to compare, summarize, systematize information under the guidance of a scientific and pedagogical worker, in general, independently apply it in practice, control their own activities; to correct mistakes, among which there are significant ones, to choose arguments to confirm opinions, has at least 75% of knowledge on the topic both during the survey and all types of control.

3 (satisfactorily)	D	The student reproduces a significant part of the theoretical material, demonstrates knowledge and understanding of the main provisions, with the help of a scientific and pedagogical worker, can analyze the educational material, correct errors, among which there are a significant number of significant ones, possesses at least 65% of knowledge on the topic both during the survey and all types of control.
	E	The learner has educational material at a level higher than the initial, a significant part of it reproduces at the reproductive level. has at least 60% knowledge of the topic both during the survey and all types of control.
2 (unsatisfactorily)	FX	The student has the material at the level of individual fragments that make up a small part of the material, has less than 60% knowledge of the topic both during the survey and all types of control.
	F	The student has the material at the level of elementary recognition and reproduction of individual facts, elements, has less than 60% knowledge of the topic as during the survey, and all types of control.

The final control is carried out in order to evaluate the results of training in the discipline. Assessment is a form of final control of the learner's assimilation of theoretical and practical material on the discipline "Integrated course of morphological disciplines" is conducted at the last lesson in the discipline based on the results of the current assessment. This type of final control does not involve any additional written work, survey, or testing in the last lesson.

Students of higher education who have obtained the required minimum number of points during the current control (average grade point is 3.0 and above), do not have missed lectures, seminars and practical classes and have fulfilled all the requirements provided for by the work curriculum in the discipline receive credit.

The learning result is evaluated on a two-point scale (passed/failed) and a multi-point scale. The average score for the current activity is converted into points on a 200-point scale, according to the table. The maximum number of points that can be obtained by a student of education in the discipline is 200. The minimum number of points that must be obtained by a student of higher education is 122.

In the event that the student fulfills the conditions for obtaining a credit, the scientific-pedagogical employee publishes the final semester control and individual study plan of the student as "credited" and the number of points scored by the student for the discipline. Information about students who did not receive a credit, with a precise indication of the reason, is also included in the "Information of the final semester control" and in the individual study plan. The reasons for not receiving a credit can be the following: a) the student of higher education has missed classes; b) the student of higher education attended all practical classes, but did not score the minimum number of points for the current educational activity and is not allowed to be counted.

After the assessment, the first copy of the "Information of the final semester control" is given to the responsible employee of the dean's office within one day after the assessment, the second copy is kept at the department.

In the case of failure to pass the test, the latter is retaken according to the schedule of the department, which is agreed with the dean's office, but not more often than once a day, until the beginning of the next academic semester.

Table 2

Unified table of correspondence of scores for current performance, scores for PMK, exam and traditional four-point score

Average score for current performance (A)	Points for current success in the module (A * 24)	Points for PMK from the module (A*16)	Points for the module and / or exam (A*24 + A*16)	Category ECTS	By 4-point scale
2	48	32	80	F FX	2 unsatisfactorily
2,1	50	34	84		
2,15	52	34	86		
2,2	53	35	88		
2,25	54	36	90		
2,3	55	37	92		
2,35	56	38	94		
2,4	58	38	96		
2,45	59	39	98		
2,5	60	40	100		
2,55	61	41	102		
2,6	62	42	104		
2,65	64	42	106		
2,7	65	43	108		
2,75	66	44	110		
2,8	67	45	112		
2,85	68	46	114		
2,9	70	46	116		
2,95	71	47	118		
3	72	50	122	E	3 satisfactorily
3,05	73	50	123		
3,1	74	50	124		
3,15	76	50	126		
3,2	77	51	128	D	
3,25	78	52	130		
3,3	79	53	132		
3,35	80	54	134		
3,4	82	54	136		
3,45	83	55	138		

3,5	84	56	140	C	4 good
3,55	85	57	142		
3,6	86	58	144		
3,65	88	58	146		
3,7	89	59	148		
3,75	90	60	150		
3,8	91	61	152		
3,85	92	62	154		
3,9	94	62	156		
3,95	95	63	158		
4	96	64	160		
4,05	97	65	162		
4,1	98	66	164		
4,15	100	66	166		
4,2	101	67	168		
4,25	102	68	170		
4,3	103	69	172		
4,35	104	70	174		
4,4	106	70	176		
4,45	107	71	178		
4,5	108	72	180		
4,55	109	73	182		
4,6	110	74	184		
4,65	112	74	186		
4,7	113	75	188		
4,75	114	76	190		
4,8	115	77	192		
4,85	116	78	194		
4,9	118	78	196		
4,95	119	79	198		
5	120	80	200		
				B	
				A	5 excellent

Methodical support

- thematic plan of practical classes;
- independent work plan;
- criteria for evaluating knowledge;
- test tasks;
- textbooks and training aids;
- educational content (demonstration and didactic materials);
- audio and video recordings;
- multimedia presentations;
- resource catalogs.

Recommended reading:

Basic:

1. Medical Biology. Parasitology. Genetics: textbook / S.Ya. Paryzhak. Lviv: "Novyj Svit-2000", 2024. 432 p.
2. Biological features of the human vital activity / G.A. Yeroshenko, O.V. Klepets, N.O. Perederii, A.V. Vatsenko, N.A. Ulanovska-Tsyba, O.B. Riabushko, K.V. Shevchenko. Poltava : TOB HBП «Укрпромторгсервіс», 2021. 262 p.
3. Organismic level of life organisation. Bases of human genetics / Yeroshenko G.A., Klepets O.V., Kinash O.V., Perederii N.O., Vatsenko A.V., Ulanovska-Tsyba N.A., Riabushko O.B., Shevchenko K.V. Poltava: TOB HBП «Укрпромторгсервіс», 2021. 288 p.
4. Population-species, biogeocenotic and biosphere levels of life organization. Training text-book on Medical biology (module II) for students of medical and dental specialties / Yeroshenko G.A., Klepets O.V., Kinash O.V., Perederii N.O., Vatsenko A.V., Ulanovska-Tsyba N.A., Riabushko O.B., Shevchenko K.V. Poltava: TOB HBП «Укрпромторгсервіс», 2022. 266 p.
5. Basic Histology. Text&Atlas / Luiz Carlos Junquiera. – 14th ed/ - McGraw-Hill, Medical Publishing Division, 2020. 528 p.
6. Histology: A Text and Atlas. With Correlated Cell and Molecular Biology / W. Pawlina, M. Ross. 8th ed. International ed. IE. Philadelphia; Baltimore; New York etc.: Wolters Kluwer, 2020. 1045 p.
7. General histology in figures and diagrams : [textbook for English-speaking students in speciality 222-Medicine in a higher educational institutions of the Ministry of the Health of Ukraine] / G. A. Yeroshenko, T. A. Scotarenko, O. S. Yakushko, O. V. Vilkhova. Poltava : Укрпромторгсервіс, 2020. 126 p.
8. Anatomy. In three volumes. Volume 1 / Edited by V.G. Koveshnikov. Human. 2nd ed., corr. and suppl. Lviv: «Magnolia 2006», 2021. 328 p.
9. Human Anatomy. In three volumes. Volume 2 / Edited by V.G. Koveshnikov. 2nd ed., corr. and suppl. Lviv: «Magnolia 2006», 2021. 248 p.
10. Human Anatomy. In three volumes. Volume 3 / Edited by V.G. Koveshnikov. 2nd ed., corr. and suppl. Lviv: «Magnolia 2006», 2021. 384 p.
11. Human Anatomy: textbook / Cherkasov V.G., Herasymiuk I.Ye., Holovatskyi A.S., Kovalchuk O.I. [et al.]. Vinnytsia Nova Knyha, 2018. 464 p.
12. Svintsytska N. L. Morphofunctional characteristic of the skull with clinical aspects: study guide / N. L. Svintsytska, V. H. Hryn, O. I. Kovalchuk. Poltava, 2020. 205 p.

Information resources:

1. Base of KROK-1 questions: <http://testcentr.org.ua>
2. OMIM (Online Mendelian Inheritance in Man) – An Online Catalog of Human Genes and Genetic Disorders <http://omim.org/>
3. Medicine Encyclopedia Articles on the site of Britannica: <https://www.britannica.com/browse/Medicine>
4. Human biology: <http://jbpub.com/humanbiology>

5. Human biology on Website of Open Textbook Library:
<https://open.umn.edu/opentextbooks/textbooks/human-biology>
6. Inner Body : [educational site]. - Access mode : <http://www.innerbody.com/>
7. Anatomy Atlases is curated by Michael P. D'Alessandro, M.D. and Ronald A. Bergman, Ph.D. - Access mode : <http://www.anatomyatlases.org/>
8. Acland's Video Atlas of Human Anatomy / Wolters Kluwer. - Access mode :
<https://aclandanatomy.com/>
9. 3D anatomy atlas. Human anatomy physiology. Human body anatomy 3D. Anatomy physiology flash cards. Atlas of human anatomy. Gray`s anatomy. - Access mode :
<http://www.anatomatlas.com/>
10. About Healthline Body Maps : interactive visual search tool/Healthline Media. -
Access mode : <http://www.healthline.com/human-body-maps/male>
11. Zygote Body : 3D anatomical models of the human body / Zygote Media Group. -
Access mode : www.zygotebody.com

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