Federal state budget educational institution of higher education "Ural state medical university" of the Ministry of Health of the Russian Federation

Department of normal physiology

APPROVED BY
Vice-Rector for educational activity
Ph.D. of Medical Sciences, Associate Professor A. A. Ushakov

2025г.

Working program of the discipline
Physiology (including physiology of the maxillofacial area)

Specialty: 31.05.03 Dentistry
Higher education level: Specialist degree
Qualification: dentist

Ekaterinburg
2025

The work program of the discipline "Physiology (including maxillofacial physiology)" has been compiled in accordance with the requirements of the Federal State Educational Standard of Higher Education in the specialty 05/31/03 Dentistry (specialty level), approved by Order of the Ministry of Science and Higher Education of the Russian Federation dated 08/12/2020 №984, and taking into account the requirements of the professional standard "Dentist", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation № 227n dated May 10, 2016, based on Federal Law № 149 dated July 27, 2006 "On Informatization, Information Technologies and Information Protection"; as well as Decree of the Government of the Russian Federation No. 3759-r dated December 21, 2021 "On Approval of the strategic direction in the field of digital transformation science and higher education".

The program is compiled by: Gagarina E.M. Candidate of Medical Sciences, Associate Professor at the Department of Normal Physiology

The program is reviewed by: Grebnev D.Y., Doctor of Medical Sciences, Associate Professor, Head of the Department of Pathologic Physiology

The working program of the discipline was discussed and approved at the 2025 Department meeting, Protocol №

Discussed and approved by the Methodological Commission of the specialty "Dentistry" on June 6, 2025. (Protocol №. 1).

1. The purpose of studying the discipline

To provide students with systematic knowledge about the functioning of a whole organism, the laws of its functioning, and the mechanisms of regulation of physiological functions. To develop the skills and abilities to study and assess the state of the physiological systems of the body necessary to perform the work functions required by the professional standard 02.005 "Dentist", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation dated May 10, 2016 № 227n, including using end-to-end technologies and digital tools, and on the basis of the Federal Law of 27.07.2006 № 149 "On Informatization, Information Technologies and Information Protection"; as well as Decree of the Government of the Russian Federation dated December 21, 2021 № 3759-r "On approval of the strategic direction in the field of digital transformation of science and higher education".

2. Objectives of the discipline:

1. Teaching a systematic approach in the process of studying the physiological mechanisms and processes which unerlie the functioning of organs and systems, as well as the regulation of vital functions of the body;
2. Studying the modern methods of basic physiological functions research, the development of physiological thinking, understanding the possibilities of managing living processes;
3. Formation of skills for assessing the state of organs and body systems which necessary for functional diagnostics;
4. Moral and deontological education, inculcation of bioethical norms and rules in the work of a doctor;
5. Formation of sanitary culture skills, healthy lifestyle, fight against bad habits;
6. Formation of students' skills of work with educational and scientific literature using cross-cutting digital technologies and digital tools within the framework of the realization of the Federal project "Digital Educational Environment"

3. The place of the discipline in the structure of the Main educational program

The discipline "Physiology (including the physiology of the maxillofacial area)" belongs to the mandatory part of Block 1 "Disciplines (modules)" of the Main educational program for specialty 31.05.03 - "Dentistry". The discipline is focused on obtaining fundamental natural science training.

4. Requirements for the results of studying the discipline on the basis of the Federal State Educational Standard:

The process of studying the discipline is aimed at teaching and forming the following competence which is necessary for the graduate to perform labor functions and labor actions according to the professional standard "Dentist" approved by Order of the Ministry of Labor and Social Protection of the Russian Federation № 227n dated May 10, 2016:

б) general professional:

Category (group) of general professional competencies	Code and name of the general professional competence	Index of the labor function and its content	Code and name of the indicator of general professional competence achievement

Bases of fundamental and natural science knowledge	GPC-9. Able to assess morphofunctional states and pathologic processes in the human organism to solve professional problems	Conducting an examination of a patient in order to establish a diagnosis (A/01.7)	IOPC-9.1. Is able to analyze the structure, topography and development of cells, tissues, organs and organ systems in interaction with their function in norm and pathology, anatomical and physiological, age-sex and individual features of the structure and development of a healthy and sick organism IOPC 9.2. Is able to evaluate morphofunctional and physiological indicators based on the results of a physical examination of a patient IOPC 9.3. Is able to evaluate morphofunctional and physiological indicators based on the results of laboratory and instrumental examination of the patient 9.4. Is able to substantiate morphofunctional features, physiological states and pathological processes in the human body to solve professional tasks

As a result of studying the discipline of Physiology (including the physiology of the maxillofacial area), the student must:

know:

- the biological role of the dentofacial area, the biomechanics of chewing, age-related changes in the maxillofacial area, the peculiarities of the external and internal environment affection on it

- the main issues of the normal and pathologic physiology of the dentofacial system, its interrelation with the functional state of other organism systems and the levels of their regulation

- patterns of a healthy organism functioning and mechanisms of physiological processes regulation, considered from the viewpoint of general physiology, special physiology and

integrative behavioral humans activity.

- the essential of research methods of various functions of a healthy organism, including the oral cavity, used in medicine.
- The complex interrelation between dental health, nutrition, general health, diseases, and the medicines usage

be able to:

- explain the principle of the most important research methods of a healthy organism functions;
- explain the informational value of various indicators (constants) and the mechanisms of regulation of organs, systems and activity of the whole organism; analyze the results of the checkup
- assess the physical development and functional state of the patient's organism
- to conduct sanitary and hygienic education among patients (their relatives/legal representatives) and medical workers in order to form a healthy lifestyle
- use educational, scientific, popular science literature, the Internet for professional activity

possess:

- medico-functional conceptual framework.
- methods of conducting experiments
- skills of working with open data sources and knowledge bases, interpretation of laboratory research results
- digital technologies of information transformation: text, tabular editors
- the technique of measuring blood pressure, counting heart rate and respiratory rate

5. Amount and type of academic work

Types of academic work	Labour intensity hours		Semesters (second)	Semesters (third)
Classroom studies (total)	189		108	81
Including:				
Lectures	34		18	16
Practical classes	90		36	54
Laboratory work				
Independent work (total)	65		54	11
Forms of certification in the discipline (exam)	27			27
Total labor intensity of the discipline	Hours	CU		
	216	6		

6. Content of the discipline

6.1. Content of sections and didactic unit

Discipline content	**The main content of the section, didactic unit**
DU-1 Physiology of excitable tissues	Electrical processes in cell membranes. Physiology of synapses, muscles, receptors. The process of

GPC-9	excitation, the concept of threshold. Adequate stimuli. The laws of irritation of excitable tissues. Physiology of synapses and nerve fibers, laws of nerve impulse conduction. Lability. Electrical phenomena in the oral cavity. Galvanism. Physiology of skeletal, smooth muscles. The cardiac muscle.
DU-2 Physiology of the central nervous system GPC-9	The role of the CNS in the integrative and adaptive activity of the organism. Properties of nerve centers. Inhibition in the CNS. Methods of the CNS functions research. Physiology of the spinal cord, medulla oblongata, midbrain, cerebellum, reticular formation, diencephalon, subcortical structures and cerebral cortex. Structural and functional features of the autonomic nervous system. The participation of the autonomic nervous system in the regulation of functions. Systemic organization of functions.
DU-3 Physiology of the sensory systems GPC-9	Classification and properties of sensory systems. Sense organs. Analyzers. Perception zones. Receptors. Principles of information coding. Visual, auditory, vestibular, motor, tactile, temperature, olfactory analyzers. Interoception. The physiology of taste. Methods of analyzers research. Oral analyzer. Features. The biological significance of pain. Types of pain. Theories of pain. Features of pain sensitivity in the oral cavity. Methods of pain sensitivity research. Physiological mechanisms and methods of anesthesia. Antinociception systems. The role of external and internal factors in pain perception. Digital anesthesia, features and capabilities. The possibilities of using cross-cutting digital technology (computer robotics and sensorics) to study the features of human sensory functions
DU-4 Physiology of higher nervous activity GPC-9	Functional systems. Biological bases of behavior. Innate and acquired forms of behavior as a way of adaptation to changes in the external environment. Physiology of conditioned reflexes. Dynamic stereotype. The architecture of a holistic behavioral act (Anokhin). Types of higher nervous activity. Methods of higher nervous activity research. Physiology of emotions, sleep, memory. Consciousness, thinking, speech. Speech-forming and communicative functions of the oral cavity.
DU-5 Physiology of the blood system GPC-9	The concept of the blood system. Blood functions. Basic constants and their regulation. Physicochemical properties of blood. Erythrocytes, leukocytes, platelets. Methods of blood research. Age-related changes in the blood system. Blood types. Hemostasis. Features of the coagulation and anticoagulation systems, their role in dental interventions. Physiology of the lymphatic system. Humoral regulation.
DU-6 Physiology of the blood circulatory system GPC-9	Functional classification of vessels. Vascular tone. Laws of hemodynamics. Blood pressure and factors which determine it. Methods of blood vessels research, blood pressure measurement. Arterial and venous pulse. Organ

	blood circulation, methods of its research. Blood depot. Microcirculation. Physiological properties and features of the myocardium. Cardiac cycle. Methods of the heart activity research. Regulation of cardiac activity, age features. Physiology of the endocrine glands. Humoral regulation.
DU-7 Physiology of respiration GPC-9	The importance of respiration for the organism. Stages of the respiratory process. The respiratory cycle. Pressure in the pleural cavity. Methods of external respiration research. Gas exchange in the lungs. Partial pressure, gas tension. Non-respiratory functions of the lungs. Gases transport. Regulation of respiration. The first breath of a newborn. Age-related features of respiration. Features of oral breathing.
DU-8 Physiology of digestion GPC-9	The general concept of energy exchange. Basic and working metabolism. Factors which determine it, its amount. Methods of physiological biocalorimetry. Human body temperature and its daily fluctuation. Physical and chemical thermoregulation. Methods of heat transfer in different environmental conditions. Peripheral and central mechanisms of thermoregulation. Physiological foundations of hardening. The physiological basis of hunger and satiation. Types of digestion. Theories of nutrition and digestion (Ugolev). Principles of diet formation for different groups of the population. Regulation of digestion in the oral cavity. Methods of the oral cavity functions research. Digestion in the stomach and intestines. Absorption. Regulation of the digestion in stomach and intestines. The role of the liver and pancreas in digestion. Physiology of the excretory system.

6.2 Supervised learning elements

Name of the competence category (group)	Code and name of the competence	Code and name of the competence achievement indicator	Didactic unit (DU)	Supervised learning elements formed as a result of mastering the discipline			Competence development stage
				Knowledge	Abilities	Skills	

Bases of fundamental and natural science knowledge	GPC-9. Able to assess morphofunctional states and pathologic processes in the human body to solve professional problems	IOPC-9.1. Is able to analyze the structure, topography and development of cells, tissues, organs and organ systems in interaction with their function in norm and pathology, anatomical and physiological, age-sex and individual features of the structure and development of a healthy and sick organism IOPC 9.2. Is able to evaluate morphofunctional and physiological indicators based on the results of a physical examination of a patient IOPC 9.3. Is able to evaluate morphofunctional and physiological indicators based on the	DU 1 Physiology of excitable tissues	1. Physiology of excitable tissues, their functioning. 2. The laws of excitable tissues irritation	1. To assess the parameters of the organism excitable tissues' activity regulation 2. To analyze and interpret the results of modern methods of laboratory functional diagnostics to identify pathologic processes in excitable tissues	1. Proficiency in medico-anatomical conceptual apparatus	Elementary (A/01.7)

		results of laboratory and instrumental examination of the patient 9.4. Is able to substantiate morphofunctional features, physiological states and pathological processes in the human body to solve professional tasks					
Bases of fundamental and natural science knowledge	GPC-9. Able to assess morphofunctional states and pathologic processes in the human body to solve professional problems	IOPC-9.1. Is able to analyze the structure, topography and development of cells, tissues, organs and organ systems in interaction with their function in norm and pathology, anatomical and physiological, age-sex and individual features of the structure and development of a healthy and sick organism	DU-2 Physiology of the central nervous system	1. Physiological features of the central and peripheral nervous system functioning. 2. Principles for assessing parameters of the nervous system activity	1. Assessment of the autonomic and somatic nervous system state 2. Assessment of the central nervous system physiological state	1. Using a reflex hammer to evaluate the reflex activity of the nervous system 2. Knowledge of the electroencephalography technique	

		IOPC 9.2. Is able to evaluate morphofunctional and physiological indicators based on the results of a physical examination of a patient IOPC 9.3. Is able to evaluate morphofunctional and physiological indicators based on the results of laboratory and instrumental examination of the patient 9.4. Is able to substantiate morphofunctional features, physiological states and pathological processes in the human body to solve professional tasks					
Bases of fundamental and natural science knowl	GPC-9. Able to assess morpho functional states and patholo gic	Knows how to analyze the structure, topography and development of cells, tissues, organs and organ	DU-3 Physiology of the sensory systems	1. Physiology of the body's sensory systems 2. Parts of analyzers, mechanisms of regulation of their work. 3.	1. Assessment of the physiological state of the body's sensory systems 2. Assessme	1. Proficiency in methods of conducting visual acuity research, identificati	

edge	process es in the human body to solve professi onal proble ms	systems in interaction with their function in norm and pathology, anatomical and physiological , age-sex and individual features of the structure and development of a healthy and sick organism IPPC 9.2 Knows how to evaluate morphofuncti onal and physiological indicators based on the results of a physical examination of a patient IPPC 9.3. Is able to evaluate morphofuncti onal and physiological indicators based on the results of laboratory and instrumental examination of the patient 9.4. Is able to substantiate morphofuncti onal features,		Capabilities of digital anesthesia, features	nt of the visual acuity	on of visual fields. 2. Proficienc y in method of the spatial tactile sensitivity threshold assessmen t 3. Proficienc y in the medico-functional conceptual apparatus and digital technologi es of the received informatio n transforma tion: text, tabular editors	

		physiological states and pathological processes in the human body to solve professional tasks					
Bases of fundamental and natural science knowledge	GPC-9. Able to assess morphofunctional states and pathologic processes in the human body to solve professional problems	IOPC-9.1. Is able to analyze the structure, topography and development of cells, tissues, organs and organ systems in interaction with their function in norm and pathology, anatomical and physiological, age-sex and individual features of the structure and development of a healthy and sick organism IOPC 9.2. Is able to evaluate morphofunctional and physiological indicators based on the results of a physical examination	DU-4 Physiology of higher nervous activity	1. Physiological bases of thinking and consciousness. 2. Features of analysis and synthesis of system formation mechanisms in the work of physiological systems. 3. Types of analytical and synthetic activity (conditioned reflexes, dynamic stereotype) 4. Modern methods of laboratory and diagnostic research of people's higher mental functions used in medicine	1. To analyze the course of physiological processes, 2. To understand the mechanisms of conditioned reflexes and dynamic stereotype formation. 3. To explain the principle of the most important research methods of higher mental functions	1. Studying typological features of humans. 2. Proficiency in the medico-functional conceptual apparatus	

		of a patient IOPC 9.3. Is able to evaluate morphofunctional and physiological indicators based on the results of laboratory and instrumental examination of the patient 9.4. Is able to substantiate morphofunctional features, physiological states and pathological processes in the human body to solve professional tasks					
Bases of fundamental and natural science knowledge	GPC-9. Able to assess morphofunctional states and pathologic processes in the human body to solve professional problems	IOPC-9.1. Is able to analyze the structure, topography and development of cells, tissues, organs and organ systems in interaction with their function in norm and pathology, anatomical and physiological,	DU-5 Physiology of the blood system	1. Morphofunctional features of blood 2. Modern methods of laboratory and diagnostic examination of the blood system used in medicine 3. Basic physicochemical parameters and biological constants of the blood	1. To assess the basic physicochemical parameters and biological constants of the blood system which characterize the functional state of a healthy person. 2. To explain the	1. Proficiency in the skills of the elementary hemogram analysis, determination of blood group affiliation. 2. Proficiency in the medico-functional conceptual	

		age-sex and individual features of the structure and development of a healthy and sick organism IOPC 9.2. Is able to evaluate morphofunctional and physiological indicators based on the results of a physical examination of a patient IOPC 9.3. Is able to evaluate morphofunctional and physiological indicators based on the results of laboratory and instrumental examination of the patient 9.4. Is able to substantiate morphofunctional features, physiological states and pathological processes in the human body to solve professional tasks		system	principle of the most important methods of the cardiovascular system of a healthy body research	apparatus	
Bases	GPC-9.	IGPC-9.1	DU-6	1.	1. To	1.	

of fundamental and natural science knowledge	Able to assess morphofunctional states and pathologic processes in the human body to solve professional problems	IOPC-9.1. Is able to analyze the structure, topography and development of cells, tissues, organs and organ systems in interaction with their function in norm and pathology, anatomical and physiological, age-sex and individual features of the structure and development of a healthy and sick organism IOPC 9.2. Is able to evaluate morphofunctional and physiological indicators based on the results of a physical examination of a patient IOPC 9.3. Is able to evaluate morphofunctional and physiological indicators based on the	Physiology of the blood circulatory system	Morphofunctional features of the cardiovascular system. 2. Basic physicochemical parameters and biological constants of the cardiovascular system 3. Modern methods of laboratory and diagnostic examination of the cardiovascular system used in medicine	assess the basic physicochemical parameters and biological constants of the cardiovascular system and blood system which characterize the functional state of a healthy person. 2. Be able to explain the principle of the most important methods of research of the blood system and cardiovascular system of a healthy body 3. To differentiate the compartments of the heart, blood vessels. 4. To carry out communica	Proficiency in elementary analysis of electrocardiograms, phonocardiograms 2. Blood pressure measurement technique, heart rate counting. 3. Proficiency in medico-functional conceptual apparatus and skills of working with open data sources and knowledge bases, interpretation of laboratory research results	

		results of laboratory and instrumental examination of the patient 9.4. Is able to substantiate morphofunctional features, physiological states and pathological processes in the human body to solve professional tasks			tion in the digital educational environment with the help of digital tools		
Bases of fundamental and natural science knowledge	GPC-9. Able to assess morphofunctional states and pathologic processes in the human body to solve professional problems	IOPC-9.1. Is able to analyze the structure, topography and development of cells, tissues, organs and organ systems in interaction with their function in norm and pathology, anatomical and physiological, age-sex and individual features of the structure and development of a healthy and sick organism	DU-7 Physiology of respirstion	1. Basic physicochemical parameters and biological constants of the respiratory system 2. Parts of the respiratory system	1. To assess the basic physicochemical parameters and biological constants of the respiratory system of the body which characterize the functional state of a healthy person. 2. To explain the principle of the most important methods for studying the functions	1. Data analysis of the main clinical, physiological and laboratory tests of the respiratory system of the body. 2. Proficiency in digital technologies for converting the received information: text, tabular editors	

		IOPC 9.2. Is able to evaluate morphofunctional and physiological indicators based on the results of a physical examination of a patient IOPC 9.3. Is able to evaluate morphofunctional and physiological indicators based on the results of laboratory and instrumental examination of the patient 9.4. Is able to substantiate morphofunctional features, physiological states and pathological processes in the human body to solve professional tasks			of the healthy organism's respiratory system 3. To differentiate the parts of the respiratory tract		
Bases of fundamental and natural science knowl	GPC-9. Able to assess morphofunctional states and pathologic	IOPC-9.1. Is able to analyze the structure, topography and development of cells, tissues, organs and	DU-8 Physiology of digestion	1. Basic physicochemical parameters and biological constants of the digestive system of the body,	1. To assess the basic physicochemical parameters and biological constants of the	1. Data analysis of the main clinical, physiological and laboratory research of metabolis	

edge	processes in the human body to solve professional problems	organ systems in interaction with their function in norm and pathology, anatomical and physiological, age-sex and individual features of the structure and development of a healthy and sick organism IOPC 9.2. Is able to evaluate morphofunctional and physiological indicators based on the results of a physical examination of a patient IOPC 9.3. Is able to evaluate morphofunctional and physiological indicators based on the results of laboratory and instrumental examination of the patient 9.4. Is able to substantiate morphofunctional		including the features of the oral cavity, which characterize the functional state of a healthy person	digestive system of the body, oral cavity and dentofacial system which characterize the functional state of a healthy person. 2. To explain the principle of the most important methods of studying the functions of the digestive system of a healthy body 3. To assess the parameters of the state of metabolism	m, the digestive system of the body which characterize the functional state of a person 2. Proficiency in medico-functional conceptual apparatus	

		features, physiological states and pathological processes in the human body to solve professional tasks					

6.3. Discipline sections (DU) and types of classes

Discipline section	Didactic Unit number	Hours according to the type of class			In total:
		Lectures	Practical classes	Independent work	
Physiology of excitable tissues	DU-1	4	9	13	26
Physiology of the central nervous system	DU-2	6	9	15	30
Physiology of sensory systems	DU-3	4	9	13	26
Physiology of higher nervous activity	DU-4	4	9	13	26
Physiology of the blood system	DU-5	4	15	3	22
Physiology of the blood circulatory system	DU-6	4	15	3	22
Physiology of respiration	DU-7	4	12	3	19
Physiology of digestion	DU-8	4	12	2	18
In total:		34	90	65	189

7. Approximate themes:

7.1. Coursework:

Not provided by the curriculum

7.2. Training and research works, creative works

Not provided by the curriculum

7.3. Essays:

- Interaction of the organs of the maxillofacial area with various body systems
- Non-drug rehabilitation
- Age-related features of the maxillofacial area
- Adaptation and compensation in dentistry.
- Medical aspects of emotions. Emotional stress.
- Deontological aspects in the work of a dentist
- Chronophysiology
- Physiology of the endocrine glands

8. Resource provision

The department has the human resources that guarantee the quality of specialist training according to the requirements of the Federal State Educational Standard of Higher Education of the specialty 31.05.03 Dentistry and the professional standard of a specialist in Dentistry.

Provided that training is conscientious, the student will acquire knowledge, abilities and skills which are necessary for the qualification level required for a graduate of the specialty 31.05.03 Dentistry. The educational process is implemented by the scientific and pedagogical workers of the department who have higher education and work experience in the profile of the discipline Physiology (including the physiology of the maxillofacial area), as well as have an academic degree of the Candidate or Doctor of Medical Sciences, the academic title of associate professor or professor.

8.1. Educational technologies

50% of practical classes are conducted in an interactive form. The discipline mastering is carried out with the help of two main types of educational work: lectures and practical classes, including ones with the help of digital tools Microsoft Teams and Mirapolis Virtual Room.

Electronic informational and educational environment: educational, educational and methodological information is presented on the digital educational platform MedSpace; students have access to electronic educational resources (electronic catalog and electronic library of the university, electronic library system "Student Consultant").

To grade academic achievements a point-rating system has been developed, current and final controls, and an exam are conducted.

8.2. Material and technical equipment

For realization of the educational process, the department has 4 classrooms with a total area of 105.6 sq. m and has the following equipment:

1. Biopac student lab polygraphs;
2. Stimulator for BSL MP30 to Biopac student lab;
3. The “Abgrate” system - a pressure measuring device;
4. Biopac student lab system;
5. Toshiba TDP - S35 projector;
6. LG RT 42 PC 3RV 2 plasma panel;
7. Philips 26-inch LCD TV;
8. TCA -9 video camera;
9. “Biolam” microscope;
10. Biomed-6 medical microscope;

11. SSP dry spirometer;
12. expert diagnostic complex "Lira-100";
13. three-channel electrocardiograph EXT -12-01;
14. breathing exercise equipment with biofeedback.

8.3. List of licensed software

8.3.1. System software

8.3.1.1. Server software:

- VMwarevCenterServer 5 Standard, license validity period: perpetual; VMwarevSphere 5 EnterprisePlus, license validity period: perpetual, dog. № 31502097527 dated 30.03.2015 OOO "Krona-KS";

- WindowsServer 2003 Standard № 41964863 dated 26.03.2007, № 43143029 dated 05.12.2007, license validity period: perpetual;

- WindowsServer 2019 Standard (32 cores), license agreement № V9657951 dated 25.08.2020, license validity period: 31.08.2023, Microsoft Corporation;

- ExchangeServer 2007 Standard (license № 42348959 dated 26.06.2007, license validity period: perpetual);

- SQL ServerStandard 2005 (license № 42348959 dated 26.06.2007, license validity period: perpetual);

- CiscoCallManager v10.5 (contract № 31401301256 dated 22.07.2014, license validity period: perpetual), OOO "Microtest";

- Ideco UTM Enterprise Edition security gateway (license № 109907 dated 24.11.2020, license validity period: perpetual), OOO “IDECO”.

8.3.1.2. Personal computer operating systems:

- Windows 7 Pro (OpenLicense № 45853269 dated 02.09.2009, № 46759882 dated 09.04.2010, № 46962403 dated 28.05.2010, № 47369625 dated 03.09.2010, № 47849166 dated 21.12.2010, № 47849165 dated 21.12.2010, № 48457468 dated 04.05.2011, № 49117440 dated 03.10.2011, № 49155878 dated 12.10.2011, № 49472004 dated 20.12.2011), license validity period: perpetual);

- Windows7 Starter (OpenLicense № 46759882 dated 09.04.2010, № 49155878 dated 12.10.2011, № 49472004 dated 20.12.2011, license validity period: perpetual);

- Windows 8 (OpenLicense № 61834837 dated 09.04.2010, license validity period: perpetual);

- Windows 8 Pro (OpenLicense № 61834837 dated 24.04.2013, № 61293953 dated 17.12.2012, license validity period: perpetual);

8.3.2. Application software

8.3.2.1. Office programs

- Office Standard 2007 (OpenLicense № 43219400 dated 18.12.2007, № 46299303 dated 21.12.2009, license validity period: perpetual);

- Office Professional Plus 2007 (OpenLicense № 42348959 dated 26.06.2007, № 46299303 dated 21.12.2009, license validity period: perpetual);

- Office Standard 2013 (OpenLicense № 61293953 dated 17.12.2012, № 49472004 dated 20.12.2011, № 61822987 dated 22.04.2013, № 64496996 dated 12.12.2014, № 64914420 dated 16.03.2015, license validity period: perpetual);

8.3.2.2. Data processing programs, information systems

- Software "Tandem.University" (including the educational portal educa.usma.ru) (license certificate No. UGMU/21 dated 22.12.2021, license validity period: indefinitely), Tandem IS LLC;

- Software 1C:University PROF (license No. 17690325, license validity period: indefinitely, Automation Technologies LLC);

- iSpring Suite software (No. 1102-l/353 dated 13.10.2022, license period: 12 months);

. Distance Learning Information Systems

- Mirapolis HCM (No. 159/08/22-K dated 16.08.2022, license period: 12 months).

8.3.2.3. External electronic informational and educational resources

"Medicine. Healthcare. VO (basic kit)", "Medicine. Healthcare. VO (premium kit)", "Medicine (VO) GEOTAR-Media. Books in English".
Link to the resource: https://www.studentlibrary.ru /
STUDENT'S CONSULTANT LLC
License Agreement No. 8/14 on granting a simple (non-exclusive) license to use the Student's Consultant Electronic Library System dated 06/23/2022. Valid until 08/31/2023.

The database "Doctor's consultant. Electronic Medical Library".
Link to the resource: https://www.rosmedlib.ru /
VSHOUZ-KMK LLC
Agreement No. 717KV/06-2022 dated 08/10/2022.
Valid until 08/09/2023.

The electronic library system "Book Up"
Provides access to the collection of the "Large Medical Library".
Link to the resource: https://www.books-up.ru /
LLC "Bukap"
Contract no. BMB for the provision of gratuitous services for the placement of electronic publications dated 04/18/2022.
Valid until 04/18/2027.

Electronic library system "Book Up"
Access to the collection of textbooks on anatomy in English
Link to the resource: https://www.books-up.ru /
LLC "Bukap"
Sublicense contract No. 73 dated 03/06/2023.
Valid until 03/31/2024.

Lan Electronic Library system, access to the Online Electronic Library collection
Link to the resource: https://e.lanbook.com/
EBS LAN LLC
Contract no. SEB 1/2022 for the provision of services dated 11/01/2022.
Valid until: 31.12.2026.

The “Yurayt” Educational platform
Link to the resource: https://urait.ru /
Electronic Publishing House YURAYT LLC
License Agreement No. 10/14 dated 30.06.2022.
Valid until: 08/31/2023.

UGMU Electronic Library, an institutional repository on the DSpace platform
Link to the resource: http://elib.usma.ru/
The Regulation on the electronic library of the Federal State Budgetary Educational Institution of the Russian Ministry of Health, approved and put into effect by the order of the Rector of the Federal State Budgetary Educational Institution of the Russian Ministry of Health, O.P. Kovtun, dated 06/01/2022, No. 212-r
Installation and Configuration Agreement No. 670 dated 03/01/2018
Validity period: indefinite

A universal database of IVIS electronic periodicals, access to an individual collection of scientific medical journals.
Link to the resource: https://dlib.eastview.com/basic/details
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Link to the resource: https://link.springer.com/
- the Nature Journals database containing full-text Nature Publishing Group journals — collections of Nature journals, Academic journals, Scientific American, Palgrave Macmillan (issues 2021).
Link to the resource: https://www.nature.com
RFBR Letter No. 785 dated 07/26/2021 On Granting Licensed Access to the Contents of the Springer Nature database in 2021 on a centralized subscription basis.
Validity period: indefinite
- Springer Journals database containing full-text journals published by Springer (issues 2022), collections: Medicine, Engineering, History, Law & Criminology, Business & Management, Physics & Astronomy.
Link to the resource: https://link.springer.com/
- The Adis Journals database, which contains full-text Adis journals published by Springer Nature in the field of medicine and other related medical fields (issues 2022).
Link to the resource: https://link.springer.com/
RFBR Letter No. 910 dated 30.06.2022 On Granting Licensed Access to the Contents of the Springer Nature publishing house databases.
Validity period: indefinite
- Springer Journals database containing full-text journals published by Springer (issues 2022), collections: Biomedical & Life Science, Chemistry & Materials Science, Computer Science, Earth & Environmental Science.
Link to the resource: https://link.springer.com/
- The Nature Journals database, which contains the full-text journals of the Nature Publishing Group, namely the Nature journals collection (issues 2022).
Link to the resource: https://www.nature.com
RFBR Letter No. 909 dated 30.06.2022 On Granting Licensed Access to the Contents of the Springer Nature publishing house databases.
Validity period: indefiniteAccess to the collection of educational materials on analog

9. Educational, methodological and informational support of the discipline

9.1.1. Electronic educational publications

1. Electronic Library System (EBS) "Student's Consultant" EBS Website www.studmedlib.ru GEOTAR-Media Publishing Group www.studmedlib.ru
2. Google Academy Scientific Literature Search Engine
Website https://scholar.google.ru/schhp?hl=ru A platform for searching scientific literature.
3. On the page of the Department of Normal Physiology on the website of the UGMU http://edu.usma.ru there are thematic plans, assignments for practical classes, methodological recommendations (LMS of the University of MedSpace)

9.1.2. Electronic databases

1. Electronic Database (DB) Medline with Fulltext Database Website: http://search.ebscohost.com MEDLINE with FullText

2. Full-text electronic database (DB) ClinicalKey Database website http://health.elsevier.ru/electronic/ ClinicalKey

3. Digital search platform for databases of publications in scientific journals Web of Science (WoS) https://clarivate.com/webofsciencegroup/, https://indicator.ru/, https://nauchkor.ru/about

9.1.3. Textbooks

1. Normal physiology: textbook / N. A. N. Aghajanyan, V. N. M. Smirnov, D. N. S. Sveshnikov [and others]. -4th ed., Spanish and supplement. - Moscow: MIA, 2022. - 541 p. ill.: ill. - ISBN 978-5-9986-0480-5. - Text: direct.

9.1.4. Educational publications

1. Atlas of normal physiology. / Edited by N.A. Aghajanyan, Moscow: Medical Information Agency LLC, 2007, 496 p.

9.2. Additional literature

1. Popova, K. A. Psychological readiness of practicing physicians for digitalization in medicine / K. A. Popova, M. V. Noskova // Actual issues of modern medical science and healthcare: collection of articles of the V International (75th All-Russian) Scientific and Practical Conference, 2020, No. 3, pp. 104-109.

2. Vlasovets, A. A. The experience of the All-Russian Medical soft skills championship. The direction "Information Technology and telemedicine: challenges of the time" / A. A. Vlasovets, A. A. Saraeva, S. I. Bogdanov // Actual issues of modern medical science and healthcare: collection of articles of the V International (75th All-Russian) scientific and practical Conference. – 2020. – №1. – pp. 946-950.

10. Certification in the discipline

Certification of students is held according to the developed point-rating system for evaluating students' academic achievements in the discipline "Physiology (including physiology of the maxillofacial area)". The final certification in the discipline is held in the form of an exam.

11. The fund of assessment tools for the discipline

The fund of assessment tools for carrying out the midterm certification (presented in applications №1).