



**Federal State Budgetary Educational Institution of Higher Education
«Dagestan State Medical University»
Ministry of Health of the Russian Federation
(FSBEI HE DSMU MH RF)**

WITNESSED
Pro-vice-chancellor,
assistant professor Omarova D.A.

_____ 2020


ACADEMIC COURSE WORKING PROGRAM

«Hominal physiology»

Discipline Index - **B1.B.18**
Major - **31.05.01 Medical care**
Degree of higher education: **specialist's program**
Graduate qualification: **physician, M.D.**
Faculty: **general medicine**
Department: **Hominal physiology**
Mode of study: **full-time**
Course: **2**
Semester: **III - IV**
Total workload: **8 c. p. /288 hours**
Lectures: **54 hours**
Practical (seminar) lessons: **126 hours**
Independent work of the student: **72 hours**
Control form: **terminal exam**
Monitoring: **36**

Makhachkala – 2020

The working program of the discipline was developed in accordance with the FSES HI in the direction of training program (specialty) 31.05.01 - "Medical Care" approved by order of the Ministry of Education and Science of the Russian Federation No. 95 dated February 16, and the curriculum approved by the Scientific Council of the FSBEI HE DSMU of the Ministry of Health of Russia, Protocol No. 1 dated 31.08.2020.

The working program of the educational discipline was approved at the meeting of the department on August 31, 2020, protocol No. 1.

The working programme is agreed:

1. Director of DSMU SL _____ (V.R. Musaeva)
2. TGO, S and QCT _____ (A.M. Karimova)
3. Dean _____ (R.M. Ragimov)

Head of department

Dr. habil. med., professor _____ (R.M. Ragimov)

Working program designers:

1. H. of department, Dr. habil. med., professor _____ (R.M. Ragimov)
2. Associate professor, c.b.s. _____ (N.M. Abdullaeva)

Reviewers:

H. of department of hominal physiology
FSBEI HE

«Stavropol State medical university»
Russian Ministry of Health professor,

_____ (L.D. Tsaturyan)

Doctor of biological sciences,
professor at the department of zoology and physiology
FSBEI HE «Dagestan State University»

_____ (M.M. Gabibov)

CONTENT

1.	Subject mastery goals and objectives	5
2.	Intended learning outcomes on the course	6
3.	The course position in the structure of the educational program	8

CONTENT

1.	Subject mastery goals and objectives	5
2.	Intended learning outcomes on the course	6
3.	The course position in the structure of the educational program	8
4.	Course content and types of academic work	9
5.	Working programme content	9
5.1.	Sections of discipline and competence formed while study	9
5.2.	Discipline sections, workload by type of academic work	19
5.3.	Lectures course schedule	20
5.4.	Practical studies course schedule	21
5.5.	Lab sessions	23
5.6.	Teaching and learning materials of the course independent work	23
5.6.1.	Student's independent work on the course	23
5.6.2.	Topic of abstract works	25
5.6.3.	Methodical guidelines for students on the subject mastery	25
6.	Evaluation tools for ongoing success level monitoring and midterm attestation following the subject mastery	26
6.1.	Ongoing success level monitoring	26
6.1.1.	List of competencies indicating the stages of their formation in the process of working program mastering of discipline	26
6.1.2.	Examples of evaluation tools for current and midterm examination success level monitoring	27
6.2.	Midterm attestation following the course subject mastery	30
6.2.1.	Midterm attestation form	30
6.2.2.	Midterm attestation procedure	31
6.2.3.	Examples of questions for preparation for the test, exam	31
6.2.4.	Examples of exam paper	31
6.2.5.	Grading system of subject mastery, grading scale description, allocation of grades	32
7.	Methodological and informational support on the course	33
7.1.	Basic reference materials	33
7.2.	Supplementary reference materials	34
7.3.	Internet Information and Telecommunication Network Resources	35
7.4.	Information technology	35
8.	Material and technical support	36
9.	Staff assistance of the course	38
10.	Use of innovative (active and interactive) training methods	39
11.	Course methodical ware	39

12.	Special features of the training organization in the course for persons with disabilities and people with special need	39
12.1.	Training for people with special need and people with disabilities	39
12.2.	In order to develop the curriculum of discipline for people with special need and persons with disabilities	39
12.3.	Education of students with disabilities	40
12.4.	List of educational and methodological support for independent work of students on the course	40
12.5.	Evaluation fund for intermediate certification of students on the course	40
12.5.1.	List of evaluation funds correlated with the planned results of the educational program	40
12.5.2.	The methodical materials defining procedures of estimation of knowledge, abilities, skills (experience of activity, the characterizing stages of formation of competences)	41
12.6.	List of basic and additional educational literature required to master the discipline	42
12.7.	Methodological guidelines for trainees in the development of the discipline	43
12.8.	Description of the material and technical base required to carry out the educational process by discipline	43
13.	Adaptions to working program sheet	43
14.	<i>Annex 1: Evaluation Fund</i>	
15.	<i>Annex 2: The course working program annotation</i>	
16.	<i>Annex 3: Study guide for practical lessons in 2 parts</i>	

1. GOALS AND OBJECTIVES OF DISCIPLINE

The goal is to form in students systemic knowledge about the vital activities of a holistic organism and its individual parts, about the main patterns of functioning and mechanisms of their regulation when interacting with each other and with environmental factors, about the physiological foundations of clinical and physiological research methods used in functional diagnostics and in the study of human integrative activity.

The objectives are:

- training of students in the analysis of the functions of a holistic organism from the point of view of integral physiology, analytical methodology and the basics of holistic medicine;
- the formation of a systematic approach of students in understanding the physiological mechanisms underlying interaction with environmental factors and implementing adaptive strategies of the human body and animals to implement normal functions of the human body from the perspective of the concept of functional systems;
- teaching students the methods and principles of research to assess the state of the body's regulatory and homeostatic systems in the experiment, taking into account their applicability in clinical practice;
- teaching students the patterns of the functioning of different systems of the human body and the features of inter-system interactions in the conditions of purposeful activity from the position of teaching about adaptation and cross-adaptation;
- teaching students how to assess the functional state of the person, the state of regulatory and homeostatic in different types of targeted activities;
- teaching students the role of higher neural activity in regulating human physiological functions and purposefully managing the body's reserve capabilities in conditions of norm and pathology;
- introducing students to the basic principles of physiological processes modeling and existing computer models (including biofeedback) to study and purposefully manage the body's visceral functions;
- the formation of the basics of clinical thinking in students on the basis of analysis of the nature and structure of interorganic and inter-system relations from the position of integral physiology for the future practical activities of the doctor.

2. PLANNED RESULTS OF TRAINING IN THE DISCIPLINE

Competencies formed in the process of studying the academic course:

№	Competence category name	CONTENT
	1	2
1	General cultural competencies	<p>GC-1: the ability to abstract thinking, analysis, synthesis.</p> <p>To know: forms of manifestations of higher neural activity (HNA) in humans, classification and characteristics of types of HNA, variants of inter-hemisphere asymmetry and their importance in the doctor's activities.</p> <p>To be able to: analyze the features of the higher nervous activity of the person, the patterns of activity of individual systems of the body at different functional states and the dynamics of physiological processes at different types of stress; - <i>conduct research:</i> higher mental functions and individually typological characteristics of a person.</p> <p>To be knowledgeable about: <i>methods</i> of mental health studies using the Eisenka test and the evaluation of HNA types.</p>
2	General professional competencies	<p>GPC-9: ability to assess morphofunctional, physiological conditions and pathological processes in the human body to solve professional problems</p> <p>To know:</p> <ul style="list-style-type: none"> - Excitability and excitability parameters; - membrane-ion theory of the origin of biopotentials; - classification of nerve fibers; - polar action permanent on excitable tissues; - laws of irritation and regularity of arousal on nerve fibers; - the importance of registration of biopotentials in medicine (EMG, ECG, EEG); - structure and function of myoneural synapse; - muscle fiber structure, sarcomeres; - modern theory of the mechanism of muscle contraction ("Sliding Thread Theory" by H. Huxley E. Huxley); - strength, work and muscle fatigue; - morpho-functional classification of neurons; - feedback principles in CNS; - types of CNS synapses and the classification of mediators; - nature of EPSP and IPSP; - functional characteristics of different parts of the central nervous system. The nature of spinal shock; - vital centers of the spinal bulb; - mechanisms of functioning and principles of regulation of endocrine cells and glands of internal secretion; - types and mechanisms of action of hormones; - hypothalamic-pituitary neuroendocrine regulation of physiological functions; - features of their interaction in the context of targeted behavior and pathology; - blood system and its role in maintaining and regulating the body's homeostatic constants, blood function; - characteristics and functional features of physiological blood constants; - rules of blood transfusion; - the importance of a biological sample in blood transfusions; - hemostasis processes and modern ideas about blood clotting mechanisms; - the main properties of the heart muscle; - cavities and valve apparatus of the heart; - basic mechanisms for regulating heart activity, heart cycle; - physiological role of vascular departments, regulation of vascular tone and systemic

		<p>hemodynamics;</p> <ul style="list-style-type: none"> - relationship of volume blood flow and linear rate at rest and exercise; - mechanisms of filtration and reabsorption at the level of the microcirculatory channel and their regulation; - neuro-humoral regulation of vascular tone; - ventilator, pulmonary volumes and capacity; - regulation of breathing, breathing features in different conditions of existence; - digestion as a process necessary to implement the body's energy and plastic functions; - Pavlovian experiments in digestive physiology; - features of the functioning of different departments of the gastrointestinal tract. <p>Digestive and non-respiratory functions of the gastrointestinal tract;</p> <ul style="list-style-type: none"> - mechanisms of hunger and saturation; - methods of researching the digestive system; - basic processes and mechanisms for maintaining the permanence of body temperature; - the main stages of urine formation and the mechanisms for regulating it; - principle of operation of "Artificial kidney" apparatus; - basic non-excretory (homeostatic) kidney function; - the main morpho-functional features of the organization of different parts of sensor systems; - theories of color perception, perception of sound vibrations, visual refraction anomalies; - types of higher neural activity on Hippocrates and I.P. Pavlov; - memory mechanisms, sleep phases and cortical rhythms. <p>To be able to:</p> <p>prepare a neuromuscular drug;</p> <p>determine the time of the reflex on the Turk;</p> <p>to reproduce the experience of central braking by I.M. Sechenov;</p> <p>identify blood groups;</p> <p>identify the SOE by Panchenkov;</p> <p>determine the amount of blood haemoglobin using Sali's method;</p> <p>interpret the general blood test and the leukocyte formula;</p> <p>identify rhesus factor; determine the specificity of urine (urometry);</p> <p>conduct and analyze the ECG;</p> <p>analyze the pulse;</p> <p>to perform spirometry and breathing samples of Stange and Gencha;</p> <p>calculate the main exchange by table and formula Harris-Benedict, approximate formula, data from the body surface;</p> <p>calculate the specific-dynamic action of food by formula;</p> <p>calculate the student's diet;</p> <p>olfactometry;</p> <p>to perform gustometry;</p> <p>to perform esthesiometry;</p> <p>reproduce Galvani's experiments;</p> <p>to investigate tendon reflexes in humans (knee, achilles);</p> <p>to investigate samples for the detection of cerebellar ataxia (Romberg, finger-nosed, knee-heel);</p> <p>to investigate orthostatic and cuneiform samples.</p> <p>To be knowledgeable about:</p> <ul style="list-style-type: none"> - technique of preparation of the nerve-muscle drug frog; - method of determining the time of the reflex on the Turk; - method of determining muscle strength (with the help of carpal and pitch dynamometers); - method of determining blood groups and rhesus factor using tsolyclone; - the method of determining AP; - probing and counting of arterial pulse; - pulseoxymetry technique; - the method of counting the RR; - Ashner's eye-heart reflex technique; - technique for determining acuity and fields of vision;
--	--	--

		<ul style="list-style-type: none"> - method of determining color perception; - technique of counting the number of red blood cells and white blood cells; - determining the time of blood clotting, E.C., haemoglobin content; - methodology for assessing the osmotic resistance of red blood cells; - method to evaluate the results of the general urine test; - methodology for determining the types of HNA (Eisenka test).
--	--	--

3. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF THE EDUCATIONAL PROGRAM

Discipline "Hominal Physiology" refers to the basic part of the B1 curriculum in the specialty 31.05.01 - "Medical care".

The material of the discipline is based on previously acquired students' knowledge and skills in biology, cytology, chemistry, physics, histology, embryology of biochemistry, anatomy, Latin language, physical culture and sports.

Sections of the discipline "Hominal Physiology"

№	Section name
1	Introduction to the subject. Physiology of excitable tissues
2	General and private neurophysiology. Vegetative nervous system
3	Endocrine System Physiology
4	The physiology of the blood system
5	Cardiovascular Physiology
6	Respiratory physiology
7	Digestive Physiology
8	Metabolism and energy physiology
9	Nutrition and thermoregulation physiology
10	The physiology of the excretion system
11	Physiology of analyzers
12	Physiology of higher neural activity

Interdisciplinary relations with subsequent disciplines

№ п/п	The name of the (following) disciplines provided	1	2	3	4	5	6	7	8	9	10	11	12
1	The propedeutics of internal diseases				+	+	+	+	+	+	+		
2	Ophthalmology		+									+	+
3	Otolaryngology		+				+	+				+	+
4	Obstetrics and Gynecology				+	+	+						
5	Pediatrics		+	+	+	+	+		+	+			+
6	Neurology, medical genetics, neurosurgery	+	+	+								+	+
7	Psychiatry, Medical Psychology												+
8	Forensic medicine				+		+	+					
9	Medical rehabilitation	+	+	+		+	+					+	+
10	Hospital therapy			+	+	+	+	+	+	+	+		
	Faculty therapy			+	+	+	+	+	+	+	+		
11	Immunology				+	+	+	+					
12	Physiatrics						+						

13	General surgery		+		+		+		+	+			+
14	Anesthesiology, resuscitation, intensive care		+		+	+	+			+	+		
15	Faculty Surgery			+			+	+					
16	Hospital surgery			+			+	+					
19	Dentistry						+	+				+	
20	Hygiene						+	+	+	+			
21	Radiation diagnosis												
22	Endocrinology		+	+		+	+	+	+	+	+		
23	Urology										+		

4. THE SCOPE OF DISCIPLINE AND THE TYPES OF TRAINING

The total laboriousness of the discipline is 8 units.

Types of work		Total hours	Number of hours per semester	
			III	IV
1		2	3	4
Contact work (total), including:				
Classroom work		180	72	108
Lectures (L)		54	18	36
Practical classes (PC),		126	54	72
Seminars (S)				
Laboratory work (LW)				
Extra-audit work				
Self-employed student (SES)		72	36	36
Types of midterm attestation	exam (E)	36		36
TOTAL:	Hour.	288	108	180
Total Laboriousness	c.p.	8	3	5

5. THE CONTENT OF THE WORK PROGRAM OF DISCIPLINE

5.1 Discipline and competence sections that are formed as they are studied

N S e c t i o n	Controlled competency code	Section name	Section content
		1	2
1	GPC-9	Introduction to the subject.	Hominal physiology is a science that studies the processes of life of a healthy person. The concept of the body, its constituent elements. Levels of morpho-functional organization of the human body. The cell, its function. Body tissues (epithelial, connective, muscle and nervous), their main functional features. The concept of the organ, its structural and functional unit of the organ. Physiological function. The relationship between structure and function is the Unity of the Body and the External Environment. The concept of the internal environment of the body and its components (blood, lymph, intercellular fluid). The concept of physiological constants. Ideas about soft and hard constants. The concepts of homeostasis, homeokines. Physiological adaptive response.

		Physiology of excitable tissues	<p>Analytical and systemic approaches in the study of physiological processes and functions. Brief characteristic of the stages of the development of normal physiology: empirical, anatomical-physiological, functional (principled role of works by W. Garvey, R. Descartes). The formation and development of physiology in the 19th and 20th centuries (the significance of scientific works by W. Garvey, R. Descartes, C. Bernard, E. Dubois-Raymond, G. Helmholtz, C. Sherrington, W. Kennana). Contribution of foreign and domestic physiologists to the development of world physiological science (D.V. Ovsyannikov, I.M. Sechenov, N.A. Mislavsky, I.P. Pavlov, N.E. Vvedensky, A.A. Ukhinsky, A.F.Samoilov, L.A.Orbeli, K.M. Bykov, E.A. Asratyan, V.V. Larin, V.N. Chernigovskiy, G.I. Kositsky, L.S. S. Stern).</p> <p>The physiological basis of functions. Irritability as the basis of the tissue's response to irritation. Classification of stimuli. The concept of excitability and arousal. Excitement and inhibition as an active state of excitable tissue. Their physiological role.</p> <p>System organization of functions (I.P. Pavlov, P.K. Anokhin). The concept of the system. Levels of system organization. Physiological system. The structure and function of biological membranes. Types of transport membrane proteins, classification and properties of ion channels. History of the discovery of bioelectric phenomena in living tissues (L. Galvani, E. Dubois-Raymond, K. Matteuchi). The membrane and ion mechanisms of the origin of biopotentials alone. Methods of registering membrane potentials.</p> <p>The physiological properties of excitable tissues. Types of irritation of excitable tissues. Features of local and spreading arousal processes. Electrophysiological characteristic of the process of arousal (A. Hodgkin, A. Huxley, B. Katz).</p> <p>The potential of the action and its phases. Ion mechanisms of excitement. Changes in the permeability of the cell membrane during arousal. Excitement and excitability. Change of excitability in arousal. Characteristics of refractory and exaltation.</p> <p>The laws of irritation of single and holistic excitable structures: "strength," "all or nothing," "strength-duration" (Weisa-Lapika). The concept of reobas, hronaxy, useful time.</p> <p>The laws of irritation in the action of DC on excitable tissues: physiological electroton, polar action of DC (E. Pfluger). The concept of cat and anelectrotony, Catholic depression, anode exaltation. The concept of parabiosis (N.E. Vvedensky), phase of development of parabiosis.</p> <p>Change of excitability of the tissue with a slow build-up of depolarizing current, the property of accommodation. Classification of nerve fibers. Mechanisms of arousal along nerve fibers. Laws of arousal in nerves. Types of signature transmission between excitable cells. The concept of synapses. Classification of synapses. Functional properties of electrical and chemical synapses.</p> <p>The mechanism of signal transmission in the chemical synapse. Types of synaptic neurotransmitters and neuromodulators. Features of signal transmission in neuromuscular and central synapses; in excitatory and inhibitory synapses.</p> <p>Physical and physiological properties of skeletal muscles. The concept of motor unit, physiological features of fast and slow motor units. Electromyography.</p> <p>Characteristics of types and modes of muscle contraction. Temporary ratio of the cycle of arousal, excitability and single contraction of skeletal muscle fiber. The mechanism of thetanic reduction. Conditions of the emergence of optimum and pessimum.</p> <p>Features of the structure of the membrane and sarcoma fibers of the skeletal muscle. The mechanism of muscle contraction. Electromechanical pairing. The dependence of the force is contracting the muscle from its original length.</p>
--	--	---------------------------------	---

			<p>The energy of muscle contraction. ATP resynthesis pathways. The power and capacity of the body's energy systems. Functional system of energy support of muscle activity.</p> <p>Physiological features and properties of smooth muscles. Their importance in the myogenic regulation of motor functions of internal organs.</p>
2	GPC-9	<p>General and private neurophysiology.</p> <p>Vegetative nervous system</p>	<p>The morphofunctional organization of the neuron as a unit of the nervous system. The occurrence of local and spreading arousal in the neuron. Integrative function of the neuron. Classification of neurons. The concept of neural networks, their types. Block-modular concept of the activity of the central nervous system. The concept of a nervous center in a broad and narrow sense of the word. The physiological properties of nerve centers are the basic principles of the spread of arousal in nerve centers, in neural networks.</p> <p>Principles of coordination of the CNS Reflex principle of the nervous system and principles of reflex theory. Reflex is the main mechanism of adaptive response of the body to changes in the conditions of the internal and external environment. The links, components of the morphological basis of the reflex from the positions of R.Descartes and P.K.Anokhin. The morphological basis of the simplest somatic reflex. The concept of adaptive reflex activity. Types of reflexes.</p> <p>The value of braking in the central nervous system. History of the discovery of peripheral and central braking. Braking functions (protective and coordinating). Types of central braking (depolar and hyperpolarization: presynaptic and post-synaptic; progressive, lateral, returnable, reciprocal).</p> <p>Unitary-chemical and binary chemical theory of central braking. Mechanisms of interaction of excitatory (UPP) and inhibitory (TPP) effects on the neuron. Mechanisms of depolar (pessymal) and hyperpolarizational inhibition of neuron.</p> <p>The role of different parts of the central nervous system in regulating physiological functions. Afferent, efferent and associative areas of the cerebral cortex. Column bark organization. Irradiation and convergence of arousal of different modalities in the cortex. The role of inhibitory neurons in providing analytic-synthetic cortex activity. Plasticity of the cortex (E.A. Asratyan). Corkovo-subcortical and corcous-visceral relations (K.M. Bykov).</p> <p>Functional asymmetry of hemispheres in humans. The concept of muscle tone. Reflex nature and the functional value of muscle tone. Types of proprioceptors. their localization, structure, role in maintaining muscle tone. The morphological basis of the tendon reflex. Mechanism of the emergence and regulation of muscle tone at the spinal level (spinal tone).</p> <p>The pathways and mechanisms of influence of the structures of the oblong brain and cerebellum on muscle tone. Mechanism of the emergence of a state of deecerer rigidity (contract tone) in a bullbar animal. Structures of the middle brain involved in the formation of mezencephalo tone. Plastic tone in a diencephalic animal. Participation of the components of the striapallidar system and the cortex of the large hemispheres in the regulation of muscle tone.</p> <p>The concept of tonic reflex. Types of tonic reflexes (static and statokinetic). Conditions of their occurrence. The involvement of spinal, oblong and middle brain structures in their implementation. Autonomous (vegetative) nervous system. Its functions. Physiological features of the sympathetic, parasympathetic and metasymy departments of the autonomous nervous system. The main types of mediators and receptors.</p> <p>The role of different parts of the central nervous system (spinal, tabloid, mesencephalic centers, hypothalamus, cerebellum, reticular formation, cortex of the large brain) in the regulation of functions of the autonomous nervous system. An idea of the typological features of the autonomic regulation of hemodynamics. Methods of determining the dysfunctions of the autonomic nervous system. Types of response to emotional load by indicators of the</p>

			autonomic nervous system.
3	GPC-9	Endocrine System Physiology	<p>The main components of the endocrine system (local and diffuse endocrine systems). The concept of glands of internal secretion. Biopotentials of glandulocytes. The secretory cycle. Types of glands of internal secretion. Central and peripheral glands. Working systems of glands of internal secretion (hypothalamo-pituitary, sympatho-adrenal, gastroenteropancreatic, etc.).</p> <p>The concept of endocrine and neuroendocrine cells. Types of biologically active substances: hormones, hormone-like peptides, neurohormones, neurotransmitters, modulators. Functional signs of hormones that distinguish them from other biologically active substances. Classification of hormones: by chemical nature (protein-peptide, steroid, amino acid derivatives), by functional basis (tropical, start-up, effector). Forms of transmission of regulatory influences with the help of biologically active substances (autocrine, isocrine, paracrine, endocrine, neurocrine).</p> <p>Ways to transport hormones with blood. The value of transport hormones in a related state. Mechanisms of action of hormones on target cells (membrane, cytosole-nuclear). Types of physiological action (metabolic, morphogenetic, kinetic, corrective) and the value of hormones. Nervous (trans- and parahypophysical) and humoral regulation of the glands of internal secretion. The role of negative feedback (ultra-short, short, long) in self-regulation of glands of internal secretion. Hormones of the glands of internal secretion (hypothalamus, pituitary gland, epiphysie, thyroid, thymus, parathyroid, pancreas, adrenal glands, genitals, placenta), their effect on metabolic processes and functions of the body.</p> <p>Stress, mechanisms, role in the processes of life. The role of G. Selye and domestic scientists in the development of the teachings on stress. Stress as a phase of adaptation. Short and long-term adaptation. Crossadaptation and its role as clinical practice.</p>
4	GPC-9	The physiology of the blood system	<p>The concept of blood, the blood system. The amount of blood circulating, its composition. Blood function. The main constants of blood, their size and functional value. The concept of osmotic blood pressure. The idea of a self-regulatory principle of the mechanism of maintaining blood constants. Functional systems that maintain the permanence of pH and osmotic blood pressure. The concept of hemolysis, its species and plasmolysis.</p> <p>The formal elements of the blood, their physiological significance. The concept of red blood, leuko- and thrombocytopoiesis, their nervous and humoral regulation. Hemoglobin, its connections, functional value. Lymph, its composition and functions.</p> <p>The idea of the protective function of the blood and its manifestations (immune reactions, blood clotting). Blood groups as manifestations of the body's immune specificity. Varieties of blood group systems (AVO, rhesus - affiliation). Their importance for obstetric and surgical practice.</p> <p>The process of blood clotting (hemostasis), its significance. The main factors involved in the process of blood clotting (tissue, plasma, thrombo, erythro- and leukocyte), their functional characteristic. The idea of external (tissue) and internal (blood) blood clotting systems, blood clotting phases, retracing and fibrinilism processes.</p> <p>Factors that accelerate and slow blood clotting. The concept of the first and second anti-clotting blood systems. An idea of the principles of their functioning. An idea of a functional system that maintains a liquid blood condition. The clotting, anti-clotting and fibrinolytic blood systems.</p>
5	GPC-9	Cardiovascular Physiology	<p>The concept of physiological circulatory system (cardiovascular system). Typical and atypical (P- and T-cells) cardiomyocytes that conduct the heart system, valve apparatus, heart cavity.</p> <p>Physical and physiological properties of the heart muscle. The concept of functional syncytia for the heart. The emergence and spread of arousal in the heart. Automation, its nature, centers and gradient. Ion mechanisms of arousal</p>

		<p>atypical myocardiocytes. Mechanisms of the occurrence of slow diastolic depolarization.</p> <p>Changes in excitability in the initiation of typical cardiomyocytes. Electromechanical pairing. Extrasystoles. Compensatory pause. The heart cycle, its phase structure. Changes in the tone of the muscle walls of the heart cavities, changes in their volume, blood pressure and the condition of the valve apparatus in different phases of the cardio cycle. The idea of chrono-, batmo-, dromo-, in-and-totropic effects as manifestations of regulatory influences on the work of the heart.</p> <p>Types of cardiac regulation. Autoregulation: myogenic (hetero- and omeometric) and neurogenic mechanisms. The regularities of myogenic authorization (Frank-Starling's Law; The Law of Anrepa; Rhythminotropic Dependence). Nervous and humoral mechanisms of extracardial regulation of cardiac activity. The humoral effects of hormones, electrolytes, mediators and other factors on the parameters of heart activity.</p> <p>Nervous regulation Features sympathetic and parasympathetic innervation of the heart muscle. Mechanisms of parasympathic and sympathetic influences on the work of the heart. Reflex regulation of the heart activity. Nervous centers of cardiac regulation. Endocrine function of the heart. Effect of atrionodium-retic peptide on vascular tone and the process of urination. Functional classification of blood vessels (elastic, resistant, metabolic, capacitive)</p> <p>The basic laws of hydrodynamics and their use to explain the physiological functions and patterns of blood movement through blood vessels. Factors that ensure the movement of blood through the blood vessels. Peripheral circulatory parameters (blood pressure, linear and voluminous blood flow rate, blood circulation time). Changes in resistance, blood pressure and blood flow rate in different areas of the vascular bed.</p> <p>Nervous, humoral and myogenic regulation of vascular tone. The concept of basal tone of the vessel and the authorization of vascular tone. Vascular center (pressor and depressor departments). Peripheral and central influences on the activity of neurons of the vasodilation center.</p> <p>Concepts of systolic, diastolic, pulse and average blood pressure. Factors that determine the magnitude of AD. Functional system that maintains normal blood pressure levels. Microcirculation and its role in the mechanisms of fluid and various substances between blood and tissues. Vascular microcirculation module. Capillary blood flow. Types of capillaries. Mechanisms of trans-capillary exchange in capillaries of large and small circles of circulation.</p> <p>External manifestations of heart activity (electric, sound, mechanical) Mechanisms of the appearance of heart EDS. Einthoven's theory. Methods of recording electrical manifestations of cardiac activity. The main withdrawals of ECG in humans (standard, strengthened, thoracic). Bipolar and monopolar ECG withdrawals. Structural analysis of normal ECG in the SECOND standard withdrawal. Teeth, complexes, intervals, segments; their temporal and amplitude characteristics.</p> <p>The spread of arousal in the myocardium (waves of depolarization and repolarization). De- and repolarization potentials on an active electrode. Vector theory of genesis ECG. The electric axis of the heart. Physiological variants of its location (normal, horizontal and vertical).. Methods of research of sound manifestations of heart activity (auscultation, phonocardiography). The scene of heart tones, their views and places of best listening. Methods of study of arterial (sphygmography) and venous (phlebography) pulse. Clinical Pulse Center in humans.</p> <p>Methods of measuring blood pressure (straight and indirect). Methods of Riva-Rochchi and Korotkova, the technique of their use. The concept of vascular tones, the idea of the mechanisms of their occurrence. Determining the Functional Change Index (IFI) as a method of rapid diagnosis of cardiovascular condition. The method of variation of heart rateometry.</p>
--	--	--

			<p>Statistical analysis of the ECG, its use to assess the nature of regulatory visions on the heart rate.</p> <p>Heart activity during physical activity. Heart ejection is an integral indicator of the heart's functioning. The mechanism of changing the cardiac output during physical activity. Changing the structure of the heart rate in the conditions of physically strenuous activity. Regulatory vascular tone during physical activity. Mechanisms of strengthening venous return during muscle work (venous, muscle, respiratory 'pumps'). Methods for assessing a person's physical performance by heart performance: Harvard step test, PWC170 (testing methodology, estimates for middle-aged people).</p>
6	GPC-9	Respiratory physiology	<p>The importance of breathing for the body. The main stages of the process. External breathing. Biomechanics inhaling and exhaling. Pressure in the pleural cavity, its changes in inhalation and exhalation. Pulmonary volumes and capacity. Reserve capabilities of the breathing system. Spirometry, spirometry. The composition of inhaled, exhaled and alveolar air. Anatomical, physiological and functional dead spaces. Vent-perfusion coefficients, their value in clinical practice. Aerogenic barrier. Diffusional ability of the lungs. Transport gases with blood. The dissociation schedule is ok-sigeglobn. Factors influencing the formation and dissociation of oxygemoglobin. The concept of oxygen storage of blood.</p> <p>Nasal and mouth breathing, their features. Functional communication of breathing, chewing and swallowing processes. Speech breath. The concept of a respiratory center in a broad and narrow sense of the word. The idea of the localization and organization of the structure of the respiratory center in the broad sense of the word Types of respiratory neurons oblong brain, their automaton. The role of different receptors and respiratory center departments in the mechanisms of changing phases of breathing. The idea of the regulation of breathing on the principle of perturbation and the principle of deviation. Protective respiratory reflexes. Mechanism of the first breath of a newborn. Breathing at elevated and low barometric pressure. FUS scheme ensures the permanence of the body's gas environment.</p> <p>Breathing in the conditions of physical activity. Assess the minute's volume of breathing. Regulation of breathing during muscle work (humoral and nerve mechanisms). Maximum oxygen consumption (IPC). The link between oxygen intake and heart rate. A true stable state. Oxygen request, oxygen consumption and oxygen duty during physical exertion.</p>
7	GPC-9	Digestive Physiology	<p>Digestion, its meaning, types and shapes. Neuro-humoral mechanisms of hunger and satiety. Analysis of the components of the functional system to maintain a constant level of nutrients in the blood. The regularities of the organization of gastrointestinal activity on the principle of the digestive conveyor. General principles of neuro-humoral regulation of the functions of the digestive tract.</p> <p>Chewing, its nature, self-regulation. Features of chewing when chewing food of different consistency. Masticiography, masticiogram analysis. Salivation and salivation. Nervous and humoral mechanisms of regulation of these processes. Phases of salivation, salivation reflex, adaptive nature of salivation. Swallowing, its phases and mechanisms. The functions of the stomach. The number, composition and properties of gastric juice. The value of the cell acid and other components of gastric juice. Phases of gastric secretion, their neuro-humoral mechanisms. The idea of the features of experimental operations on the stomach and their use to study the nerve and humoral effects on the secretion of the stomach. Motor activity of the stomach. Nervous and humoral factors affecting motor and tow function of the stomach. The importance and role of digestion in the duodenum. Pancreatic function.</p> <p>The number, composition and properties of pancreatic juice. Enzymes of pancreatic juice, released in an active state and in the form of ziogens. Mechanisms of regulation of pancreatic secretion. Contours of self-regulation</p>

			<p>of pancreatic secretion, their value. Liver. Bile, its quantity, composition, importance for digestion. Mechanisms of bile formation, deposition and bile, their regulation. Intestinal hepatic recycling of bile acids. The importance and role of digestion in the small intestine.</p> <p>Mechanism of intestinal juice formation. The quantity, property, the fermentation composition of intestinal juice. Regulatory of the intestinal juice department. Strip and membrane digestion, their relationship and severity in various parts of the gastrointestinal tract. Intracellular digestion. Immunocompetent cells of the gastrointestinal tract. Motor activity of the small and large intestine, its features, significance, mechanisms of regulation. Features of digestion, the value of the microflora in this process. The enzyme composition of colon juice. Act of defecation as the end result of digestion in the colon. The absorption of digestive products in various parts of the digestive tract, its mechanisms.</p>
8	GPC-9	Metabolism and energy physiology	<p>The exchange of substances is the main condition for the maintenance of life and the preservation of homeostasis. The plastic and energy role of nutrients. Processes of assimilation and dissimulation of substances. The exchange of proteins, fats and carbohydrates, their regulation. Regulation of nutrient content in the body. The value of water to the body. The idea of water and mineral exchange regulation. An idea of the body's energy balance. The caloric value of different nutrients. Methods of direct and indirect (full and incomplete gas analysis) calorimetry. The concept of caloric value, respiratory coefficient and caloric equivalent of oxygen, their size for different types of oxidized nutrients. Daily exchange and its components. The main exchange, the conditions for determining the main exchange, the factors influencing its value. Specific dynamic effect of nutrients. Work boost, working exchange. The amount of working exchange under different types of labor.</p>
9	GPC-9	Nutrition and thermoregulation physiology	<p>Nutrition physiology. Principles of rational nutrition. A daily diet and basic requirements for it. Nutrients in the daily diet according to age, profession and other factors that affect metabolic processes. A balanced diet. Nutrition mode. The concept of thermoregulation. Heat production. Heat dissipation. The permanence of the temperature of the internal environment of the body as a necessary condition for the normal flow of metabolic processes. The temperature pattern of the body, its daily fluctuations. Poikylotermia, homotermia, hibernation.</p> <p>Functional system that ensures the permanence of the temperature of the body's internal environment.</p>
10	GPC-9	The physiology of the excretion system	<p>The notion of excretion, its role in maintaining homeostasis. The kidney is the main excreting organ. The morpho-functional characteristic of nephron, features of its blood supply. The mechanism of tubular filtration, its regulation.</p> <p>Primary urine, the difference between its composition and blood plasma. Reabsorption: mandatory (obligate) and selective (optional). Active and passive processes underlying reabsorption. The concept of threshold and non-threshold substances.</p> <p>The rotating-anti-urine concentration mechanism at the level of the Loop of Henle and the collecting tube.</p> <p>Mechanisms for regulating the reabsorption process. The role of the main humoral factors: aldosterone and antidiuretic hormone. Secretion in the renal tubules. Secondary urine. The idea of the excretory functions of the kidneys (regulation of fluid volume, osmotic pressure, acid-base equilibrium, the amount of inorganic and organic substances, blood pressure, blood creation). The mechanism of urination, its regulation.</p>
11	GC-1 GPC-9	Physiology of analyzers	<p>The concept of a sensor system. The concept of the analyzer from the point of view of the teachings of I.P. Pavlov. The ratio of the concepts of "sensor system" and "analyzer." The concept of the organ of the senses. An idea of the basic and auxiliary structures of the sense organ.</p> <p>The concept of peripheral (receptor) department of sensory system, receptor,</p>

		<p>peripheral field of neuron. Functional properties and features of receptors: specificity, high excitability, low accommodation, ability to adapt; rhythmic generation of impulses of arousal.</p> <p>Classification of receptors by criteria: reception of internal or external irritations; nature of an adequate irritant: the nature of sensations; Modalities; Threshold of irritation Adaptation speed receptor connections with the sensory neuron. The mechanism of receptor arousal. Receptor and generator potentials. Coding signals in receptors.</p> <p>Functional properties and features of the sensory conduction department (multi-levelness, multichannel, presence of "sensory funnels", specific and non-specific ways of transmitting information). A view of the three-neuron organization of the conduction department. The participation of the conduction department in the conduct and processing of afferent arousals.</p> <p>Features of the organization of the cortical sensor system. Functional differences of neurons that make up different cortical zones. The idea of mono- and polymodality of neurons, the mechanism of interaction of sensory systems (convergence and divergence of arousals, lateral and return braking, mediator interaction, synthesis of synaptic receptors).</p> <p>Coding information in different parts of sensor systems. The ratio of irritation intensity to sensation intensity. Weber-Fechner's law. The main ways to regulate sensory systems are based on the use of different forms of inhibition of downward influences from the above-mentioned departments to the underlying ones. The concept of functional mobility. Adaptation of sensor systems.</p> <p>The morpho-functional characteristic of the visual sensory system. The concept of field of vision and visual acuity. Methods of their definition. The concept of refraction, accommodation and adaptation of the eye. Mechanisms of these processes, their anomalies (astigmatism, myopia, farsightedness, presbyopia). Pupil reflex. The morpho-functional characteristic of the visual sensory system. The concept of field of vision and visual acuity. Methods of their definition. The concept of refraction, accommodation and adaptation of the eye. Mechanisms of these processes, their anomalies (astigmatism, myopia, farsightedness, presbyopia). Pupil reflex.</p> <p>Mechanisms of reception and perception of color. The main types of color perception disorders. Hearing sensor system. Sound-capturing formations, sound-conducting pathways and sound-taking devices of the hearing sensor system. The mechanisms of the reception of sound. Binaural hearing. Methods of research of the auditory sensor system. The general morphological and functional organization of the skin sensory system departments. Tactile and temperature sensory systems as its components. Classification of tactile receptors, their structural and functional differences. Methods of researching tactile sensor system. The concept of spatial threshold of tactile sensitivity. Classification of thermoreceptors. Methods of studying the temperature sensor system.</p> <p>The general morphological and functional organization of the departments of the taste sensor system. The receptors are a taste sensory system. Taste bud, taste buds. Types of tongue taste buds. The mechanism of reception and perception of taste. Methods of research of the taste sensor system (thickness and functional mobility). The general morphological and functional organization of the departments of the olfactory sensory system. The mechanism of reception and perception of smell. Methods of research of the olfactory sensory system (olfactorometry). The role of interaction of olfactory and other sensory radiant in the formation of taste sensations. The concept of pain, nociception. Pain function. Pain classification. The morpho-functional characteristic of the pain sensory system. Idea about theories of the mechanism of pain (intensity, synchronization of the afferent flow, specificity, gate control, generators). Pain is like the body's integrative response to the</p>
--	--	--

			<p>damaging effects of the irritant. Components of pain reaction.</p> <p>The role of the thalamus and cortex of the large hemispheres of the brain in the integration and analysis of pain arousal. Sensory-discriminatory and semantic analysis of the damaging effects. Concepts of anti-nociceptive system (ANSC). Components and functions of the ANSC. ANSC levels: a system of downward braking control of primary afferents and first relay nuclei; limbic-hypothalamic level; cortical level (secondary somatosensory and orbital-frontal cortex areas of large hemispheres). Neurochemical and neurophysiological mechanisms of ANSC. Presynaptic and post-synaptic changes in the activation of the ANSC. The concept of pain threshold. Algometry. Physiological basics of anesthesia.</p>
1 2	GC-1 GPC-9	Physiology of higher neural activity	<p>The concept of HNA. The idea of manifestations of GNI (congenital and acquired forms of behavior, higher mental functions). The concept of a conditioned reflex. The story of the discovery of conditioned reflexes. The importance of the works of Pavlov and his followers in the creation of the doctrine on conditioned reflexes and physiology of GNI. Comparative characteristic of conditional and unconditional reflexes. The value of conditioned reflexes in adapting animals and humans to living conditions.</p> <p>Rules and stages of conditioning reflexes. Classification of conditioned reflexes by criteria: ratio of nature of conditional and unconditional stimuli (natural and artificial); biological significance of the absolute irritant (food, defensive, etc.); type of receptors excited by a conditional irritant (sound, light, etc.); The relationship of a conditional irritant to the first or second signaling systems; complexities of conditional reflex (reflexes 1, 2, 3, etc. of orders); the nature of changes in the body's activities (positive, negative); ratio of the time of action of conditional and unconditional stimuli (cash, lag, trace).</p> <p>The concept of temporary communication. Pavlovian and modern ideas about the levels of localization of temporary communication and mechanisms of its formation. Braking in GNI, its types: unconditional (exorbitant and external), conditional (fading, differentiated, conditional brake, lagging), conditions of their occurrence. A modern view of braking mechanisms in GNI. The value of inhibition of conditioned reflexes for the organization of adaptive human activity. The concept of GNI type (by I.P. Pavlov). Classification and characterization of GNI types. The role of types of GNI and other individual-typological characteristics of a person in the realization of adaptive activity of the concept of psyche and higher mental functions. Types of basic mental functions (feeling, perception, perception, attention, emotion, motivation, memory, speech, thinking, consciousness).</p> <p>The concept of sensation. The idea of the nature of sensation. The concept of perception. An idea of its mechanism. The concept of attention. Types of attention. The idea of the mechanisms of attention from the positions of Pavlov, Akhtom and modern science. Physiological attention correlates. The concept of motivation. Motivation classification. An idea of the mechanism of their occurrence. The role in this process is the hypothalamus and the cortex of the large hemispheres.</p> <p>The concept of emotion. Types of emotions. An idea of the mechanism of their occurrence. The role of different brain structures in the formation of emotional states. The importance of emotions to organize behavior. The concept of memory. Types of memory. An idea of the mechanisms of short-term and long-term memory. The concept of thinking. Types of thinking. The role of different brain structures in the implementation of the thinking process. The development of abstract thinking in human ontogenesis.</p> <p>The concept of speech. Types of speech and speech function. The idea of the mechanisms of speech, functional asymmetry of the cortex of the large hemispheres of the brain, associated with the development of speech in humans. The concept of consciousness. The idea of sub- and super-consciousness, their relationship with consciousness. The idea of physiological</p>

		and psychophysiological methods of researching mental functions. The notion of targeted behavior. Analysis of the components of the functional system of the behavioral act.
--	--	--

5.2. Discipline sections, labor-intensive by type of training work

№	Discipline section name	Activities (in hours)				
		L	LW	PC	SES	Total
1	2	3	4	5	6	7
1	Introduction to the subject. Physiology of excitable tissues	4		12	7	23
2	General and private neurophysiology. Vegetative nervous system	6		12	7	25
3	Endocrine System Physiology	2		6	8	16
4	The physiology of the blood system	2		9	7	18
5	Cardiovascular Physiology	4		19	7	30
6	Respiratory physiology	4		10	5	19
7	Digestive Physiology	8		16	5	29
8	Metabolism and energy physiology	2		6	5	13
9	Nutrition and thermoregulation physiology	2		6	6	14
10	The physiology of the excretion system	4		6	5	15
11	Physiology of analyzers	8		14	5	27
12	Physiology of higher neural activity (HNA)	8		10	5	23
Total:		54		126	72	252

5.3. Lectures course schedule

№ Section	Lecture topics	Number of hours per semester	
		III	IV
1	Introduction to physiology. The physiology of excitable tissues. Bioelectric phenomena in tissues.	2	
	Nerve fibers. Myoneural synapses. Muscle physiology. The mechanism of muscle contraction. Indicators of physical muscle activity (strength, work and muscle fatigue).	2	
2	General physiology of the central nervous system. Neuron, reflex, reflex arc. Excitement and inhibition in the central nervous system.	2	
	Private physiology of the CNS. The role of different parts of the central nervous system in the regulation of muscle tone and phase movements.	2	
	Physiology of the autonomic (autonomous) nervous system.	2	
3	The physiology of the glands of internal secretion. Hypothalamic-pituitary system.	2	
4	The physiology of the blood system.	2	
5	The physiology of the cardiovascular system. Clinical-physiological methods of heart research.	2	
	Hemodynamics. System circulatory regulation.	2	
6	Respiratory physiology. Essence and meaning. External breathing, breathing volumes. Mechanisms of inhalation and exhalation. Pleural cavity.		2

	Transport of gases with blood, alveolar-capillary barrier. Breathing regulation. Features of breathing in different conditions.		2
7	The physiology of digestion, essence and importance. I.P. Pavlov's role in the study of digestion. Digestive and non-food functions.		2
	Digestion in the mouth and stomach. The composition of saliva, gastric juice. The role of Hydrochloric Acid in digestion.		2
	The mechanism of evacuating food from the stomach. Digestion in the 12-fingered intestine. The role of pancreatic juice and bile in digestion.		2
	Digestion in the large and small intestine. Strip and wall digestion (Ugolev). The role of the microflora of the large intestine. The absorption of the gastrointestinal tract.		2
8	The physiology of exchange and energy. The plastic and energy value of proteins, fats, carbohydrates. Introductory and salt exchange. Regulation.		2
9	The physiology of a rational diet. Diet requirements. Thermoregulation (physical, chemical).		2
10	The physiology of the excretion system. Renal, extrastural selection pathways. Nefront. Mechanisms of diabetes: tangle filtration.		2
	Mechanisms of diabetes: tubal reabsorbtion and secretion. Regulation of kidney function.		2
11	Physiology synthesis of analyzer systems. Pavlov's teaching about analyzers. Common properties of analyzers. Receptors, their classification.		2
	Sas. Physiology of tactile, temperature, olfactory, motor and taste analyzers. Pain analyzer, pain classification. Nociceptors are their species, the body's anti-nociceptive system.		2
	Visual analyzer. Optical eye system. Refractive anomalies, their correction. Retinal physiology, photoreceptors. Theories of color perception.		2
	Auditory and vestibular analyzers. The structure of the auditory analyzer. The mechanism of sound perception. The concept of a visceral analyzer.		2
12	Higher Nervous Activity (HNA). The physiology of the cerebral cortex. Electroencephalography (EEG), the clinical significance of cortical rhythms. I.P. Pavlov's role in the study of HNA.		2
	HNA. Methods and rules of conditioning reflexes (Pavlov). Temporary communication, mechanisms of education. The archectectomy of the behavioral act on Anohin.		2
	HNA. Cortical braking, its views. Types of HNA by Hippocrates and Pavlov. Sleep, species, phases and sleep mechanisms. Dreams.		2
	Features of HNA in a person. The teachings on the I and II signal systems on Pavlov. Functional asymmetry of large hemispheres.		2

5.4. Practical classes course schedule

№ Sec tio n	Practical classes topics	Number of hours per semester	
		III	IV
1	Introductory class. Excitable fabrics, excitability parameters. The experiences of Galvani and Matteuchy.	3	
	The laws of irritation and arousal. Myoneural synapses.	3	
	Muscle physiology: types of muscle contraction, tetanus. Dynamometry in humans.	3	
	The final lesson: "The physiology of excitable tissues."	3	
2	Analysis of the reflex arc. Determining the time of the reflex on the Turk. The main properties of nerve centers. Braking in the central nervous system. Sechenov and Holtz' experiences.	3	

	The physiology of the spinal cord, spinal shock, tendon reflexes in humans. Tonic reflexes. Trials to detect static and dynamic ataxia.	3	
	Physiology of the cerebellum, sterhopalida and limbic system.	3	
	Vegetative nervous system. Vegetative reflexes in humans.	3	
3	Human endocrine system. The effect of adrenaline on the pupil and the isolated heart of the frog. Simol's iodine reaction.	3	
	Final class: "General and private neurophysiology. Vegetative nervous system." "Neurohumoral function regulation"	3	
4	Clinical-physiological methods of blood research, determination of hemoglobin, SEE, counting of formal elements	3	
	Determining blood type, rhesus factor, clotting time	3	
	Final class: "The physiology of the blood system"	3	
5	Myocardial physiology. Features of the heart muscle. Heart automation, Stannius experience. Clinical-physiological methods of heart research: listening to tones, defining boundaries, analysis of ECG.	3	
	Regulation of heart activity: reflexes, influence of hormones and electrolytes.	3	
	Final class: "The Physiology of the Heart" (theoretical parsing).	3	
	The final lesson: "The Physiology of the Heart" (research methodology).	3	
	Hemodynamics. Methods of measuring AD. Pulse analysis, sphygmography.	3	
	Regulation of hemodynamics. Factors influencing the amount of blood pressure. The effect of physical activity on the pulse and blood pressure in the volunteer.		2
	The final lesson: "The physiology of the vascular system."		2
6	The physiology of external breathing. Respiratory volumes, spiograph.		4
	Transport of gases by blood, oxyhemometry. Calculating the partial pressure of gases. Pulsoxymetry.		2
	Breathing regulation. A test for breathing (Stange and Gencha). Effect of physical activity (squats) on human breathing.		2
	The final lesson: "Breathing Physiology."		2
7	Digestive physiology. Experimental and clinical methods of studying the physiology of digestion. Demonstration of various fistulas, gastric and duodenal probes.		2
	Digestion in the mouth and stomach. Determining the digesting strength of gastric juice in different conditions. Masticiography.		2
	Parsing Pavlov's classic experiences: "Imaginary Feeding," the experience of an isolated ventricle.		2
	Pavlovian curves of gastric juice separation into various nutrient materials.		2
	Duodenal sensing.		2
	Analysis of endoscopic methods of patient examination: esophagoscopy, gastroscopy, duodenoscopy, colonoscopy, rectoromanoscopy.		2
	Observation of intestinal automatism and movement of ciliary beats in frog.		2
8	The physiology of metabolism and energy. Calculating the main exchange based on weight, height and age data.		2
	Calculating the percentage of deviation of the main exchange of the patient from due. SDTP calculation. Calculation of the total (gross exchange).		2
	Final class: "Metabolism and Energy Physiology"		2
9	Nutrition physiology. Compiling a daily diet for representatives of different occupational groups.		2
	The physiology of thermoregulation. Analysis of the temperature map of the human body surface, daily temperature fluctuations. Measuring the patient's temperature.		2
	The final lesson: "The physiology of nutrition and thermoregulation."		2
10	Determining the specific weight of urine (urometry). Extrarenal pathway of excretion (study of sweat glands by Sniakin).		2
	Calculating the speed of tuber filtration (Clearance). Familiarity with the principle of the "artificial kidney" apparatus.		2

	The final lesson: "The physiology of the excretion system."		2
11	Sas. Taste study (gustometry), study of sense of smell (olfactorometry), study of tactile sensitivity (esthesiometry).		2
	Aristotle's experience. Weber-Figsner's law. Dealing with the physiology of pain and anesthesia.		2
	Determining visual acuity, determining the field of vision (perimeter).		2
	Marriott's experience. Study of the pupil reflex. Determining the patient's color perception by Rabkin's tables.		2
	The physiology of the auditory and vestibular analyzer. Determining hearing acuity. Comparison of air and bone conductivity.		2
	Physiology of auditory and vestibular analyzers. Adaptation of the auditory analyzer. Features of binaural hearing.		2
	The final lesson: "The Physiology of the Analyzers."		2
12	HNA. The physiology of the cortex. Electroencephalography (EEG). The development of a conditional flashing reflex in a person.		2
	Exploring the functional system of behavioral act on Anohin. Study of short-term visual and auditory memory in students.		2
	Definition of the type of HNA (Isaac test). Determining the type of GNI of a person by the way words are grouped. A test to determine the dominant hemisphere of the brain.		2
	The final lesson: "Physiology of higher neural activity."		2

5.5. LABORATORY RESEARCH

There are no separate laboratory sessions at the department. Practical classes include studies of certain human physiological indicators, reflexes on volunteers, experiments and experiments on frogs.

5.6 . Educational and methodical support for self-discipline (module)

5.7 5.6.1. Self-employed student in discipline

№	Section	Types of SES	Total hours	Forms of control
1	2	3	4	5
1	1	Providing frog classes; preparing oral reports on dynamometry, preparation for practice - filling in the working notebook the main terms of the section; Study of academic and scientific literature; preparation for control questions on the topic of practical training, working with electronic educational resources, located in the EIDE DSMU	7	check protocol, check section terminology
2	2	Preparing for practice sessions - filling in the working notebook the basic terms of the section; Study of academic and scientific literature; reporting on tendon reflexes; preparation for control questions on the topic of practical training, working with electronic educational resources located in the EIDE DSMU.	7	проверка протокола, проверка терминологии раздела
3	3	Preparing for practice sessions - filling in the working notebook the basic terms of the section; Study of academic and scientific literature; preparing reports with a presentation on endemic zob, diabetes, adrenal pathology; preparation for control questions on the topic of practical training, working with electronic educational resources located in the EIDE DSMU.	8	filling out a questionnaire to identify the risk of SD, checking the protocol, checking the terminology of the section

4	4	Preparation for practical sessions to identify blood groups using tsoliclone, solving situational problems in determining blood type, filling in the working notebook the main terms of the section; preparation for control questions on the topic of practical training, working with electronic educational resources, located in the EIDE DSMU	7	anti-A, anti-B, anti-AB, protocol check, section terminology check
5	5	The student has to perform all ECG registration procedures on their own. Preparing for practice sessions - filling in the working notebook the basic terms of the section; Study of academic and scientific literature; preparation for control questions on the topic of practical training, working with electronic educational resources, located in the EIDE DSMU	7	check the protocol, check the terminology of the section, familiarize yourself with the work of the ECG apparatus
6	6	preparing for practice sessions - filling in the working notebook the main terms of the section; Study of academic and scientific literature; Solutions to the studu tasks issued in practice sessions; The report on spirographs; preparation for control questions on the topic of practical training, working with electronic educational resources located in the EIDE DSMU.	5	introduction to the spiograph, protocol check, background check
7	7	Reference messages on Pavlov's work on digestion. Preparing for practice sessions - filling in the working notebook the basic terms of the section; Study of academic and scientific literature; preparation for control questions on the topic of practical training, working with electronic educational resources, located in the EIDE DSMU	5	review of Pavlov's works, protocol check, check the terminology of the section
8	8	Preparing for practice sessions - filling in the working notebook the basic terms of the section; Solving situational problems on the topic, calculating the EO by tables of family members at home; preparation for control questions on the topic of practical training, working with electronic educational resources located in the EIDE DSMU.	5	check protocol, check section terminology
9	9	preparation for practical classes filling in the workbook of the main terms of the section; preparing abstracts on proper nutrition, drawing up a diet at home; preparation for control questions on the topic of practical lesson, work with electronic educational resources located in the EIDE DSMU.	6	diet requirements, protocol check, background check
10	10	preparation for practical classes filling in the workbook of the main terms of the section; abstract reports on methods for determining various indicators of kidney performance: clearance, PAG, concentration index; preparation for control questions on the topic of practical lesson, work with electronic educational resources located in the EIDE DSMU	5	introduction to hemodialysis, artificial kidney, protocol check, check of the terminology of the section
11	11	Preparing for hands-filling in the working notebook of the main terms of the section; reference messages on topics: "Refraction anomalies and corrections," "Theories of color perception"; preparation for control questions on the topic of practical training, working with electronic educational resources, located in the EIDE DSMU	5	introduction to Foster's perimeter device, protocol check, section terminology check
12	12	Preparing for practice - filling in the working notebook the basic terms of the section; Determining the types of GNI on the Eisenka test at home in family members; preparation for control questions on the topic	5	check protocol, check section terminology

		of practical training, working with electronic educational resources, located in the EIDE DSMU.		
13	Test preparation	Repetition and consolidation of the studied material (working with lecture material, educational literature); Wording of questions; pre-examination individual and group consultations with the teacher.	24	
14	Examination		12	
Total:			108	

5.6.2. The subject of abstract works

№	Section	Competence	Topics
1	1	GPC-9	Nobel laureates in physiology, their contribution to science
2	1	GPC-9	Cell physiology. The cell membrane, its structure and function. Modes of transport through membranes. Classification of ion channels.
3	1	GPC-9	The concept of synapses. Classification of synapses and mediators. Nature of EPSP and IPSP.
4	1	GPC-9	Muscle physiology. Motor units. Electromyography.
5	2	GPC-9	The concept of a nervous center in a broad and narrow sense. The physiological properties of nerve centers.
6	2	GPC-9	The value of braking in the central nervous system. The history of the discovery of braking. A modern interpretation of the braking process.
7	2	GPC-9	The vegetative nervous system and its functions. The main types of mediators and receptors. Vegetative reflexes in humans and their clinical significance.
8	3	GPC-9	Endocrine system. Classification of biologically active substances. Stress, mechanisms. Hans Selye's role in the development of the stress teaching.
9	4	GPC-9	The types of blood group systems, their characteristic. Basic and additional agglutinogens.
10	4	GPC-9	Identify blood groups and rhesus factor using tsolyclone.
11	4	GPC-9	Functional system that ensures the maintenance of liquid blood condition (RASB - regulation of the aggregate state of blood).

5.6.3. Guidelines for students in the discipline

(appendix no.3, teaching guide to practical lessons for students in 2 parts).

Part 1: The physiology of excitable tissues. General and private neurophysiology, endocrine system physiology. physiology of the blood system. The physiology of the cardiovascular system.

Part 2: Breathing physiology. Digestive physiology. The physiology of metabolism and energy. Nutrition and thermoregulation physiology. The physiology of selection. Physiology of synthesis-analyzer systems. Physiology of higher neural activity. Authors of teaching manuals: the staff of the department.

6. Evaluation tools for the current, milestone control of academic performance and intermediate certification based on the results of the discipline

6.1. Current and Midterm Examination

6.1.1. A list of competencies showing the stages of discipline formation in the process of mastering the work program

Competence code

GC-1	the ability to abstract thinking, analysis, synthesis.		
GPC-9	the ability to evaluate morphofunctional, physiological states and pathological processes in the human body to solve professional problems.		
<i>Nº Section</i>	<i>Controlled competencies</i>	<i>Discipline section name</i>	<i>Evaluation tools</i>
<i>Current (CE) and midterm (ME) examination</i>			
1	GPC-9	Hominal physiology as a science. Levels of organization of the human body. The unity of the body with the external environment.	CE: S, Pr, AP ME: S, Pr, AP, T
2	GPC-9	Integrative function of the central nervous system. Principles of coordination of the CENTRAL National Committee. The plasticity of the cortex of the big brain. Functional asymmetry of the hemispheres of a large brain in humans.	CE: S, Pr, AP ME: S, Pr, AP, T
3	GPC-9	The body's neuroendocrine system. The role of neuropeptides in regulating physiological functions.	CE: S, Pr, AP ME: S, Pr, AP, T
4	GPC-9	The body's internal environment and homeostasis. Mechanisms of hemostasis and febrileis.	CE: S, Pr, AP ME: S, Pr, AP, T
5	GPC-9	Clinical-physiological methods of heart research. Heart reflexes. Intra- and extracardial mechanisms of regulation of the CVS.	CE: S, Pr, AP ME: S, Pr, AP, T
6	GPC-9	Breathing, gas exchange in lungs and tissues, atmospheric air composition, respiratory regulation, mountain and caesarean disease.	CE: S, Pr, AP ME: S, Pr, AP, T
7	GPC-9	Pavlov's role in the study of digestive physiology. Neurohumoral regulation of digestive function.	CE: S, Pr, AP ME: S, Pr, AP, T
8	GPC-9	Exchange of substances and energy, calculation of the main metabolism, professional groups, the basics of adequate nutrition.	CE: S, Pr, AP ME: S, Pr, AP, T
9	GPC-9	Principles of rational nutrition. Nutrition mode. The permanence of the temperature of the internal environment to the body is the conditions of normal metabolism.	CE: S, Pr, AP ME: S, Pr, AP, T
10	GPC-9	The renal and extrarenal mechanisms maintain the permanence of the internal body. The principle of the "Artificial Kidney" machine works.	CE: S, Pr, AP ME: S, Pr, AP, T
11	OK-1, GPC-9	The concept of the analyzer from the position of the teaching of I.P. Pavlov. Receptor and generator potentials. Principles of encoding signals of information in analyzers.	CE: S, Pr, AP ME: S, Pr, AP, T
12	GC-1, GPC-9	HNA. types of human HNA. Differences between human HNA and animals. Memory, kinds of memory.	CE: S, Pr, AP ME: S, Pr, AP, T

GC-1, GPC-9,	Hominal Physiology Exam	Tests and/or oral interviews on tickets in face-to-face format or online mode.
-----------------	-------------------------	--

6.1.2. Examples of evaluation tools for current and midterm examination

INTERVIEW ON CONTROL AND SITUATIONAL TASKS (GPC-9: « **To know** » и « **to be able to** »)

Section 1. General physiology of excitable tissues: control issues (GPC-9)

1. What is excitability, which fabrics are excitable? Common properties of excitability: excitability threshold, reobase, useful time, hronaxy, lability.
2. Refractory and its phases.
3. The nature of membrane potential (the potential of rest). Selective permeability of the cell membrane in the emergence of membrane potential.
4. The nature of arousal, the phase of potential action.
5. The structure and function of the neuromuscular synapse.

Section 4. Blood System Physiology: Situational Tasks (GPC-9)

1. The woman, 35, complained of acute abdominal pain. Pain is permanent, amplified by movement and walking. Palpation notes local soreness in the right iliac region. There was an increase in body temperature to 38 C. In blood tests: Hb - 110 g/l; leukocytes - 14,000 per 1 ml; SEE - 14 mm/h. What changes from the blood are available to the patient? What is the shift of the leukocyte formula to the left?
2. An athlete who participates in a marathon race in Death Valley (USA) at an air temperature of 50 C, after 1 hour of running took a blood test. What homeostatic blood parameters could have changed and why?
3. In situations accompanied by increased activity of the sympathetic department of the autonomic nervous system, for example, in case of danger, pain, emotional stress (stress), blood clotting increases. What is the biological meaning of increasing blood clotting in stressful situations? What negative consequences can lead to increased clotting in emotional stress?

Terminology (glossary) on the topic or section of discipline (see textbook to practice)

Criteria for assessing current and milestone performance control (interview on control issues, including glossary and situational tasks)

« Unsatisfactory »:

Knowledge: the student does not know the material or has not mastered a significant part of the program material within the set questions, is not able to independently highlight the main

positions in the studied material of discipline, does not know the terminology.

Skills: the student is not able to apply the existing knowledge in the interpretation of physiological parameters, specific situations and solving situational problems.

«Satisfactory»

Knowledge: the student has learned the basic content of the subject material, but has gaps: knowledge is unsystematic by topic or section of discipline. The material sets out fragmented, inconsistent, confusing individual terms.

Skills: the student has difficulty presenting the material on the topic or section of the discipline: it sets out inconsistently and not systematically. It is difficult to apply the knowledge necessary to solve individual situational problems, in explaining specific concepts and situations.

«Good»

Knowledge: the student is able to independently highlight the main positions in the studied material. Shows knowledge of the program material on the topic or section of discipline. Gives the correct answer, but makes minor errors and shortcomings in the reproduction of the studied material, definition of concepts, inaccuracies when using terminology.

Skills: the student is able to use the knowledge when interpreting physiological parameters in a modified situation, observes the basic rules of the culture of oral speech, correctly uses terminology.

«Full mark»

Knowledge: the student independently highlights the main positions in the studied material and is able to give a full description of the basic ideas of the developed discipline material. Knows a glossary on a topic or discipline section.

Skills: the student is able to make a complete and correct answer on the basis of the studied material, to highlight the main provisions, to independently confirm the answer when solving situational problems, independently and reasonably to make analysis, generalizations and conclusions. To establish interdisciplinary (based on previously acquired knowledge) and intra-subject connections, to creatively apply the knowledge to solve physiological problems. Consistently, clearly, clearly, connected, justified and unmistakably outlines the educational material: gives an answer in a logical sequence using accepted terminology, draws his own conclusions, formulates an accurate definition and interpretation of the basic concepts and rules. He is able to independently use visual aids, reference materials, textbook, additional literature, primary sources, physiological devices and medical tools on the topic or section of discipline.

PRACTICAL SKILLS

Section 5. Cardiovascular Physiology

GPC-9 controlled competencies codes ("to be knowledgeable of").

Clinical and physiological methods of CVS research.

1.1. Sphygmography

1.2. Blood pressure check

Criteria for assessing current and midterm attestation

«Unsatisfactory»: the student does not have practical skills in the study of physiological functions on this topic or the section of physiology.

«Satisfactory»: the student has basic practical skills on the topic or section of discipline, but performs them only with outside help, makes mistakes and inaccuracies in self-fulfillment, use of terminology.

«Good»: the student has sufficient skill to work with the tools, to reproduce experiments on a live object, but performs using a guide to practical lessons.

« Full mark»: the student has the skill of demonstrating physiological experimentation and methods of clinical research of human physiological functions, shows deep and complete knowledge of skills to the topic or section of discipline.

ASSESSMENT

Section 4. Blood System Physiology (GPC-9: "to know")

To determine the rate of subsidence of red blood cells use a reagent:

- ! 0.5% sodium chloride solution
- ! 3% acetic acid solution
- ! 1.7% solution of saline acid
- + ! 5% sodium citrate solution

1. To determine haemoglobin by Sali technique use reagent:

- ! 3% acetic acid solution
- ! 3.5% sodium chloride solution
- ! 3.7% lemon-acid sodium solution
- + ! 0.1N solution of saline

2. To count white blood cells in Goryayev's counting chamber, blood is diluted:

- ! isotonic sodium chloride solution
- ! 0.15% hydrochloric acid solution
- ! 3.5% sodium citrate solution
- + ! 5% acetic acid solution with methylene blue

3. Determining the amount of haemoglobin in the blood is produced by:

- ! Gorjaev's chamber
- ! celloscope
- ! Panchenkov device
- + ! photoelectric colorimeter, Sahli hemoglobinometer

Section 12. HNA Physiology (GC-1, GPC-9: «to know»)

4. The idea of the reflexive nature of the activities of the higher parts of the brain for the first time put forward:
 - ! I.P. Pavlov
 - ! P.K. Anokhin
 - + ! I.M. Sechenov

6. In the functional system of behavior (by P.K. Anokhin) severe toothache forms:
 - ! indicative reflex
 - ! decision-making
 - ! result acceptor
 - + ! dominant motivation

7. In the functional system of behavior (P.K. Anokhin) after afferent synthesis comes the stage of:
 - ! sustainable performance
 - ! anxiety
 - ! Paradoxical
 - + ! decision-making

Criteria for assessing midterm attestation (testing):

- «full mark»: 91-100%
- «good»: 76-90%
- «satisfactory»: 61-75%
- «unsatisfactory»: < 61%

6.2. Intermediate certification on the results of discipline development

6.2.1. Intermediate appraisal forms – terminal exam:
assessment and oral interviews or oral interviews

6.2.2. Intermediate appraisal procedure in 1 and/or 2 stages:

In full-time mode: testing and interviewing or interviewing;

in On-line mode: testing and interviewing or interviewing.



6.2.3. Examples of questions to prepare for the exam (interview):

(GC-1, GPC-9)

1. What is excitability, which fabrics are excitable? Common properties of excitability: excitability threshold, reobas, useful time, hronaxy, lability.
2. The nature of membrane potential (the potential of rest). Selective permeability of the cell membrane in the emergence of membrane potential.
3. Features of hormonal regulation functions. Types and mechanisms of action of hormones. Classification of hormones by chemical structure.
4. Thyroid. The role of her hormones in regulating the growth and development of the body.
5. Blood buffer systems, their role in maintaining blood pH.
6. Factors that make up the elasticity of lung cravings (ETC).

7. Intrathoracic negative pressure, role in respiration.
8. Glomerular filtration. Composition of primary urine.
9. Reabsorption and secretion processes in the nephron canal apparatus. Forming the ultimate urine. Number and composition.
10. The doctrine of I.P. Pavlov on conditional reflexes. General characteristics and properties of conditional reflexes. Rules of education and methodology for the development of conditional reflexes. Classification of conditional reflexes.
11. Mechanism of conditional reflex formation. Current ideas about the time link closure mechanism. The role of the dominant in time link closure mechanisms. Stages of conditional reflex formation. Types of classical conditional reflexes: food, defensive, motor, vegetative. Conditional reflexes of the second and highest order.

6.2.4. Examination cards examples

 MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION Federal State Budget Higher Education Institution « Dagestan State Medical University »
Examination card № on the course «Hominal physiology» for students of the 2nd year of specialty, training program- «Medical Care»
<ol style="list-style-type: none"> 1. Excitability and excitable tissues. Power and temporal parameters of excitability. 2. Adrenal hormones (cortical and cerebral layers). 3. Factors that make up the elasticity of lung cravings (ELC). Intrathoracic negative pressure, role in respiration. 4. Determining the time of the Turk reflex in a spinal frog.
The ticket was made by Ph.D., s.l. Nurmagomedova H.A. Approved at the meeting of the Department of Hominal Physiology «_» _____20_, protocol «_» Head of Department , Professor _____ Rahimov R.M.
 MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION Federal State Budget Higher Education Institution « Dagestan State Medical University »

Examination card №
on the course «Hominal physiology»
for students of the 2nd year of specialty,
training program- «Medical Care»

1. Stimulus and its classification.
2. Blood buffer systems, their role in maintaining blood pH.
3. Vital capacity of lungs (VC), pulmonary volumes. Spirometry.
4. Exploring color perception using polychromatic tables.

The ticket was made by Ph.D., s.l. Nurmagomedova H.A.

Approved at the meeting of the Department of Hominal Physiology «_» _____20_, protocol «_»

Head of Department, Professor

Rahimov R.M.

6.2.5. Discipline evaluation system, description of the scale of assessment and rating

Grading degree	Assessment scale			
	«Unsatisfactory» (basic level has not reached)	«Satisfactory» (Basic level)	«Good» (Mid-level)	«full mark» (high or advanced level)
Competence code – GC-1, GPC-9				
To know	The student is not able to independently highlight the main positions in the studied material of the discipline. Does not know the basic content of the material discipline and terminology.	The student has mastered the basic content of the discipline material, but has unsystematic knowledge about the main positions in the studied material, confuses individual terms	The student is able to independently highlight the main positions in the studied material. He knows the basic ideas of the educational material, and the terminology.	The student shows deep knowledge of the material, independently highlights the main positions shows deep knowledge and understanding of physiological processes.
To be able to	The student is not able to state the basic provisions of the educational material.	The student is able to present the basic material of the discipline, but has difficulties in interpreting individual physiological processes and solving situational problems.	The student is able to independently present the main material of the textbook, use knowledge to generalize the educational material and interpret physiological constants when solving situational problems.	The student is able to logically consistently and detail the entire material, independently make a conclusion about the physiological processes occurring in the human body, freely solves situational problems.
To be knowledgeable	The student does not know the skill.	The student has basic material and skills, is able to perform physiological experiments and clinical methods of research, but at the teacher's hint.	The student has knowledge of all the studied software material, and basic skills, is able to perform physiological experiments and clinical methods of research, but admits minor inaccuracies in reproduction.	The student deeply owns the material, all the skills, independently and unmistakably performs physiological experiments and clinical methods of

				research.
--	--	--	--	-----------

Criteria for assessing intermediate performance control (testing):

- «full mark »: 85-100%
- «good»: 70-84%
- «satisfactory»: 50-69%
- «Unsatisfactory»: < 50%

7. EDUCATIONAL, METHODICAL AND INFORMATION SUPPORT FOR DISCIPLINE

7.1. Basic literature

Print publication:

№	Edition	Number of copies in the library
1	Hominal physiology.: textbook/under. ed.V.M.Smirnova.-3th ed., re-reg. and additional - M.:IC "Academy" - 2010.	188
2	Hominal physiology.: textbook/under. Ed. akad. K.V. Sudakova M. : GEOTAR - Media, 2015.	150
3	Hominal physiology: textbook/ed. L.S. Tel, N.A. Aghajanyan. M., "Litterra", 2015.	500

Electronic editions:

1	Hominal physiology [Electronic resource: textbook / edited by L.L. Tel, N.A. Aghajanyan - M.: Litterra, 2015. - http://www.studmedlib.ru/book/ISBN9785423501679.html
2	Hominal physiology [Electronic resource: textbook / edited by B.B. Tkachenko. - 3rd ed., ispr. and additional - M.: GEOTAR-Media, 2016.- http://www.studmedlib.ru/book/ISBN9785970436646.html

7.2. Additional literature

Print publication:

№	Editions	Number of copies in the library or department
1	Atlas in Physiology / A.G. Kamkin, M.S. Kiselyova, in 2 volumes. Volume 1. - M.: GEOTAR-Media, 2012. 402 s.	50
2	Atlas in Physiology / A.G. Kamkin, M.S. Kiselyova, in 2 volumes. Volume 2. - M.: GEOTAR-Media, 2012. 474 s.	50
3	Human physiology. Atlas of Dynamic Schemes: Training Manual / edited by Sudakov K.V., -22nd ed., corrected. and additional - M.: GEOTAR-Media, 2015. 416 s.	30
4	Teaching manual for practical classes for students in two parts. Part 1. /Ed. Prof. T.S. Sulakvelidze - DSMU CPI. Makhachkala. - 2018. 96 s.	150
5	Teaching manual for practical classes for students in two parts. Part 2. /Ed. Prof. T.S. Sulakvelidze - DGMU CPI. Makhachkala. - 2018. 104 s.	150
6	Guide to practical classes on normal physiology: a textbook for students of VPO / under ed. S.M. Budylin, V.M. Smirnova. - M.: Academy, 2011. 439 s.	395

7	Physiology. A textbook for dental faculties honey. Universities. Edited by V.M. Smirnova, V.G. zalova, M.A. Medvedeva. 3rd edition. M.: MIA, 2020.	150
---	--	-----

Electronic editions:

№	Edition
1	2
1	Hominal Physiology: textbook / V.P. Degtyarev, N.D. Sorokina - M.: GEOTAR-Media, 2016.- http://www.studmedlib.ru/book/ISBN9785970435472.html
2	Hominal Physiology [Electronic resource: textbook / edited by K.V. Sudakova. - M.: GEOTAR-Media, 2015.- http://www.studmedlib.ru/book/ISBN9785970435281.html
3	Human Physiology: Atlas of Dynamic Schemes: Training Manual / K.V. Sudakov, V.V. Andrianov, J.E. Vagin, I.I. Kiselyov. - 2nd ed., ispr. and additional - M.: GEOTAR-Media, 2015.- http://www.studmedlib.ru/book/ISBN9785970432341.html
4	ELS Medical University (Student Consultant) http://www.studmedlib.ru - access to all students of the 2nd year of the medical faculty of DSMU

7.3. Internet Information and Telecommunications Resources

№	The name of the resource
1	Electronic Library: Dissertation Library: Website/Russian State Library. - Moscow: RGB, 2003. - URL: http://diss.rsl.ru/?lang=ru - Text: Electronic.
2	Government of the Russian Federation: official website. - Moscow. - Updated within 24 hours. - URL: http://government.ru . - Text: electronic.

7.4 Information technology

When studying the discipline, a common package of documents internet - materials that provide ample opportunities to improve university training in normal physiology in order to learn the skills of educational activities. The standard capabilities of most programs are the implementation of the didactic principle of visibility in learning; their use enables students to apply different ways to solve an educational problem.

Learning methods using information technology.

Learning methods using information technology used in normal physiology classes include:

- computer testing;
- demonstration of multimedia materials, including videos, audio-video lectures;
- list of search engines (site moodle.dgmu.ru);
- list of encyclopedic sites;
- list of software:

1. Microsoft Windows 7 Professional operating system.

2. Microsoft Windows 10 Pro (on new computers).

3. Application packages:

Microsoft Office Professional Plus 2007 Microsoft Office Professional Plus 2010

Microsoft Office Professional Plus 2013

Microsoft Office Standard 2013

Microsoft Office Standard 2016 within: Microsoft Word 2007 (2010, 2013, 2016), Microsoft Excel 2007 (2010, 2013, 2016), Microsoft Power Point 2007 (2010, 2013, 2016).

List of information reference systems:

1. Electronic Information and Education Environment (EIOS) DSMU. URL: <http://eos-dgmu.ru>; <https://eos-dgmu.ru/course/view.php?id=25>
2. Student consultant: electronic library system. URL: <http://www.studentlibrary.ru>
3. Physician Consultant: Electronic Library System. URL: <http://www.rosmedlib.ru>
4. Federal Electronic Medical Library (FEMB). URL: <http://feml/scsml.rssi.ru>
5. Science Electronic Library eLibrary. URL: <https://www.elibrary.ru/defaultx.asp>
6. Medical reference system. <http://www.medinfo.ru/>

8. LOGISTICS DISCIPLINE

No. in sequence	View of the room with number (educational audience, laboratory, a computer class, etc.) with the indication of the address (location) of the building, clinical base, the building, a construction, the room, room space, his appointment (for independent work, holding practical lessons, the current control, intermediate certification, electronic training, lecture classes, etc.)	Equipment name
1	<p>Halls No. 2 and No. 3 on A. Aliyeva Street 1, Bio-Hull and Hall. morphocorps - for lectures. For practical classes: classrooms (audiences) of the department (2nd 3rd floors of the bio-hull, A. Aliyeva Street 1.):</p> <p>No. 3 (area 25m², seats - 20, training tables - 10, marker board - 1 piece, hanger - 1 piece);</p> <p>No 68 (area 40m², seating - 27, training tables - 14, marker board - 1 piece, hanger - 1 piece, screen - 1 piece, portrait - 2 pieces, bookcase - 2 pieces, screen - 1 piece);</p> <p>No76 (area 23m², seating - 21, training tables - 11, marker board - 1 piece, hanger - 1 piece, washstand - 1 piece, bookcase - 1 piece)</p> <p>No77 (area 16m², seats - 13, training tables - 7, marker board - 1 piece, hanger - 1 piece, weed - 1 piece.</p> <p>№78 (area 16m², seats - 17, training tables - 9, marker board - 1 piece, hanger - 1 piece, washstand - 1 piece, shelf hinged - 1 piece)</p> <p>No79 (area 17m², seating - 18, training tables - 8, marker board - 1 piece, washstand - 1 piece, shelf hinged - 1 piece)</p> <p>№81 (area 35m², seats - 22, training tables - 11, marker board - 1 piece, washstand - 1 piece, cabinet - 2 pieces)</p> <p>No97 (area 22m², seats - 19, training tables - 9, marker board - 1 piece, washstand - 1 piece)</p> <p>No98 (area 35m², seating - 28, training tables - 11, marker board - 1 piece, washstand - 1 piece, wardrobe - 1 piece, portrait - 1 piece, hanger - 2 pieces, hanging shelf - 4 pieces)</p> <p>Cabinet of the head of the department No.80 (area - 22m², a set of cabinet furniture - 1pc, rolls - 1 piece, chairs - 10 pieces, chair - 1 piece,, a cupboard - 2 pieces, a sofa - 1 piece)</p> <p>- The cabinet for lessons in valeology and SRS (3rd floor of the bio-hull) No 99 (area - 57m², medical couch - 1pc, chairs - 24 pieces, training tables - 13, banners - 15 pieces);</p> <p>Training laboratory - No. 82 (2nd floors of the bio-hull, A. Aliyeva Street 1) (area</p>	<p>For lectures: laptop "ASUS" - 2 pieces, projector "ACER" , "BEN" , "Overhead" projector -1.</p> <p>For official use:</p> <ol style="list-style-type: none"> 1. personal computers (without printers) - 3 pieces.; 2. "Canon FC-128" xerox - 1 piece.; 3. laser printer HP LJ-1 – 1 piece; 4. Mfp “KYOCERA” – 1 piece; 5. Scanner “GENIUS” – 1 piece; 6. Fridge – 3 pieces. <p>For practical training and SES:</p> <p>distiller - 1 piece;</p> <p>lake frogs for physiological experiments;</p> <p>Galvani tweezers - 6.;</p> <p>Laboratory couch -1;</p> <p>Goryayev's chamber – 8 ;</p> <p>Panchenko tripod – 10 ,</p> <p>Sahli hemoglobinometer – 10;</p> <p>melangers for red blood cells - 6 pieces, for white blood cells -15 pieces; microscopes - 12 pieces;</p> <p>sets of tsoliclone sets - 5 pieces;</p> <p>Electrocardiographs (ECG): EC 12 T - 01 - 2 pieces;</p> <p>EC 1T-1/3 (Axion) - 1.;</p> <p>Water spiral - 4.;</p> <p>Spirographer microprocessor SMP21/01 - 1 pc.;</p> <p>Spirographer microprocessor SMP21/01 - 1 pc – 6 шт.;</p> <p>fistulas - 10.;</p> <p>probes: gastric - 2 pieces, duodenal - 1 piece.;</p>

	<p>18m2, seats - 6, laboratory table - 1, computer table - 1 piece, desktop - 2 pieces, cabinet - six-door - 1 piece, wall clock - 1 st., wash - 1 piece).</p> <p>Experimental Laboratory - Auditorium No. 100 (3rd floor of the bio-hull, A. Aliyeva Street 1) (area - 15 m2, microtom - 1 piece, laboratory tables - 3 pieces, chair - 2 tbps.)</p> <p>Scientific laboratory (2nd floor of the bio-hull, A. Aliyeva Street 1) - room number 4 (area - 11 m2, medical couch - 1 piece, closet. - 3 pieces, screen - 1 piece)</p> <p>Assistant - room no. 5 (2nd floors of the bio-hull, A. Aliyeva Street 1 (area 13m2, seating - 5, training tables - 4, washstand - 1 piece, closet - 2 pillars). (18m2, seating - 8, desktop - 3pc, washstand - 1 piece, wardrobe - 1 piece, cabinet - 2 pieces)</p> <p>Preparation room № 83 (2nd floors of the bio-hull, A. Aliyeva Street 1) (area 13m2, washstand - 2 pieces, closet - 2 pieces).</p> <p>Sanitary conveniences - room 6 (2nd floors of the biohulus, A. Aliyeva Street 1) (area 3m2, washstand - 1 piece).</p>	<p>Floor scales - 2 pieces;</p> <p>The growth - 2 pieces;</p> <p>Tonometers - 11 pieces;</p> <p>Phonendoscope - 6 pieces; молоточек неврологический – 6 шт.;</p> <p>Dynamometers: wrist - 7 pieces and mill - 3 pieces;</p> <p>Yrometer - 5 pieces;</p> <p>portable dializer for the device "Artificial kidney" - 4 pieces;</p> <p>Olfatometer - 2 pieces;</p> <p>circumul for aesthetics - 5 pieces;</p> <p>A set of solutions for the conduct of density - 6;</p> <p>Sivtsev's tables - 10 pieces;</p> <p>Foster's perimeters - 4 pieces;</p> <p>Rabkin's table - 2 pieces;</p> <p>Set of tuning - 1 piece;</p> <p>individual tuning tones - 6 pieces;</p> <p>shield for the development of a conditioned reflex in a person - 4 pieces;</p> <p>Laboratory utensils for practical training (test tubes, glasses, flasks, cylinders, tripods for test tubes, pipettes, buxes, etc.);</p> <p>magnifying magnifying glass - 2 pieces</p>
--	--	---

9. HUMAN RESOURCING FOR DISCIPLINE

Information about the human resources needed to carry out the educational process

№	Teacher's name	Conditions of attraction (staff, internal part-time, external part-time, by contract)	Occupation degree/academic rank	Education (which educational institution graduated, year)	Level of education, the name of the specialty by diploma, the name of the assigned qualification	Total work experience	Experience of practical work on the profile of the educational program in specialized organizations, indicating the period of work and position
1	2	3	4	5	6	7	8
1	Rahimov R.M.	pc.	H. of dep., prof., Dr. habil. med.	Higher, DMI	Physician,M.D.	42	33/3
2	Nurmagomedova H.A.	pc.	H. of Inst. worker,assistant p., c.b.s.	Higher DMI 1966	Physician,M.D.	51	50
3	Bilalova R.R.	pc.	Dr. habil. med.,, assistant p.	Higher DSMI 1967	Physician,M.D.	54	51
4	Ishmaelova A.H.	pc.	Dr. habil. med.,, assistant p.	Higher DGMI 1971	Doctor of Dental Surgery	51	51
5	Abdullayeva N.M.	intra-group simultaneity	c.b.s, assistant p.	Higher DSU 2000	biologist, teacher of biology, chemistry	19	16
6	Garunova R.E.	pc.	ct. npen.	Higher DSMI 1994	Doctor of Medical care	22	22
7	Suleimanova R.G.	pc.	Dr. habil. med.,, i/c associate prof.	Higher DSMA 2002	Doctor of Medical care	18	18
8	Botasheva M.M.	Under contract	c.b.s, assistant lecturer	Higher CSTU 2001	Chemistry and Biology Teacher	19	19
9	Magomedova M.M.	intra-group simultaneity	assistant lecturer	Higher DSPU 1972	Chemistry and Biology Teacher	48	30

10. USE OF INNOVATIVE (ACTIVE AND INTERACTIVE) TEACHING METHODS

Active teaching methods used in the study of this discipline account for 10% of the volume of classroom classes.

№	Section name	Kind, the name of the theme of the class using forms of active and interactive teaching methods. Sections: 1,2,3,4,5,6,11,12.	Laboriousness (in hours)
1	Endocrine System Physiology	<i>Lecture:</i> Hypothalamic-pituitary system (problem lecture)	2
2	HNA Physiology	<i>Practical class:</i> Types of HNA by Hippocrates and Pavlov (training conference)	3
3	The physiology of the blood system	<i>Practical class:</i> Blood groups, blood transfusions. (solving multi-level tasks at the self-employed stage.)	3
4	Physiology of analyzers	<i>Practical class:</i> Conductor's department of analyzers. (Role-playing game)	3

11. METHODOLOGICAL SUPPORT FOR THE COURSE

Guidelines for students in two parts - annex no.3 (attached).

12. FEATURES OF TRAINING IN THE DISCIPLINE FOR DISABLED AND PEOPLE WITH DISABILITIES

12.1. Training program for disabled and people with disabilities

The department has compiled an adapted working program using special methods of training and didactic materials, designed to take into account the health of students.

12.2. In order to master the curriculum, the department provides the department of disabilities and persons with disabilities:

1) for disabled and visually impaired:

✓ On the website of the department exhibited: lectures and practical classes in physiology accompanied by voiceover (voice of lecturer and teachers), which can be used by students with visual impairment.

✓ In practice, the teacher devotes more time for oral conversation, consultations on the topic of classes.

✓ There are magnifying magnifying meadows on the DGMU (EIOS) website, voiced lectures intended for visually impaired students.

2) for people with disabilities, people with hearing disabilities:

- The department's website displays text with illustrations on the sections of the discipline "Hominal Physiology" that can be used by students with hearing loss.

- Students with hearing disabilities can use teaching aids with detailed description of practical works.

3) disabled people with musculoskeletal disorders:

- The department organizes a remote practice session, as well as for such students on the 1st floor of the bio-hall (DSMU scientific library) a special room is allocated, where the teacher-physiologist conducts a class.

12.3. Education for students and people with disabilities can be co-organized.

12.4. The list of educational and methodical support for self-employed students in the discipline.

Educational materials for self-employed students from disabilities and persons with disabilities are provided in forms adapted to their disabilities and perception of information:

Student categories	Form
Hearing impairment	- In print; lectures and guidance paper . In the form of an electronic document; EIOS-DsMU, department's website
Visually impaired	- In the form of an electronic document EIOS-DSMU, eios-DSMU and on the website of the Department of Lectures and hands-on classes with voiceovers. Oral conversation
With a violation of the musculoskeletal system	- Printed form lectures and guidance paper at EIOS-DSMU

12.5. Assessment Fund for Interim Assessment of Discipline Students

12.5.1. List of assessment funds related to the planned results of the educational program for students with disabilities

Student category	Types of appraisal	Forms of monitoring and evaluation of learning outcomes
Hearing impaired	Tests, online testing	Predominantly written form of exam
Visually impaired	Interview, Online interview	Mostly oral check (individually)
With a violation of the musculoskeletal system	Remote test solution, control issues, conversation in the form of videoconferencing	Control organization in EIOS DSMU

12.5.2. Methodical materials that determine the procedures for assessing knowledge, skills, skills and experience, characterizing the stages of competency formation

The evaluation of the results of the education of disabled and disabled persons is to use the technical means they need in connection with their individual characteristics.

The procedure for assessing the results of training of disabled and disabled people in the discipline provides information in forms adapted to the limitations of their health and perception of information:

For visually impaired persons:

- printing in enlarged font;
- In the form of an electronic document;
- in the form of an audio file.

For those with hearing impairments:

- in printed form;
- in the form of a video file
- In the form of an electronic document.

For people with musculoskeletal disorders;

- in printed form;
- In the form of an electronic document;
- in the form of an audi-video file.

The procedure for assessing the results of the education of disabled and disabled people in the discipline (module) ensures that the following additional requirements are met, depending on the individual characteristics of the students:

1. Instructions on how to conduct the evaluation procedure are provided in an accessible form (orally, in writing, and, if possible, orally using the services of a surdo-translator);
2. Affordable form of grants of appraisal tools (in print, in print in enlarged font, in the form of an electronic document, the tasks are read out by an assistant, tasks are provided using surdo-translation (if possible));
3. Affordable form of job response (written on paper, a set of answers in the personal office, using assistant services, orally).

If necessary, for students with disabilities and those with disabilities, the procedure for assessing the results of the training in the discipline (or module) can be carried out in several stages.

The procedure for assessing the results of education for disabled and disabled people is allowed with the use of remote educational technologies.

12.6. List of basic and complementary educational literature needed to learn discipline for people with disabilities and people with disabilities

Basic literature

Print:

№	Edition	Number of copies in the library
1	Hominal physiology.: textbook/under. ed.V.M.Smirnova.-3th ed., re-reg. and additional - M.:IC "Academy" - 2010.	188

Электронные издания:

1	Sudakov K. V., Normal Physiology: textbook / edited by K. V. Sudakov. - M.: GEOTAR-Media, 2015. - 880 pp. - ISBN 978-5-9704-3528-1 - Access Mode: http://www.studmedlib.ru/book/ISBN9785970435281.html Authors: Sudakov K. V.,
---	---

	Andrianov V.V., Vagin J.E., Jebrailova T.D., Kiselyov I.I., Umryukhin P.E. (voiced text)
2	Degtyarev V.P., Normal Physiology: textbook / V.P. Degtyarev, N.D. Sorokina - M. : GEOTAR-Media, 2016. - 480 s. - ISBN 978-5-9704-3547-2 - Access Mode: http://www.studmedlib.ru/book/ISBN9785970435472.html (voiced text)

Additional literature

Print:

№	Edition	Number of copies in the library
1	Teaching manual for practical classes for students in two parts. Part 1. /Ed. Prof. T.S. Sulakvelidze - DSMU CPI. Makhachkala. - 2018. 96 s.	100
2	Teaching manual for practical classes for students in two parts. Part 2. /Ed. Prof. T.S. Sulakvelidze - DSMU CPI. Makhachkala. - 2018. 104 s.	100

Electronic editions:

№	Edition
1	2
1	Hominal physiology [Electronic resource]: textbook/V.P. Degtyarev, N.D. Soroki-na - M.: GEOTAR-Media, 2016. - http://www.studmedlib.ru/book/ISBN9785970435472.html (voiced text)

12.7. Guidelines for HIA students to learn discipline

Individual work is essential for the study of the discipline of people with disabilities and persons with disabilities. Individual work refers to two forms of interaction with the teacher: individual learning (consultation), i.e. additional explanation of the educational material and in-depth study of the material with those students who are interested in it, which are an important factor contributing to the individualization of learning and the establishment of educational contact between the teacher and the student with a disability or learning disabilities.

12.8. Description of the logistics needed to carry out the educational process in the discipline (see above)

The discipline of disabled and disabled people is carried out using the means of general and special purpose training: voiced lectures are attached: voiced lectures are attached (<https://eos-dgmu.ru/mod/url/view.php?id=10437>; <https://eos-dgmu.ru/mod/url/view.php?id=10636>) and books(<http://www.studmedlib.ru/book/ISBN9785970435281.html>; <http://www.studmedlib.ru/book/ISBN9785970435472.html>) e.t.c.

13. THE LIST OF CHANGES TO THE WORK PROGRAM

Changes to the working program are made on the basis of orders and orders of the rector, as well as on the basis of decisions on improving the educational and methodical provision of discipline approved at the appropriate level (decision of the scientific council), the CCMC and are registered in the change list.

Work program change registration sheet

List of additions and changes made to the discipline work program	RP updated at the meeting of the department		
	Date	Sub-faculty meeting protocol number	Signature of the head of the department