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Информация о владельце:
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Должность: И.о. ректора
Дата подписания: 30.01.2026 16:46:29
Уникальный программный ключ:
89bc0900301c561c0dcc38a48f0e3de67848446

Federal State Budget Educational Institution
of Higher Education
Pacific State Medical University
of the Ministry of Health of the Russian Federation

APPROVED BY
First Vice-Rector

_____ / Trankovskaya L.V./
"9" июня 2025

DISCIPLINE WORK PROGRAM

Б1.О.10 Human physiology

(name of discipline)

Specialty	**31.05.01 General Medicine for international students (in English)** (code, name)
Degree	Specialist's degree
Profile	02 "Healthcare" (in the field of providing primary health care to the population in medical organizations: polyclinics, outpatient clinics, inpatient/outpatient facilities of the municipal health care system)
Mode of study	Full-time
Period of mastering the BEP	**6 years** (nominal length of study)
Department	of Human Physiology and Pathophysiology

Vladivostok, 2025

Program of the discipline **Б1.О.10 Human physiology** is based on:
1) Federal State Educational Standard of Higher Education for the specialty approved by the Order No. 988 of Ministry of Science and Higher Education of the Russian Federation
dated August 12, 2020.

2) Curriculum for the 31.05.01 General Medicine for international students (in English), profile 02 "Healthcare" (in the field of providing primary health care to the population in medical organizations: polyclinics, outpatient clinics, inpatient/outpatient facilities of the municipal health care system), approved by the Academic Council of FSBEI HE PSMU of the Ministry of Health of Russia, Report No. 8/24-25 dated March 31, 2025.

Work program for the discipline was developed by the writing team of the Department of Human Physiology and Pathophysiology of the FSBEI HE PSMU of the Ministry of Health of Russia, under the guidance of the Head of the Department of Human Physiology and Pathophysiology, Doctor of Medical Sciences, Professor Markelova E.V.

Developed by:

Assistant professor	Candidate of Medical Sciences, Associate Professor	Sidorova O.N.
(position held)	(academic degree, academic title)	(full name)
Assistant professor	Candidate of Medical Sciences	Poleshchuk T.S.
(position held)	(academic degree, academic title)	(full name)

1. GENERAL PROVISIONS

1.1. Purpose and Objectives of Mastering Б1.О.10 Human physiology

The purpose of mastering the discipline is to develop universal and professional competencies in a future specialist by, on the basis of a system approach, acquiring modern knowledge of natural sciences in general and special (specialty) physiology, forming perception of the human body as an open self-regulating system that ensures its adaptation to the habitat.

Objectives of mastering the discipline:

1. Learning about a systemic approach in the process of examining the physiological mechanisms and processes underlying the functioning of organs and systems, as well as the regulation of vital functions of the body.
2. Mastering modern methods of examination of basic physiological functions.
3. Developing physiological thinking, understand the possibilities of influencing vital processes.
4. Developing skills of assessing the state of organs and systems of the body as part of functional diagnostics.

2. DISCIPLINE AS PART OF THE BASIC EDUCATIONAL PROGRAM

Discipline Б1.О.10 Human physiology is included in the Mandatory part of the Unit 1 of the basic educational program for the specialty 31.05.01 General Medicine for international students (in English), profile 02 "Healthcare" (in the field of providing primary health care to the population in medical organizations: polyclinics, outpatient clinics, inpatient/outpatient facilities of the municipal health care system), and is part of the 3rd and 4th semesters' curriculum.

3. PLANNED LEARNING OUTCOMES OF THE DISCIPLINE

3.1. Mastering the discipline **Б1.О.10 Human physiology** is aimed at the development of students' competencies. The discipline facilitates the development of students' competencies corresponding to the types of professional activity.

Competency Code	**Competency Description**	**Competency Indicators**
Universal Competencies		
Systemic and critical thinking	UC-1. Is able to analyze of problems critically using system approach and devise a plan of action	CI.UC-1_1- looks for and investigates problem situations that arise during professional activity CI.UC-1_2- selects sources of information for critical analysis of problem situations that arise during professional activity CI.UC-1_3- develops and substantively argues a plan of action for solving problem situations using systemic and interdisciplinary approaches
General Professional Competencies		
Etiology and pathogenesis	GPC-5. Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity	CI.GPC-51- assesses the morphofunctional state based on the acquired knowledge CI.GPC-52- distinguishes between pathological and physiological processes, identifies etiology of changes CI.GPC-53- provides diagnostic assessment of the identified changes

3.2. Types of professional activity corresponding to competencies developed over the course of

mastering Б1.О.10 Human physiology:

Types of professional activity objectives

1. *Medical*

Kinds of professional activity objectives

1. *Diagnostics*
2. *Treatment*

3.3. Planned learning outcomes of mastering the discipline are represented by knowledge, skills, abilities and/or experience, characterize the stages of developing competencies and ensure achievement of the planned outcomes of mastering the basic educational program. Learning outcomes of a discipline are correlated with competency indicators.

4. SCOPE AND CONTENT OF THE DISCIPLINE

4.1. Scope of the Discipline and Types of Academic Work

Type of Academic Work		**Total Hours**	**Semesters**	
			3	**4**
			hours	**hours**
1		2	3	4
Classroom hours (total), including:		**164**	**92**	**72**
Lectures (L)		48	28	20
Practical classes (C)		116	64	52
Independent work of the student (IW), including:		**88**	**52**	**36**
Electronic educational resource (EER)		10	4	6
Calculation and graphic assignments		14	10	4
Preparing for classes (CP)		40	26	14
Preparing for continuous assessment (CAP)		24	12	12
Preparing for interim assessment (IAP)		36		36
Type of interim assessment	pass/fail test (T)			
	exam (E)	E		E
TOTAL: TOTAL credit value	hrs.	**288**	144	144
	credits	**8**	4	4

4.2. Contents of the Discipline

4.2.1. Topics of Discipline Lectures and Academic Hours per Semester

No.	**Lecture Topic**	**Hours**
1	2	3
	Semester No. 3	
1.	Introduction to physiology. General physiology of excitable systems	2
2.	Physiology of the muscular system	2
3.	General principles of body function regulation. Reflex theory	2
4.	Excitation and in central nervous system	2
5.	Regulation of somatic functions	2
6.	Regulation of autonomic (vegetative) functions	2
7.	Humoral (hormonal) regulation of body functions	2
8.	Physiology of the endocrine system	2

9.	Physiology of the blood system. Respiratory function	2
10.	Protective function of the blood	2
11.	Physiology of cardiac function. Examination methods	2
12.	Physiology of blood vessels	2
13.	Regulation of cardiac activity and vascular tone	2
14.	Physiology of respiration	2
	Hours per semester total	**28**
	Semester No. 4	
1.	Physiology of digestion	2
2.	Physiology of metabolism and thermoregulation	2
3.	Physiology of excretion	2
4.	General patterns of adaptation to different conditions	2
5.	Physiology of sensory systems. General aspects, vision	2
6.	Physiological states of the brain. Sleep	2
7.	Physiological foundations of learning, memory, and thinking. Innate (native) and acquired (learned) behavior	2
8.	Functional brain states	2
9.	Types of higher nervous function	2
10.	Physiological basis of motivations and emotions	2
	Hours per semester total	**20**

4.2.2. Topics of DisciplinePractical Classes and Academic Hours per Semester

No.	**Practical Class Topic**	**Hours**
1	2	3
	Semester No. 3	
1	Bioelectric phenomena in excitable tissues	2
2	Examination of excitability. Laws of irritation	2
3	Types and mechanisms of muscle contractions. Electromyography	2
4	Muscle work and fatigue	2
5	Physiology of tissue elements of the nervous system	2
6	General principles of function regulation. Reflex activity of the CNS	2
7	Interaction of excitation and inhibition processes in the CNS	2
8	Regulation of somatic functions. Reflex level	2
9	Movement control at cortical level of CNS	2
10	Neural regulation of autonomic functions	2
11	Humoral regulation of functions. Hypothalamic–pituitary system	2
12	Physiology of the endocrine system	2
13	Module 1 knowledge control: “General physiology of excitable tissues and control systems of the body”	2
14	Physiology of the blood system. Blood constants	2
15	Physiology of the erythrocyte	2
16	Respiratory function of the blood	2
17	Protective function of the blood. Physiology of the leukocyte	2
18	Physiological basis of blood coagulation	2
19	Physiological basis of blood transfusion	2
20	Assessment of practical skills Related to the blood system	2
21	Hemodynamic function of the heart	2

22	Properties of the cardiac muscle	2
23	External manifestations of cardiac activity	2
24	Physiological basis of ECG and PCG	2
25	Regulation of cardiac activity	2
26	Physiology of blood vessels	2
27	Regulation of vascular tone	2
28	Vascular response examination methods	2
29	Regional circulations	2
30	Assessment of practical skills related to the cardiovascular system	2
31	Module 2 knowledge control: “Physiology of the blood system and blood circulation”	2
32	Summing up the semester	2
	Hours per semester total	**64**
	Semester No. 4	
1	Physiology of external respiration	2
2	Regulation of respiration	2
3	Aspects of breathing in various conditions	2
4	Examination of external respiration	2
5	Digestion in various parts of the gastrointestinal tract	2
6	Digestion regulation	2
7	Physiology of metabolism and energy	2
8	Physiological basis of rational nutrition	2
9	Physiological basis of thermoregulation	2
10	Mechanisms of uropoiesis (urine formation)	2
11	Regulation of urine formation and excretion	2
12	Clinical and physiological methods of excretory system examination	2
13	Module 3 knowledge control: “Physiology of respiration, digestion, metabolism, and excretion”	2
14	General patterns of adaptation to different conditions	2
15	General physiology of sensory systems. Optical system of the eye	2
16	Visual system	2
17	Physiology of auditory and vestibular systems	2
18	Physiology of somatosensory, taste, and olfactory systems	2
19	Functional brain states, methods of assessment. Electroencephalography. Physiology of sleep	2
20	Innate (native) and acquired (learned) behavior. Physiological foundations of learning, memory, and thinking	2
21	Innate (native) and acquired (learned) behavior. Physiological foundations of learning, memory, and thinking	2
22	Physiological foundations of attention, motivations, emotions	2
23	Inhibition in higher nervous function	2
24	Types of higher nervous function. Signal systems	2
25	Module 4 knowledge control: “Physiology of adaptation, sensory systems, and higher nervous function”	2
26	Preparation for practical skills assessment. Summing up the semester	2
	Hours per semester total	**52**

4.2.3. Independent Work of the Student

No.	Name of the Discipline Section	Type of IW	Total Hours

1	3	4	5
	Semester No. 3		
1	General physiology of excitable tissues and control systems of the body	1. Graphical comparison of excitation and excitability 2. Table of correlation of mechanical and physiological phases and electrical events of muscle contraction 3. Drawing diagrams of reflex arcs of somatic and autonomic reflexes 4. Table of physiological effects of hormones of the endocrine system 5. Preparing for practical classes and continuous assessment	26
2	Physiology of the blood system and blood circulation	1. Drawing diagrams of functional systems maintaining basic blood constants (blood mass, osmotic pressure, pH), reflex arcs of cardiac and vascular reflexes, and functional system of maintaining blood pressure 2. Preparing a library-research paper on physiological basis of blood and blood substitutes transfusion 3. Table of cardiac cycle phases 4. Drawing a graph of correlation between the processes of excitation, contraction, and excitability in the heart muscle; graphic representation of ECG, sphygmogram, phlebogram with analysis of basic parameters 5. Calculation of hemodynamic parameters 6. Preparing for practical classes and continuous assessment	26
	Hours per semester total		**52**
	Semester No 4		
3	Physiology of respiration, digestion, metabolism, and excretion	1. Tables of lung volumes, digestive juices, regulatory effects on digestion 2. Drawing diagrams of functional systems of respiration, nutrition, and thermoregulation; secretory and motor reflexes of the gastrointestinal tract, and the act of urination 3. Writing a library-research paper on the physiological foundations of dietetic nutrition, hypo- and hyperthermia 4. Preparing for practical classes and continuous assessment	18
4	Integrative functions of the body. Physiology of adaptation, sensory systems, and higher nervous function	1. Drawing diagrams of the sensory systems pathways 2. Tables of distinctive features of unconditioned and conditioned reflexes, functions of the right and left hemispheres 3. Writing reports on the mechanisms of adaptation to various climatic conditions, functional states of the brain 4. Preparing for practical classes and continuous assessment	18

	Exam	Preparing for interim assessment	36
	Hours per semester total		**72**
	Hours total		**124**

5. REQUIREMENTS FOR IMPLEMENTATION OF DISCIPLINE

5.1. Discipline Requirements for Educational Materials and Provided Information

Essential reading

No.	Name/Title, Resource Type	Author(s)/Editor	Publisher Imprint, Web Address	Number of Copies (accesses) in the Library and Information Center
1	2	3	4	5
1	Избранные лекции по нормальной физиологии = Selected Lectures on Normal Physiology : учебное пособие на русском и английском языках [Электронный ресурс]	М. М. Лапкин, Е. А. Трутнева	М.: ГЭОТАР-Медиа, 2021. – 544 с. URL: http://www.studentlibrary.ru/	Unlimited access
2	Normal physiology : textbook for students' independent work = Нормальная физиология: учебник на английском языке [Электронный ресурс]	Ye.V. Dorokhov, A.V. Karpova, V.A. Semiletova et al.	М.: ГЭОТАР-Медиа, 2021. – 512 с. URL: http://www.studentlibrary.ru/	Unlimited access
3	Normal physiology: textbook [Электронный ресурс]	ed. K. V. Sudakov.	М.: ГЭОТАР-Медиа, 2022. – 728 с. URL: http://www.studentlibrary.ru/	Unlimited access

Supplementary reading

No.	Name/Title, Resource Type	Author(s)/Editor	Publisher Imprint, Web Address	Number of Copies (accesses) in the Library and Information Center
1	2	3	4	5
1	Cardiac physiology: учеб. пособие	Горкавая А. Ю., Климкина Т. Н., Иванова А. Ю., Полещук Т. С.	Владивосток: Медицина ДВ, 2024. - 96 с. URL: http://www.studentlibrary.ru/	Unlimited access, 38

Online resources

1. Electronic library system "Student Consultant" http://studmedlib.ru/
2. Electronic library system "University Library Online"http://www.biblioclub.ru/
3. Electronic library system "Urait" https://urait.ru/
4. Electronic library system "BookUp" https://www.books-up.ru/
5. Resources owned by the Library and Information Center of FSBEI HE PSMU of the Ministry of Health of Russia https://tgmu.ru/university/bibliotechno-informacionnyj-centr/resursy-bic/sobstvennye/

Online resources and respective user guides are available on the Library and Information Center website Library and Information Center — PSMU (tgmu.ru)

5.2. Discipline Requirements for Facilities and Resources

Information on the facility and resource availability and requirements of the discipline is available on the Facility and resource availability and requirements. FSBEI HE PSMU of the Ministry of Health of Russia (tgmu.ru)" page of the official website of the university.

5.3. List of Information Technologies, Information and Reference Systems, Licensed and Free Software (Including Domestically-developed Software):

1. PolycomTelepresence M100 Desktop Conferencing Application (Videoconference system)
2. SunRav Software tTester
3. 7-PDF Split & Merge
4. ABBYYFineReader
5. Kaspersky Endpoint Security
6. INDIGO online testing system
7. Microsoft Windows 7
8. Microsoft Office Pro Plus 2013
9. 1C:University
10. GARANT system
11. MOODLE (Modular Object-Oriented Dynamic Learning Environment)

6. ASPECTS OF THE IMPLEMENTATION OF THE DISCIPLINE FOR STUDENTS WITH DISABILITIES AND SPECIAL NEEDS

6.1. Availability of Accessible Environment

For students with disabilities and special needs, if a written application is submitted, lectures and practical classes are carried out taking into account health limitations, individual capabilities and medical status (hereinafter referred to as individual characteristics) of the student. Compliance with the following general requirements is ensured: teaching aids for collective and individual use are provided, required technical assistance is provided by an assistant; buildings and premises where lectures and practical classes are taking place meet accessibility requirements, other arrangements lack of which makes it impossible or difficult to master the discipline are made.

6.2. Ensuring Compliance with General Requirements

When lectures and practical classes are carried out at the written application of the student, the following general requirements are met: lectures and practical classes for students with disabilities and special needs take place at the same location as for students who do not have disabilities, if this does not cause difficulties for students; an assistant (assistants), who provide(s) students with the necessary technical assistance taking into account individual characteristics of the student, is (are) provided; necessary teaching aids are provided, taking into account individual characteristics of the student.

6.3. Availability of the Internal Policies and Procedures of FSBEI HE PSMU of the Ministry of Health of Russia to Students with Disabilities in a Format Accessible to Them.

All internal policies and procedures of FSBEI HE PSMU of the Ministry of Health of Russia concerning the discipline are made available to students with disabilities in a format accessible to them.

6.4. Increase in the Time Limit of Interim Assessment for Students with Disabilities and Special Needs in Relation to the Established duration

Format of the interim assessment of academic performance within the scope of the discipline conducted for students with disabilities and special needs is selected taking into account individual characteristics of the students (orally, by writing on paper, by typing on a computer, as a test, etc.). The duration of the interim assessment in relation to the established duration is increased at the written application of the student with disabilities. Time limit for the student's preparation for the test is increased by at least 0.5 hours.

7. STAFFING REQUIREMENTS OF THE DISCIPLINE

Academic teaching personnel that ensure the implementation of the discipline education process meet the requirements of the Federal State Educational Standard of Higher Education for the 31.05.01 General Medicine specialty; list of the aforementioned personnel is available on the website of the educational organization.

8. TUTORIAL WORK

Type of tutorial work	Forms and approaches to tutorial work
Assistance in personal growth	Overt Problem-centric debates, workshops, Olympiads, professional events (volunteers, organizers, administrators) Participation in subject and interdisciplinary Olympiads, practical skills competitions, applied science conferences and symposia Talks and problem-centric debates on topics of ethics and deontology in interactions with different categories of participants of professional activity
	Covert – creating atmosphere and infrastructure. Developing a culture of healthy lifestyle and cultivating skills aimed at preserving and improving health. Motivating students to participate in professional, research, administrative, and other kinds of professional activity. Creating atmosphere of kindness and respect with a high level of communication during implementation of the discipline.
Civic position and values	Overt Conducting events that facilitate development of civil culture (discussions/debates and talks).
	Covert – focusing on civic values-oriented position and legal awareness Development of mindful civic position during professional activity Cultivating socially-relevant characteristics and personal experience of community work.
Social values	Overt Highlighting aspects of organization of healthy lifestyle based on health-preserving technologies. Highlighting ecology-related questions, environmental issues as a factor affecting population health and select population risks.
	Covert Development of environmental awareness and sustainable ecological behavior.