

MINISTRY OF HEALTH OF UKRAINE  
Kharkiv National Medical University

Department of Physiology  
Training year 2021-2022

**SYLLABUS OF TRAINING COMPONENT**

**«IMPROVEMENT OF KNOWLEDGE IN PHYSIOLOGY, BIOLOGICAL  
CHEMISTRY, MICROBIOLOGY, VIROLOGY, AND IMMUNOLOGY AS  
USQE TRAINING»**

**Elective** training component

**Internal** form of training

Training direction **22 «Health care»**

Specialty (specialization) **222 «Medicine»**

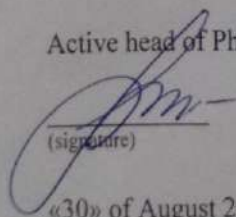
Training program of **2<sup>nd</sup> Master's level of higher education**

Course **3**

Syllabus of training discipline was considered  
at the meeting of Physiology department

Protocol from  
«30» of August 2021 № 16

Active head of Physiology department



ass.prof. L.V. Chernobay  
(name, surname)

«30» of August 2021

Approved by methodical commission of KhNMU  
on problems of general and preprofessional  
training

Protocol from  
«31» September 2021 № 1

Head



prof. O.Yu. Vovk  
(name, surname)

«31» September 2021

## **DEVELOPERS OF SYLLABUS**

1. Dmytro Marakushin, professor of Physiology department, D.Med.Sc., professor.
2. Larysa Chernobay, active head of Physiology department, PhD, associate professor.
3. Iryna Karmazina, responsible for organizational and methodical work of Physiology department for foreign students training, PhD, associate professor.

## INFORMATION ABOUT TEACHERS PROVIDING TRAINING COMPONENT

### Teaching stuff of Physiology department:

1. Dmytro Marakushin, director of ERI of International Citizens, professor of Physiology department, D.Med.Sc., [di.marakushyn@knmu.edu.ua](mailto:di.marakushyn@knmu.edu.ua)
2. Larysa Chernobay, active head of Physiology department, associate professor, PhD, [lv.schernobay@knmu.edu.ua](mailto:lv.schernobay@knmu.edu.ua)
3. Oksana Vasyliieva, Dean of VII faculty for foreign students training, associate professor, PhD, [ov.vasyliieva@knmu.edu.ua](mailto:ov.vasyliieva@knmu.edu.ua)
4. Inna Isaieva, responsible for international relations and scientific work of Physiology department, associate professor, PhD, [im.isaieva@knmu.edu.ua](mailto:im.isaieva@knmu.edu.ua)
5. Iryna Karmazina, responsible for organizational and methodical work of Physiology department for foreign students training, secretary of Academic Council of ERI of International Citizens, associate professor, PhD, [is.karmazina@knmu.edu.ua](mailto:is.karmazina@knmu.edu.ua)
6. Roman Alekseienco, responsible for educational activities of Physiology department, associate professor, PhD, [rv.alekseienco@knmu.edu.ua](mailto:rv.alekseienco@knmu.edu.ua)
7. Olga Dunaieva, responsible for school of young educator of Physiology department, associate professor, PhD, [ov.dunaieva1@knmu.edu.ua](mailto:ov.dunaieva1@knmu.edu.ua)
8. Mykhailo Kirichenko, associate professor, PhD, [mp.kyrychenko@knmu.edu.ua](mailto:mp.kyrychenko@knmu.edu.ua)
9. Alina Goncharova, responsible for organization of distant learning of Physiology department, associate professor, PhD, [av.goncharova@knmu.edu.ua](mailto:av.goncharova@knmu.edu.ua)
10. Nataliia Maslova, responsible for publishing activity of Physiology department, associate professor, PhD, [nm.maslova@knmu.edu.ua](mailto:nm.maslova@knmu.edu.ua)
11. Oksana Bulynina, union committee representative of Physiology department, senior teacher, [od.bulynina@knmu.edu.ua](mailto:od.bulynina@knmu.edu.ua)
12. Svitlana Shenger, secretary of training and methodical meetings of Physiology department, senior teacher, [sv.shenher@knmu.edu.ua](mailto:sv.shenher@knmu.edu.ua)
13. Nataliia Hloba, responsible for work of student scientific club of Physiology department, assistant, [ns.hloba@knmu.edu.ua](mailto:ns.hloba@knmu.edu.ua)
14. Nadiia Grygorenko, assistant, PhD, [nv.hryhorenko@knmu.edu.ua](mailto:nv.hryhorenko@knmu.edu.ua)

**Information about teachers:** professional interests include clinical and physiological direction of Physiology discipline training with full horizontal and vertical integration. All training-methodical provision of discipline is provided at the website of department and in the system of Distant Training of KhNMU on Moodle platform.

**Contact number and e-mail of Physiology department:** 707-72-77, 707-73-76

e-mail: [physiologykhnmu@ukr.net](mailto:physiologykhnmu@ukr.net)

**Information about consultations:** *Off-line consulting* are carried out every day from 15:00 to 17:00 and on Saturdays from 9:00 to 15:00 (classrooms of Physiology department according to registration list formed by teachers and schedule of department). *Online consultations:* according to registration of student for work-offs in ASC system and further organization of rework by teachers in System of Distant Learning of KhNMU.

**Location:** KhNMU, TLB-3, 5<sup>th</sup> floor, Physiology department.

# TRAINING DISCIPLINE “IMPROVEMENT OF KNOWLEDGE IN PHYSIOLOGY, BIOLOGICAL CHEMISTRY, MICROBIOLOGY, VIROLOGY, AND IMMUNOLOGY AS USQE TRAINING”

## Information about Discipline

### 1. Description of discipline "Physiology"

Training Year: second.

Semester: III-IV semesters, 2021-2022.

Scope of Discipline: 3.0 ECTS credits – 1,5 credits of Physiology, 0,5 credits of Biological Chemistry, 1.0 credits of Microbiology, Virology, and Immunology; 14 h of lectures, 16 h of practical-seminar classes, 60 h of Student Individual Work (SIW).

General Description of Discipline: “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training” is an elective discipline that focuses on the training of highly qualified masters-doctors and is one of the most important subjects in the medical education system. The training program is based on the latest advances in medical and biological disciplines.

*The subject of discipline is* the functions of a living organism, their relationship with each other, regulation and adaptation to the external environment, origin, and formation in the process of evolution and individual development of the individual. In general, the described elective course provides the advanced knowledge of physiology, biological chemistry, microbiology, virology, and immunology as USQE training.

The discipline “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training”:

- a) is based on students' study of medical biology, medical and biological physics, medical chemistry, biological and bioorganic chemistry, morphological disciplines, and integrates with them;
- b) establishes the basis for students to study pathophysiology and propaedeutics of clinical disciplines, which involves the integration of teaching with these disciplines and the formation of the ability to apply knowledge of physiology, biochemistry, microbiology, virology, and immunology in USQE training.

The Role and Place of Discipline in System of Training of Medical Professionals: the discipline is based on the study of medical biology, Latin language, ethics, philosophy, ecology, medical and biological physics, medical chemistry, biological and bioorganic chemistry, morphological disciplines and integrates with these disciplines, laying the foundations for students to study pathophysiology, pathomorphology, deontology and propaedeutics of clinical disciplines, which involves the integration of teaching with these disciplines and the formation of the ability to apply the gained knowledge in the process of further training and passing the USQE “Krok-1”.

Page of Discipline in Moodle: Physiology department, course: “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training” (EC) / Specialty 222: "Medicine" Level "Master's", 2 year.

**2. Purpose and tasks of the discipline “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training”.** The task of discipline is to advance the knowledge of physiology, biochemistry, microbiology, virology, and immunology as USQE training.

**3. The status of discipline** is elective, **the form of discipline** is mixed, as it has the follow-through in the system of Distance learning in Moodle and the teaching of discipline includes the compilation of traditional training forms carried out in classes together with elements of online training using special informational, interactive technologies, online consulting, and others.

**4. Training methods.** Include lectures, practical classes and SIW using the presentations, video materials, methodical recommendations, workbooks, conspectuses, atlases, and other materials presented in repository of KhNMU, Distance learning system of KhNMU on Moodle platform on the page of Physiology department.

**5. Recommended references.**

1. Medical physiology (eleventh edition) / Arthur C. Guyton, John E. Hall. – Elseveier, 2006.
2. Medical physiology: principles for clinical medicine / edited by Rodney A. Rhoades, David R. Bell. – 4th ed. – Lippincott Williams & Wilkins, a Wolters Kluwer business, 2013.
3. Ganong’s review of medical physiology (23rd edition) / Kim E. Barrett, Susan M. Barman, Scott Boitano, Heddwen L. Brooks. – McGrawHill Lange, 2010.
4. Saladin: Anatomy & Physiology: The Unity of Form and Function (Third Edition) / Saladin K.S. – The McGraw–Hill Companies, 2003.
5. Human physiology (twelfth edition) / Stuart Ira Fox. – McGraw-Hill, 2011.
6. Human anatomy and physiology (seventh edition) / Elaine N. Marieb, Katja Hoehn. – Person Education. Inc. publishing as Benjamin Cummings, 2007.

**6. Prerequisites and corequisites of discipline.**

- Disciplines that precede the discipline “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training” include medical biology and chemistry, medica and biological physics, Latin language, etic and deontology, ecology, history of medicine.

- Disciplines that are studied simultaneously with discipline “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training” include human anatomy, histology, biological and bioorganic chemistry.

**7. Results of training.** As a result of P training a student *should know*:

- the mechanisms of formation of physiological, biochemical, and microbic states of human body;
- the parameters of mechanisms of neural and humoral regulation of physiological functions of the body and its systems and their analysis;
- the state of human health in different conditions based on physiological and biochemical criteria.

A student *should be able to*:

- interpret the mechanisms and laws of various functional systems functioning in conditions of adaptation to changes of environment;
- explain the physiological, biochemical, and microbic basis of methods of body functions research.

**The Content of Discipline “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training” Training plan**

Topic	Lecture	Seminar	Individual work
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b><i>Section I. General Physiology and Higher Integrative Functions</i></b>			
<b>Section 1. Introduction to Physiology</b>			
Topic 1. Subjects and tasks of physiology. Methods of research.	--	--	--

Topic 2. Basic stages of physiology development. History of the development of physiology in the XIX century. Contribution of I.M. Sechenova, IP Pavlova, P.K. Anokhin, P.G. Kostyuk in the development of world physiology. Ukrainian Physiology School	--	--	--
Total in Section 1.	--	--	--
<b>Section 2. Physiology of excitable structures</b>			
Topic 3. Functions of cellular membrane. Mechanisms of transmembrane	--	--	0,5
Topic 4. Membrane potentials. Resting potential and action potential	--	--	0,5
Topic5. Conduction of excitation by nerve fibers and through the neuromuscular synapse	--	--	0,5
Topic 6. Properties of skeletal muscles and mechanisms of their contraction	--	4	0,5
Topic 7. Properties of smooth muscles. Practical skills on the physiology of	--	--	2
Total in Section 2.	--	<b>4</b>	<b>4</b>
<b>Section 3. Biological regulation of body functions</b>			
Topic 8. Circuits of biological regulation of functions. Reflex principle of the central nervous system activity	--	--	1
Topic 9. Synapses of the central nervous system. Excitation and inhibition in the central nervous system	--	--	1
Total in Section 3.	--	--	<b>2</b>
<b>Section 4. Nervous regulation of motor functions</b>			
Topic 10. The role of the spinal cord in the regulation of motor functions	--	--	0,5
Topic 11. The role of brainstem in the regulation of motor functions	--	--	0,5
Topic12. Role of the forebrain and cerebellum in the regulation of motor functions. Regulation of systemic activity of an organism	--	--	1
Topic13. Practical skills in the nervous regulation of the functions of the body and the role of the central nervous system in the regulation of motor functions	--	--	--
Total in Section 4	--	--	<b>2</b>
<b>Section 5. Nervous regulation of visceral functions</b>			
Topic14. Structural and functional organization of the autonomic nervous system, its role in the regulation of visceral functions	2	0,5	7
Total in Section 5	2	0,5	<b>7</b>
<b>Section 6. Humoral regulation of visceral functions</b>			
Topic15. Humoral regulation, its factors, mechanisms of action of hormones on target cells, regulation of secretion of hormones	--	--	0,5
Topic16. The role of hormones in the regulation of mental, physical and sexual development	--	--	0,5
Topic 17. The role of hormones in regulation of sexual functions	--	--	0,5
Topic 18. The role of hormones in the regulation of homeostasis	--	--	0,5
Topic19. The role of hormones in the regulation of adaptation	--	--	1
Total in Section 6	--	--	<b>3</b>
<b>Section 7. Sensory Systems</b>			
Topic 21. General characteristics of sensory systems	--	--	--
Topic22. Somatosensory system. Physiological bases of pain and anesthesia	--	--	1
Topic 23. Visual sensory system	1	--	--
Topic 24. Auditory sensory system	1	--	--

Topic 25. The Vestibular Sensory System	--	--	1
Topic 26. Taste sensory system	--	--	1
Topic 27. Olfactory sensory system	--	--	1
Total in Section 7	<b>2</b>	--	<b>4</b>
<b><i>Section 8. Higher integrative functions of the nervous system</i></b>			
Topic 28. Physiological bases of behavior. Inborn reflexes and instincts. Processes and mechanisms of formation and inhibition of conditioned reflexes. Memory and learning	--	--	1
Topic 29. Physiology of emotions, their kinds. Theories of emotions and mechanisms of their development. Emotional tension and its manifestation. Functional system of behavioral act (acad. P.K. Anokhin)	--	--	1
Total in Section 8	--	--	<b>2</b>
<b>Section 9. Higher nervous activity of human (HNA)</b>			
Topic 30. Types of HNA. First and second signal systems. Language and modern mechanisms of its development. Features of asymmetry of cerebral hemispheres	--	--	0,5
Topic 31. Physiology of sleep, its forms and phases. Modern theories of sleep development and its disorders	--	--	0,5
Topic 32. Practical skills in the physiology of higher integrative functions of the nervous system	--	--	--
Total in Section 9.	--	--	<b>1</b>
<b><i>Section 9.1. Physiological basis of work and sport</i></b>			
Topic 33. Muscular and mental working capacity, their indicators and periods. Theories of fatigue development. The relationship between physical and mental labor. Training.	--	--	1
Total in Section 9.1.	--	--	<b>1</b>
<b>Section II. Physiology of Visceral Systems</b>			
<b><i>Section 10. The blood system</i></b>			
Topic 1. General characteristics of the blood system. Functions of blood, physical and chemical properties of blood	--	2	0,5
Topic 2. Physiology of erythrocytes. Protective blood functions. Blood groups.	--	1	0,5
Topic 3. Protective functions of the blood. Physiology of leukocytes.	2	2	10
Topic 4. Types and mechanisms of hemostasis. Physiology of platelets	2	1,5	5
Topic 5. Practical skills on physiology of blood	--	--	--
Total in Section 10.	<b>4</b>	<b>6,5</b>	<b>16</b>
<b><i>Section 11. The blood circulation system</i></b>			
Topic 6. General description of the blood circulation system. Physiological properties of cardiac muscle	--	--	0,5
Topic 7. Physiological bases of electrocardiography. Normal ECG.	--	--	0,5
Topic 8. Heart pumping function, its role in hemodynamics, physiological bases of research methods	--	--	0,5
Topic 9. Regulation of the cardiac activity	--	--	0,5
Topic 10. Systemic circulation. The laws of hemodynamics, the role of blood	--	--	0,5
Topic 11. Regulation of systemic circulation:	--	--	0,5
Topic 12. Features of regional blood circulation and its regulation	--	--	0,5

Topic 13. Dynamics of lymph circulation	--	--	0,5
<i>Topic 14. Practical skills on the physiology of the circulatory system</i>	--	--	--
Total in Section 11.	--	--	<b>4</b>
<b><i>Section 12. The system of respiration</i></b>			
Topic 15. General characteristics of the respiratory system. External respiration	2	--	2
Topic 16. Gas exchange in the lungs Topic 17. Transport of gases by blood	--	--	--
Topic 18. Regulation of respiration. Practical skills in the physiology of the	--	--	--
Total in Section 12.	<b>2</b>	--	<b>2</b>
<b><i>Section 14. Energy exchange. Section 15. Thermoregulation</i></b>			
Topic 19. Energy exchange and methods of its research	--	--	--
Topic 20. Body temperature and regulation of its constancy	--	--	--
<i>Topic 21. Practical skills on the physiology of energy exchange and thermoregulation</i>	--	--	--
Total in Sections 13 and 14.	--	--	--
<b><i>Section 15. Digestive system</i></b>			
Topic 22. General characteristics and functions of the digestive system	2	3	5
Topic 23. Digestion in the oral cavity. The role of taste and olfactory sensory systems			
Topic 24. Digestion in the stomach (microbiological, virological, and immunological aspects of digestion in upper departments of digestive tract)			
Topic 25. Digestion in the duodenum. The role of pancreatic juice and bile in digestive processes. Digestion in the intestines. Physiological basis of hunger and satiety. Significance of microflora in digestion.	2	2	7
Topic 26. Microbic state of human body in nutrition process			
Total in Section 15.	<b>4</b>	<b>5</b>	<b>12</b>
<b><i>Section 16. Excretory system</i></b>			
Topic 27. Excretory system. The role of the kidneys in the processes of excretion, mechanisms of urine formation.	--	--	--
Topic 28. The role of kidneys in maintaining homeostasis	--	--	--
Topic 29. Practical skills in the physiology of excretory system	--	--	--
Total in Section 17.	--	--	--
<b>Total number of hours for discipline – 90</b>	<b>14</b>	<b>16</b>	<b>60</b>
<b>Credits of ECTS - 3,0</b>			

### Topics of lectures

<b>№</b>	<b>Topics of lectures</b>	<b>Hours</b>
1	Structural and functional organization of autonomic nervous system, its role in regulation of visceral functions. Modern biochemical notions of mechanisms of visceral functions regulation on the level of membrane receptors.	2
2	Visual and auditory sensory systems.	2
3	Protective functions of blood. Modern notions of viral damage and immune mechanisms of protection	2
4	Biochemical aspects of hemostasis system as protective function of blood	2
5	General characteristic of respiratory system. External respiration. Barrier function of lungs	2
6	Digestion in the mouth. Role of gustatory and olfactory sensory systems. Digestion in the	2



	stomach (microbiological, viral, and immunological aspects of digestion)	
7	Digestion in duodenum. Role of pancreatic juice and bile in digestion. Digestion in intestine. Physiological basis of hunger and saturation. The role of microflora in digestion. Microbic state of human body in nutrition process.	2
	<b>Всього лекційних годин:</b>	<b>14</b>

### Topics of seminars

№	Topic of practical class	Hours
1	Research of skeletal muscles contraction mechanisms.	4
2	Structural and functional organization of autonomic nervous system, its role in regulation of visceral functions. Modern biochemical notions of mechanisms of visceral functions regulation on the level of membrane receptors.	0.5
3	Functions of blood, physical and chemical properties of blood.	2
4	Physiology of erythrocytes. Blood groups.	1
5	Protective functions of blood. Modern notions of viral damage and immune mechanisms of protection	3
6	Biochemical aspects of hemostasis system as protective function of blood	0.5
7	Digestion in the mouth. Role of gustatory and olfactory sensory systems. Digestion in the stomach (microbiological, viral, and immunological aspects of digestion)	3
8	Digestion in duodenum. Role of pancreatic juice and bile in digestion. Digestion in intestine. Physiological basis of hunger and saturation. The role of microflora in digestion. Microbic state of human body in nutrition process.	2
	<b>In total:</b>	<b>16</b>

### Topics of Student Individual Work (SIW)

№	Topic	Hours
<b>1</b>	<b>2</b>	<b>3</b>
1	Preparation for practical classes - theoretical training and practical skills development	20
2	Self-study of topics that are not part of the classroom lesson plan:	
	1) Properties of smooth muscles, mechanisms of their contraction and relaxation	2
	2) Modern biochemical notions of mechanisms of visceral functions regulation on the level of membrane receptors.	5
	3) Role of hormones in processes of psychic and physical development and linear growth	3
	4) Functional state of sensory systems of human organism. Physiological basis of pain and analgesia	4
	5) Research of fatigue and rehabilitation during muscle work and adaptation of organism to physical load	1
	6) Physiology of emotions, their types. Theories of emotions. Mechanisms of their development. Functional system of behavioral act (acad. P.K. Anokhin).	2
	7) Physiology of sleep, its forms and stages. Modern theories of sleep development and sleep disorders – individual student work	1
	8) Protective properties of blood. Modern concepts of viral damage and immune mechanisms of protection	6

	9) Biochemical aspects of hemostasis system as protective function of blood	4
	10) Dynamics of lymph circulation, lymph composition and its amount. Physiology of regional blood circulation: cerebral, cardiac and pulmonary..	2
	11) Physiological basis of hunger and saturation. The role of microflora in digestion. Microbic state of human body in nutrition process.	6
3	Preparation for the final attestation classes.	4
<b>Total hours of independent work of the student</b>		<b>60</b>

### **Politics and Values of Training Discipline “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training”**

Discipline requirements: Students are expected to attend all lectures and workshops. If a student was absent from a lecture or seminar, he must complete this lesson. Thematic plans of lectures, practical seminars, and work schedule of teachers of the Department of Physiology, who take practice are posted on the information stand of the department and on the Moodle platform of the Distance Learning System of KhNMU. Written and homework must be completed completely and on time, if students have questions, you can contact the teacher in person or by e-mail, which the teacher provides in the first workshop. During the lecture, students are encouraged to keep a synopsis of the lesson and keep a sufficient level of silence. Asking questions to the lecturer is perfectly normal.

Class attendance and behavior: timely practice of absences of practical seminars and lectures, inadmissibility of delays and absences without good reason. Compliance with the requirements for clothing, medical examination, etc.

The use of electronic gadgets during classes is possible only with the permission of the teacher.

Policy on academic integrity: during training both in lectures and in seminars it is important: - respect for colleagues;

- tolerance for others and their experience;
- susceptibility and impartiality;
- the ability to disagree with the opinion, but to respect the personality of the opponent;
- careful argumentation of their opinion and the courage to change their position under the influence of evidence;
- I-statement, when a person avoids unnecessary generalizations, describes his feelings and formulates his wishes based on their own thoughts and emotions;
- Mandatory acquaintance with primary sources.

Audience behavior (basic "yes" and "no"):

It is important for students to follow the rules of good behavior at the university. These rules are common to all, they also apply to all faculty and staff, and do not differ in principle from generally accepted norms.

During classes ***it is allowed:***

- leave the audience for a short time if necessary and with the permission of the teacher;
- drink soft drinks;
- take photos of presentation slides;
- take an active part in the class.

During classes ***it is forbidden:***

- eat (except for persons whose special medical condition requires another - in this case, medical confirmation is required);
- smoking, drinking alcohol and even low-alcohol beverages or drugs;
- use obscene language or use words that offend the honor and dignity of colleagues and faculty;

- gambling;
- damage the material and technical base of the university (damage inventory, equipment; furniture, walls, floors, litter the premises and territories);
- shouting or listening to loud music in classrooms and even in corridors during classes.

***Plagiarism and academic integrity.*** The Department of Physiology maintains zero tolerance for plagiarism in accordance with the Order of the Rector of KhNMU "***On the procedure for checking in KhNMU text documents of dissertations, research reports, scientific publications, materials of scientific forums, educational literature, educational and methodical publications and teaching aids for the presence of textual borrowings.***" Students are expected to continually increase their awareness of academic writing. The first lessons will provide information on what to consider plagiarism and how to properly conduct research and scientific research.

Recommendations for successful completion of the discipline: activity of higher education students during practical classes, implementation of the required amount of educational work, namely active participation in the discussion of theoretical issues, situational tasks and practical skills during practical seminars in the format of interactive teaching methods. The student must be ready to understand in detail the theoretical material, ask questions, express their views, discuss. During the discussion it is important:

- respect for colleagues and tolerance for others and their experience;
- susceptibility and impartiality;
- the ability to disagree with the opinion, but to respect the personality of the opponent,
- careful argumentation of their opinion and the courage to change their position under the influence of evidence;
- Mandatory acquaintance with primary sources.

A creative approach in its various manifestations is welcome. Students are expected to be interested in participating in city, national and international conferences, competitions, and other events in the discipline "Physiology" and in the research of the Department of Physiology.

Encouragement and punishment. Department of Physiology holds monothematic student conferences, participation in the SNO of the department, scientific conferences, for active participation in which the student receives additional points.

Safety: The first lesson in the subject "Physiology" will explain the basic principles of labor protection by conducting appropriate training. It is expected that each student should know where the nearest evacuation exit is, where the fire extinguisher is, how to use it, and so on. According to the Order of the Rector of KhNMU "***On the Algorithm of action in case of detection of signs of acute respiratory disease in an applicant, teacher or employee of KhNMU***" must comply with sanitary and hygienic standards and appropriate behavior in an epidemic or pandemic.

Procedure for informing about changes in the syllabus: announcements about changes in the syllabus must be posted on the page of the Department of Physiology on the Moodle platform of the Distance Learning System of KhNMU and on the information stands of the department.

### **Evaluation Politics**

Evaluation System and its requirements. ***Methods of evaluation of student training activity.***

1. ***Current training activity (CTA) control*** of the preparation and assimilation of physiological issues in accordance with the topic of the occupation of the work program in the form of solution of situational tasks, programs of control of oral answers to the control topics of the classes.

2. ***Attestation final lessons:*** a decision-making work that contains situational tasks in the format "Krok-1" and an oral answer from the section of physiology.

3. ***Semester credits.***

4. ***Credits.***

**Evaluation of the success of students' training in the ECTS of the organization of the educational process (CTA and exam) in the discipline “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training”**

*Assessment of Current Training Activities (CTA)* is conducted in accordance with the "Instructions for the assessment of educational activities". When assessing the mastering of each discipline subject (CTA) and the final attestation (FA), the student is evaluated according to the traditional 4-point system: "excellent", "good", "satisfactory" and "unsatisfactory".

The final score for the current training activity (CTA) and the final attestation (FA) is defined as the arithmetic average of the traditional estimates for each class and software rounded to 2 decimal signs and converted to a multi-point scale according to Table 1.

The recalculation of the average score for the CTA and FS for the "Physiology" discipline, which ends with the exam, is conducted in accordance with Table 1. The minimum number of points to be scored by the student for admittance to the examination is 70 points, the minimum score for the exam is 50, respectively.

Table 1.

**Recalculation of the average mark for current activity in a multi-point scale scale  
(for disciplines that end with exam)**

4-points scale	200- points scale	4- points scale	200- points scale
5	120	3.91-3,94	94
4.95-4,99	119	3.87-3,9	93
4.91-4,94	118	3.83- 3,86	92
4.87-4,9	117	3.79- 3,82	91
4.83-4,86	116	3.74-3,78	90
4.79-4,82	115	3.7- 3,73	89
4.75-4,78	114	3.66- 3,69	88
4.7-4,74	113	3.62- 3,65	87
4.66-4,69	112	3.58-3,61	86
4.62-4,65	111	3.54- 3,57	85
4.58-4,61	110	3.49- 3,53	84
4.54-4,57	109	3.45-3,48	83
4.5-4,53	108	3.41-3,44	82
4.45-4,49	107	3.37-3,4	81
4.41-4,44	106	3.33- 3,36	80
4.37-4,4	105	3.29-3,32	79
4.33-4,36	104	3.25-3,28	78
4.29-4,32	103	3.21-3,24	77
4.25- 4,28	102	3.18-3,2	76
4.2- 4,24	101	3.15- 3,17	75
4.16- 4,19	100	3.13- 3,14	74
4.12- 4,15	99	3.1- 3,12	73
4.08- 4,11	98	3.07- 3,09	72
4.04- 4,07	97	3.04-3,06	71
3.99-4,03	96	3.0-3,03	70
3.95- 3,98	95	Below 3	Unsatisfactory

**Indicative criteria for assessing current training activities (CTA).** Practical classes in the discipline "Physiology" are structured and provide a comprehensive assessment in points of all types of educational activities (learning tasks) that students perform during the practical lesson: 1) At the initial stage of practical training (in general assessment) current educational activity this stage makes 20% of points) test control is carried out: tests contain not less than 10 test tasks of selective type with one correct answer. His results are evaluated positively if the student gave at least 70% of correct answers; the student does not receive points if the number of correct answers is less than 70%.

An indicative example of assessing the initial stage of a practical lesson:

General % of points of CTA for the initial stage of practical class	% points of converting into the traditional mark for the initial stage of practical class	Traditional scale mark	% of correct answers for 10 test tasks
20% of points	19-20% of points	Excellent («5»)	91-100%
	16-18% of points	Good («4»)	81-90%
	14-15% of points	Satisfactory («3»)	70-80%
	<14%= 0% of points	Unsatisfactory («2»)	<70% (< 7 correct answers)

2) At the main stage of practical training (in the general assessment of current educational activities, this stage is 50% of points) are assessed:

2.1) performance of practical work (research), recording the research protocol in accordance with the requirements, the ability to analyze and interpret the results of research and correctly draw sound conclusions;

2.2) solving situational problems and tasks of the format "Step-1", oral answer to the control questions of the lesson, drawing graphs, diagrams, contours of regulation.

If the student correctly performed practical work (research), recorded the research protocol in accordance with the requirements, was able to analyze and interpret the results of the study, draw sound conclusions, and correctly solved all the proposed situational tasks, other tasks, he scores from 46% to 50%.

The student scores 41-45% of points if he correctly performed practical work (research), recorded the research protocol in accordance with the requirements, was able to analyze and interpret the results of the study, draw sound conclusions, and solve at least half of the proposed tasks.

The student scores 35-40% of points if he correctly performed practical work (research), wrote down the research protocol in accordance with the requirements, was able to analyze and interpret the research results, draw sound conclusions, and did not solve any of the proposed tasks.

The student does not gain points at the main stage of educational activities, if he failed to properly perform practical work (research), record the research protocol in accordance with the requirements, analyze and interpret the results of the study, draw sound conclusions.

An indicative example of the assessment of the main stage of the practical lesson:

General % of points of CTA for the main stage of practical class	% points of converting into the traditional mark for the main stage of practical class	Traditional scale mark	% of correctly executed practical tasks of the main stage of practical class
50% of points	46-50% of points	Excellent («5»)	91-100%
	41-45% of points	Good («4»)	81-90%
	35-40% of points	Satisfactory («3»)	70-80%
	<35%= 0% of points	Unsatisfactory («2»)	<70% (< 7 correct answers)

3) At the final stage of practical training (in the general assessment of current educational activity this stage makes 30% of points) the control of theoretical and practical preparation is carried out by means of test tasks (not less than 10) or the decision of complex situational problems, creation of contours of regulation and other tasks. allow you to assess the degree of achievement of the educational goal. It is assessed positively provided that the student has correctly solved at least 70% of the test tasks or solved all situational tasks and other tasks. Provided that the student has correctly solved less than 70% of the test tasks, or has not solved the proposed situational tasks, the student does not receive any points.

An indicative example of evaluating the final stage of a practical lesson:

General % of points of CTA for the final stage of practical class	% points of converting into the traditional mark for the final stage of practical class	Traditional scale mark	% of correct answers for 10 test tasks or complex situational tasks, or others
30% of points	28-30% of points	Excellent («5»)	91-100%
	24-27% of points	Good («4»)	81-90%
	21-23% of points	Satisfactory («3»)	70-80%
	<21%= 0% of points	Unsatisfactory («2»)	<70% (< 7 correct answers)

At the final stage of the lesson, the teacher adds the percentage of points scored by the student for each stage of the lesson, converts them into a traditional assessment (according to the tables of indicative examples of assessment of the practical lesson) and puts the score in the journal and in the student's notebook own signature).

**An indicative example of a comprehensive assessment of a student's learning activities in a practical lesson ( $\Sigma$  percent points):** A grade of "good" ("4") can be obtained by several sums of percentage points:

- **example №1:** 19-20% of the points of the initial stage ("5") + 40% of the points of the main stage ("3") + 23% of the points of the final stage ("3") = 82-83% of the points = "4" for practice session;

- **example №2:** 16% of points of the initial stage ("4") + 41% of points of the main stage ("4") + 24% of points of the final stage ("4") = 81% of points = "4" for practical training.

Comprehensive assessment of educational activities is carried out by setting the traditional assessment:

"5" - the student correctly completed at least 90% of the educational tasks;

"4" - the student correctly completed at least 80% of the educational tasks;

"3" - the student correctly completed at least 70% of the educational tasks;

"2" - the student performed correctly less than 70% of the educational tasks.

**Assessment of the final lesson.** The final (attestation) lesson must be conducted in accordance with the Curriculum in the discipline of "Physiology" during the semester according to the schedule of final (attestation) classes. Acceptance of software is carried out by the teacher of the academic group or the exchange of related groups between teachers. The Department of Physiology provides the following materials for preparation for the software on the information stand, on the Moodle platform of the Distance Learning System of KhNMU and in the form of "Methodical instructions":

- test tasks of the format "Step-1" (see "Guidelines for preparing students for EDKI" Step-1 ");
- a list of theoretical questions and practical skills (including questions on independent work) and tests of the initial level of "knowledge-skills" (see "Guidelines for preparing students for practical classes in the discipline" Physiology ");
- criteria for assessing the "knowledge-skills" of students;

- schedule of students completing missed classes during the semester.

**Conducting the final (attestation) lesson.** The control of student preparation during the final (attestation) lesson (SO), which lasts 4 academic hours, is carried out by the decision of the department according to the following algorithm:

1. Carrying out of computer test control (within 50 minutes: performance of 50 test tasks of selective type with one correct answer). Computer test control of knowledge acquisition in solving situational tasks is carried out at the beginning of the certification (final) lesson and consists of two types of tasks in this section of physiology: 30 situational tasks format "Step-1" and 20 situational tasks format for checking the final level of knowledge skills "of theoretical material in the discipline "Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training". Evaluation criterion - 90.5% of correctly solved tasks. This result is an admission to the main (oral) part of the software in this section of physiology.

2. Carrying out the main (oral) part of the software in this section of the discipline is carried out by the teacher on the questionnaires, which contain integrated tasks (10 theoretical questions and practical skills with the ability to analyze and interpret research results and draw sound conclusions).

3. Situational integrated tasks with in-depth study of the discipline (10 tasks): solving a situational problem, drawing graphs, diagrams, contours of biological regulation with the ability to determine cause-and-effect relationships, which is the basis for forming clinical thinking of the future doctor. Situational integrated tasks are standardized and aimed at monitoring the student's achievement of the ultimate goal of the discipline.

**Indicative criteria for evaluating the final (attestation) lesson:** The complex number of points that a student scores based on the results of the final control has the following components:

1. According to the results of computer test control, a student receives: 40 points - if he gave the correct answers by at least 98%; 30 points - if he gave the correct answers by at least 96%; 20 points - if he gave the correct answer by at least 90.5%.

2. For the implementation of the main (oral) part of the software in this section of the discipline: 40 points - if he correctly performed all planned practical work and was able to analyze and interpret research results and draw reasoned conclusions, and gave correct answers of at least 90% situational tasks and other integrated tasks; 30 points - if the student correctly performed all the planned practical work, was able to analyze and interpret the results of research and draw reasoned conclusions, as well as gave the correct answers to at least 80% of situational tasks and other integrated tasks; 20 points - if the student correctly performed all the planned practical work, was able to analyze and interpret the results of research and draw reasoned conclusions, as well as gave the correct answers to at least 70% of situational tasks and other integrated tasks.

3. For the implementation of situational integrated tasks with in-depth study of the discipline (10 tasks) the student receives: 40 points - if he gave the correct answers by at least 98%; 30 points - if he gave the correct answers by at least 96%; 20 points - if he gave the correct answer by at least 90.5%.

Comprehensive assessment of the final (certification) lesson is carried out by setting the traditional assessment:

"5" - the student scored at least 110 points for completing educational tasks;

"4" - the student scored at least 80 points for completing educational tasks;

"3" - the student scored at least 60 points for completing educational tasks;

"2" - the student scored less than 60 points for completing educational tasks.

**Conducting and assessing an exam in the discipline "Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training".** The recalculation of the average grade for PND and PZ for the discipline "Physiology", which ends with

the exam, is carried out according to Table 1. The minimum number of points that a student must score for admission to the exam - 70 points, the minimum positive grade for the exam - 50 points. The conversion of the average grade for current activities into a multi-point scale is carried out in accordance with the "Instructions for the evaluation of educational activities." The exam in the discipline "Physiology" is a process during which the following are tested for the course:

- level of theoretical knowledge;
- development of creative thinking;
- skills of independent work;
- competencies - the ability to synthesize the acquired knowledge and apply them in solving practical problems.

To conduct the exam, a session schedule is established, approved by the Order of the Rector of KhNMU, indicating the specific dates of the exams, which are set outside the semester. If the exam is not passed, the dates of re-setting during the holidays are set, until the beginning of the next semester.

**Exam.** The Department of Physiology considers the affiliation to natural science training approves the method of the exam and approves it in the curriculum of the discipline in the prescribed manner: 1) assessment of practical skills and theoretical knowledge on all topics of the discipline on the day of the exam; 2) assessment of practical skills is carried out according to the criteria of "performed", "failed". Assessment of theoretical knowledge is carried out according to table 2.

Table 2

Assessment of theoretical knowledge if practical skills are evaluated according to the criteria "performed", "failed"

Questions	«5»	«4»	«3»	Oral answer according to question cards including theoretical part of discipline	For each answer student gets from 10 to 16 points that is evaluated as following: «5» - 16 points; «4» - 13 points; «3» - 10 points
1	16	13	10		
2	16	13	10		
3	16	13	10		
4	16	13	10		
5	16	13	10		
	80	65	50		

**Grade of the discipline.** The discipline "Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training" is studied for 2 semesters, so the grade is defined as the arithmetic mean of the IPA scores for these semesters, which are translated into a 120-point ECTS scale (Table 1) with the addition of scores obtained directly on the exam. The maximum number of points that a student can score for studying the discipline - 200 points, which consist of the maximum number of points for current educational activities - 120 points, as well as the maximum number of points for the exam - 80 points. The minimum number of points that a student can score for studying the discipline - 120 points, which consist of the minimum number of points for current educational activities - 70 points, as well as the minimum number of points for the exam - 50 points.

**Assessment of individual student tasks:** The meeting of the department approved a list of individual tasks (participation with reports in student conferences, profile competitions, preparation of analytical reviews with presentations, etc.) with the definition of the number of points for their performance, which can be added as incentives (not more than 10). Points for individual tasks are awarded to students once only on a commission basis (commission - head of the department, head teacher, group teacher) and only if they are successfully completed and defended. The total amount of points for IPA may not exceed 120 points.



**Assessment of students' independent work:** Assimilation of topics in the discipline “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training”, which are submitted only for independent work, is checked during the final lesson and exam.

Discipline assessment technology. Assessment of the results of the study of disciplines is carried out directly during the exam. The grade in the discipline is defined as the sum of scores on the IPA and the exam and is min - 120 to max - 200. The correspondence of grades on the 200-point scale, four-point (national) scale and ECTS scale is given in table 3:

Table 3

Conformity of grades on 200-point scale, four-point (national) scale and ECTS scale

Grade on 200-point scale	Grade on ECTS scale	Grade on four-point (national) scale
180–200	A	Excellent
160–179	B	Good
150–159	C	Good
130–149	D	Satisfactory
120–129	E	Satisfactory
Below 120	F, Fx	Unsatisfactory

The grade in the discipline is given only to students who have passed all the final classes and exams. Students who do not meet the requirements of the discipline curriculum are given an FX grade if they have been admitted to the exam but have not passed it. A grade of F is given to students who are not admitted to the exam. After completing the discipline, the person responsible for the organization of educational and methodical work at the department or the teacher puts the student's grade on the scales (Table 3) in the record book and fills in the progress of students in the discipline in the appropriate standardized form - exam.

**Elimination of academic debt (work off):** lectures on the subject “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training” will be practiced in the form of writing and defending an abstract on the topic of the lecture; Practice of practical seminars is carried out in the form of face-to-face or remote defense of the topic of the lesson to the next teacher.

Test questions, tasks for independent work are placed in workbooks (see "Guidelines for preparing students for practical classes in the discipline “Improvement of knowledge in physiology, biological chemistry, microbiology, virology, and immunology as USQE training” on the information stands of the department and on the page of the Department of Physiology on the Moodle platform Distance Learning KNMU).

**Rules for appealing the grade:** an appeal in case of a negative grade is made on the same day by the student submitting an application addressed to the head of department of Physiology, which appoints a commission of examiners to retake the exam or final lesson.

**Additional materials:**

1. <http://distance.knmu.edu.ua/course/index.php?categoryid=64>  
PHYSIOLOGY. GENERAL PHYSIOLOGY / specialty 222 «Medicine»: educational qualification «Master of Medicine», 2 year (VI, VII faculties for foreign students)
2. <https://www.testcentr.org.ua/uk/krok-1>
3. <https://www.youtube.com/watch?v=vxapV-sUeb4&feature=youtu.be>
4. <http://gohigher.org/yak-stvoriti-silabus-resursi-sho-dopomozhut-efektivno-organizuvati-robotu>
5. [http://files.knmu.edu.ua:8181/upload/redakt/doc\\_uchproc/polog\\_ad\\_etyka\\_text.pdf](http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/polog_ad_etyka_text.pdf)

6. [http://files.knmu.edu.ua:8181/upload/redakt/doc\\_uchproc/nak-poriad-pogl-vyv-dysc.docx](http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/nak-poriad-pogl-vyv-dysc.docx)
  7. [http://files.knmu.edu.ua:8181/upload/redakt/doc\\_uchproc/polog\\_komis\\_ad\\_text.pdf](http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/polog_komis_ad_text.pdf)
  8. [http://files.knmu.edu.ua:8181/upload/redakt/doc\\_uchproc/polog\\_neform\\_osv.pdf](http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/polog_neform_osv.pdf)
  9. [http://www.knmu.kharkov.ua/index.php?option=com\\_content&view=article&id=7108%3A2021-03-10-14-08-02&catid=12%3A2011-05-10-07-16-32&Itemid=33&lang=uk](http://www.knmu.kharkov.ua/index.php?option=com_content&view=article&id=7108%3A2021-03-10-14-08-02&catid=12%3A2011-05-10-07-16-32&Itemid=33&lang=uk)
  10. [http://www.knmu.kharkov.ua/index.php?option=com\\_content&view=article&id=2520%3A2015-04-30-08-10-46&catid=20%3A2011-05-17-09-30-17&Itemid=40&lang=uk](http://www.knmu.kharkov.ua/index.php?option=com_content&view=article&id=2520%3A2015-04-30-08-10-46&catid=20%3A2011-05-17-09-30-17&Itemid=40&lang=uk)
- [http://files.knmu.edu.ua:8181/upload/redakt/doc\\_uchproc/kodex\\_AD.docx](http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/kodex_AD.docx)