

SYLLABUS

INTERNATIONAL EUROPEAN
UNIVERSITY



SCHOOL OF
MEDICINE

PHYSIOLOGY

2023



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|----------------------------|--|---|--------------------------|-------------------------------------|
| Discipline | | | | |
| | | Physiology | | |
| Teacher(s) | | | | |
| | | Professor Savitsky Ivan Vladimirovich Senior Lecturer Ukrainska Svitlana Ivanovna | | |
| Profile of the teacher(s) | | | | |
| | | https://medicine.ieu.edu.ua/pro-yemsh/kafedry/kafedra-fundamentalnykh-dystsyplin | | |
| Consultations | | | | |
| Face-to-face consultations | | Second Tuesday of the month, 17:00-18:00 | | |
| Online consultations | | First Wednesday of the month, 16:00-17:00 | | |
| Contact phone number | | | | |
| | | +380955725728 | | |
| E-mail | | | | |
| | | svitlanaukrainska@ieu.edu.ua | | |
| Discipline page | | | | |
| | | https://medicine.ieu.edu.ua/pro-yemsh/kafedry/kafedra-fundamentalnykh-dystsyplin | | |
| Form of final control | | Test | Differentiated test | Exam |
| | | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |



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1 Brief annotation of the discipline

The subject of study 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 an individual.

2 Prerequisite for studying the discipline

In accordance with the schedule of the educational process, the discipline "Physiology" is taught to 2nd year students in the first and second semester. The discipline is based on the students' study of medical biology, Latin, ethics, philosophy, ecology, medical and biological physics, medicinal chemistry, biological and bioorganic chemistry, morphological disciplines and is integrated with these disciplines.

3 Purpose and objectives of the discipline

Physiology as a basic discipline is focused on the training of highly qualified masters of medicine and is one of the most important subjects in the medical education system. The purpose of teaching the discipline "Physiology" is to study the functions of various cells, tissues, organs and systems in general in order to use the knowledge gained in the study of subsequent medical disciplines and in future professional activities. It provides an understanding of the concept of health, healthy lifestyle and prevention of dysfunctions in the course of life.

4 Learning Outcomes

Use of the acquired knowledge in professional activities. As a result of studying, students should analyze the age-related features of body functions and their regulation, regulated parameters and draw conclusions about the mechanisms of nervous and humoral regulation of physiological functions of the body and its systems, analyze the state of human health under different conditions on the basis of physiological criteria, interpret the mechanisms and patterns of functioning of the excitatory structures of the body, analyze the state of sensory processes in ensuring human life, explain the physiological basis of methods of studying functions

Physiology lays the foundation for students to study pathophysiology and propedeutics of clinical disciplines, which involves the integration of teaching with these disciplines and the development of skills to apply knowledge of physiology in the process of further education and professional activities; lays the foundation for a healthy lifestyle and prevention of dysfunction in the course of life.

5 ECTS Credits

The discipline is assigned 9 ECTS credits: 270 hours (40 hours of lectures, - 105 -practical classes, 125 hours. SRS).



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Structure of the discipline

| Titles of content sections and topics | Number of hours | | | | |
|---|-----------------|------------|-----|------|------|
| | total | Among them | | | |
| | | l. | pr. | lab. | ind. |
| Chapter 1. Introduction to physiology. Physiology of excitatory structures | | | | | |
| Topic 1: Subject and tasks of physiology. Methods of physiological research | 7 | 2 | 3 | | 4 |
| Topic 2. Resting potential of nerve and muscle fibers. | 7 | 2 | 3 | | 4 |
| Topic 3. Action potential of nerve and muscle fibers. | 9 | 2 | 3 | | 4 |
| Topic 4. Mechanisms of electrical stimulation of excitable structures. | 9 | 1 | 3 | | 5 |
| Topic 5. Skeletal and smooth muscle contractions. | 9 | 1 | 3 | | 5 |
| Chapter 2. Nervous regulation of body functions | | | | | |
| Topic 6. Excitation and inhibition in the central nervous system. | 9 | 2 | 3 | | 4 |
| Topic 7. The role of the spinal cord in the regulation of functions. | 9 | 1 | 6 | | 4 |
| Topic 8. The role of the brain in the regulation of functions. | 9 | 1 | 6 | | 4 |
| Topic 9. Nervous regulation of autonomic functions. | 9 | 2 | 3 | | 5 |
| Chapter 3. Humoral regulation of body functions | | | | | |
| Topic 10. Humoral regulation of vegetative functions. | 9 | 2 | 3 | | 4 |
| Topic 11. The role of hormones in the regulation of physical, mental, sexual development. | 9 | 1 | 3 | | 4 |
| Topic 12. The role of hormones in the regulation of homeostasis and adaptation of the body to stress factors. | 12 | 1 | 6 | | 5 |
| Chapter 4. Physiology of analyzers and GNI | | | | | |
| Topic 13. Sensory systems. | 9 | 1 | 3 | | 5 |
| Topic 14: Physiological basis of behavior. | 9 | 1 | 3 | | 4 |
| Chapter 5. Physiology of the blood system | | | | | |
| Topic 15: Physicochemical properties of blood. | 9 | 1 | 3 | | 5 |
| Topic 16. Properties and functions of red blood cells. | 9 | 1 | 3 | | 4 |
| Topic 17. Protective properties of blood. Blood groups. | 9 | 1 | 3 | | 4 |
| Topic 18: Hemostasis. | 9 | 1 | 3 | | 4 |
| Chapter 6. Physiology of the cardiovascular system | | | | | |
| Topic 19. General characteristics of the circulatory system. | 11 | 2 | 3 | | 5 |
| Topic 20. Mechanical work of the heart. | 9 | 1 | 3 | | 4 |
| Topic 21. Registration and analysis of ECG. | 9 | 1 | 3 | | 4 |
| Topic 22. Blood flow in arterial and venous vessels. | 9 | 2 | 3 | | 5 |
| Topic 23. Regulation of the heart, local and systemic circulation. | 9 | 2 | 6 | | 4 |
| Chapter 7. Physiology of the respiratory system | | | | | |
| Topic 24. Study of external respiration. | 9 | 1 | 3 | | 4 |
| Topic 25. Gas exchange in the lungs. Transport of gases by blood. | 9 | 1 | 3 | | 4 |
| Chapter 8. Physiology of the digestive system | | | | | |
| Topic 26: Digestion in the mouth and stomach. | 9 | 1 | 3 | | 4 |



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|--|------------|-----------|------------|--|--|------------|
| Topic 27: Digestion in the intestines. The role of the liver and pancreas. Absorption in the gastrointestinal tract. | 9 | 1 | 3 | | | 5 |
| Chapter 9. Physiology of metabolism and energy. Thermoregulation | | | | | | |
| Topic 28. Physiology of metabolism and energy. Thermoregulation. | 14 | 2 | 6 | | | 4 |
| Chapter 10. Physiology of the excretory system | | | | | | |
| Topic 29. Regulation of kidney function. | 12 | 2 | 6 | | | 4 |
| Total hours | 270 | 40 | 105 | | | 125 |

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List of mandatory tasks

1. Action potential, mechanisms of origin, its parameters, physiological role
2. Patterns of excitation by nerve fibers
3. Conjugation of excitation and contraction. Mechanisms of contraction and relaxation of skeletal muscles.
4. Types of muscle contractions: single and tetanic; isotonic and isometric
5. Mechanisms of excitation transmission through the neuromuscular synapse
6. The concept of reflex. The structure of the reflex arc and the functions of its links.
7. Motor reflexes of the hindbrain, decerebral stiffness
8. Excitation and inhibition in the nervous system
9. Sensory, associative and motor areas of the cerebral cortex, their functions
10. Synapses of the autonomic nervous system, their mediators, cytoresceptors and blockers of excitation transmission in synapses.
11. Somato-sensory system, its structure and functions.
12. Physiological mechanisms of pain.
13. Biological forms of behavior. Needs and motivations, their role in the formation of behavior
14. Functions of the new cerebral cortex and higher nervous activity of the human.
15. Language, its functions, physiological basis of formation
16. Composition and functions of blood
17. Electrolytes of blood plasma. Blood osmotic pressure and its regulation
18. Types of hemoglobin and its compounds, their physiological role
19. Physiological characteristics of the Rh blood system (CDE).
20. Conjugation of excitation and contraction in the myocardium. Mechanisms of myocardial contraction and relaxation.
21. Elastic traction of the lungs, negative pressure in the pleural cleft.
22. Oxyhemoglobin dissociation curve, factors affecting its course.
23. Heat production in the body, its regulation.
24. Neurohumoral ("gastric and intestinal") phase of regulation of gastric secretion. Enteral stimulants and inhibitors of gastric secretion.
25. Absorption in the digestive tract. Mechanisms of absorption of sodium ions, water, carbohydrates, proteins, fats.
26. The role of the kidneys in ensuring isovolumetry
27. Physiological basis of sport. Principles of building optimal training regimens

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Selective tasks

1. Create situational test tasks
2. Creating multimedia presentations on the topics of practical classes
3. Creating biological crosswords on the topics of practical classes
4. Making posters with contours of physiological regulation of functions
5. Participation in the work of the student scientific club
6. Participation in student scientific and practical conferences
7. Organization and visiting of thematic museums
8. Publication of abstracts of scientific conference reports in co-authorship with a teacher



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Signs of discipline

| Term of Teaching | Semester | International disciplinary integration | Course (year of study) | Cycles: general training/ vocational training/ free choice |
|------------------|----------|--|------------------------|---|
| 2 semester | III, IV | Yes | 2st | General training |

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Grading System and Requirements

The current performance of students is assessed on a 4-point scale (2; 3; 4; 5) at each practical, taking into account the approved evaluation criteria for the relevant discipline. The student must receive a grade for each topic for further conversion of grades into points on a multi-point (200-point) scale.

Criteria for assessing current academic performance:

Excellent ("5") - the student answered 90-100% of the questions correctly. Solves situational problems of increased complexity, is able to summarize the material.

Good ("4") - the student answered 70-89% of the questions correctly. Possesses the necessary practical skills and techniques for their implementation in excess of the required minimum.

Satisfactory ("3") - the student answered 50-69% of the questions correctly. Has only the required minimum of research methods.

Unsatisfactory ("2") - the student answered 50% of the questions correctly. When answering and demonstrating practical skills, he/she makes significant, gross mistakes.

Evaluation of students' independent work in preparation for classroom practical classes is carried out during the current control of the topic at the relevant classroom.

The semester credit is evaluated on a two-point scale (passed/not passed) and a 200-point scale by determining the arithmetic mean of current grades for each practical lesson on a 4-point scale and its subsequent conversion to 200-point scale. The minimum number of points that a student must score is 120.

The final control of knowledge in the discipline "Physiology" is carried out in the form of an exam. The exam in the discipline is conducted in the form of a written test for individual options, each of which contains 3 theoretical questions.

<https://ie.u.edu.ua/docs/rate-of-study.pdf>

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Conditions for admission to the final control

Students who have completed all types of work and assignments provided for in the semester curriculum in accordance with the discipline, attended all classes provided for in the curriculum, written and submitted a medical history, and have an average grade for current academic activities of at least "3" (72 points on a 120-point scale) are admitted to the semester final control.

<https://ie.u.edu.ua/docs/rate-of-study.pdf>

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Discipline policy

Basic principles of the classes:

openness to new and extraordinary ideas, tolerance, friendly partnership atmosphere of mutual understanding and creative development;

all tasks provided by the program must be completed on time;

in order to achieve the learning objectives and successfully complete the course, it is necessary to actively engage in work from the first day, systematically attend lectures and practical classes, prepare and learn protocols for practical classes, not be late for classes, come to classes dressed in a medical gown, be in



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the classroom without outerwear and headgear (if necessary, a medical hat is allowed to cover the head).

The student must perform all the necessary tasks in the classroom and work daily on self-improvement, be able to work in a team in a mini-group, ask for help and get it when you need it. Different models of work in the classroom, including work on solving problems, allow you to unleash your own potential, learn to trust your partners, and develop the skills of intellectual teamwork.

The course involves the intensive use of mobile learning technologies and information exchange in joint groups of mobile messengers, which allows students and the teacher to communicate with each other at any time convenient for them, and for students who are absent from classes to receive the necessary educational information and present completed assignments.

On the other hand, students should exclude the possibility of using a mobile phone during tests and homework checks, a tablet or other mobile devices, not to resort to cheating and plagiarism, to observe the cooperation and solidarity of the teacher and students, to ask the teacher for help in organizing and consulting on scientific, search and research work, to participate in scientific circles; it is forbidden to come to class with a strong tobacco smell. If a student smokes, the smell must be eliminated and a protective medical mask must be worn throughout the class; throughout the course, students' autonomous skills are actively developed, as they can prepare additional information on a topic that is not included in the list of topics for practical classes of content modules and make a presentation or informing additionally.

The teacher, in turn, must ensure the full implementation of the curriculum, not be late for lectures, practical (seminar) classes, and objectively assess students' knowledge and practical skills. It is important to prevent any manifestations of corruption, pay special attention to students in practical classes when working with equipment, and prevent bias and discrimination regardless of race, ethnicity, or religious beliefs.

A student who, for valid reasons, confirmed by documentary evidence, was not subject to current control has the right to undergo current control within two weeks after returning to study.

A student who was absent from classes without valid reasons, did not participate in current control activities, did not eliminate academic debt, is not allowed to take the final semester control of knowledge in this discipline, and on the day of the exam, the academic staff member assigns a grade of "not admitted" in the examination record. Retake of the differentiated test in the discipline is assigned subject to the completion of all types of educational, independent (individual) work provided for by the working curriculum of the discipline and is carried out in accordance with the schedule of liquidation of academic debt approved by the directorate.

<https://ieu.edu.ua/docs/050.pdf>

14 Academic integrity policy

Participants in the educational process are guided by the principles of academic integrity

<https://ieu.edu.ua/docs/011.pdf>

15 Recommended sources of information

Main literature:

1. Physiology: textbook for students of higher medical schools / V.G. Shevchuk, V.M. Moroz, S.M. Belan [et al. - Edition 2, revised and supplemented - Vinnytsia: New book. - 2015. - 448 c.
2. Shevchuk V.G. Physiology: textbook / V.G. Shevchuk. - Vinnytsia: "New book", 2017. - 448c.
3. Filimonov V.I. Human physiology: textbook / V.F. Filimonov - K.: Medicine, 2013. - 816 c.

Auxiliary literature:

1. Rovnyi A.S. Physiology of motor activity: textbook / A.S. Rovnyi, V.A. Rovnyi, O.O. Rovna - Kharkiv: KhNADU, 2014. 343 p.
2. Godun NI Physiology of higher nervous activity: a study guide / NI Godun: O. M. Lukashevych, 2014. 158 p.
3. Vovkanych L. S. Physiological bases of physical education and sports: a textbook: in 2 parts / L. S. Vovkanych, D. I. Bergtraum: LSUFK, 2013. 195 p.
4. Human Movement, Structure and Function / Nigel Palastanga, Roger Soames. - 6th ed., 2013. - 652 p.



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Information resources

Test Center - database of licensed test tasks Step 1 <http://testcentr.org.ua/>

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Tips for successful studying on the course

1. Be active, persistent, inquisitive, consistent
2. Be neat and polite
2. Systematically prepare for practical classes
3. Attend lectures and take notes
4. Perform tasks for independent work and defend them in class.
5. Handle the equipment of the department, including microscopes, with care.
6. To be present in the classroom in a white coat.
7. To solve tests and tasks independently, to work actively in class.
8. Keep a sketchbook and sketch macro and micro preparations.
9. Visit the Krok Center website and focus on medical biology questions.
10. Prepare presentations and crossword puzzles in the discipline. Participate in student scientific conferences and engage in research work in the department's scientific circles.