

**National Pirogov Memorial Medical University, Vinnytsya**

"APPROVE"

Acting rector of higher education institution



Viktoriia PETRUSHENKO

"31" August 2023 year

"AGREED"

Head of Human Physiology Department



Mykhailo YOLTUKHIVSKYY

"29" August 2023 year

**SYLLABUS  
of academic discipline**

**"PHYSIOLOGY"**

Specialty	222 Medicine
Educational level	the second (master`s) level
Educational programme	EPP Medicine, 2022
Academic year	2023-2024
Department	Normal Physiology
Lecturer	Prof.of HEI Mykhaylo YOLTUKHIVSKYY
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Syllabus compiler	Assoc. prof. of HEI Oksana OMEL'CHENKO

## 1. Status and structure of the discipline

Discipline status	Compulsory
Discipline code in EPP/discipline place in EPP	CC 17, discipline of general training
Course / semester	2nd year (III-IV semesters)
The discipline volume (the total number of hours / number of credits ECTS)	300 hours / 10 credits ECTS
The discipline structure	Lectures - 52 hours Practical classes 100 hours Intermediate control 24 hours Independent work 128 hours Totally: classroom classes - 57%, independent extracurricular work - 43%
Number of modules	2
Number of content modules	16
Language of study	English
Form of study	Full-time (or remote full-time by order)

## 2. Description of the discipline

### Short annotation of the course, relevance.

The program subject direction is to study the regularities of functions and processes in the holistic organism and its parts (systems, organs, tissues, cells), mechanisms and patterns of the body life at different stages of ontho- and phylogeny in interaction with the environment in the dynamics of life processes; the program is focused on obtaining knowledge of the regularities of functions and processes in the integral body and its parts, depending on the conditions of its stay, on the state of regulatory processes, depending on the load level, analysis of the causes and mechanisms of functional and metabolic deviations in the functioning of the organism organs and systems under changing the conditions of the external environment; forming practical skills: to apply natural and scientific knowledge at the patient's bed; evaluate the functioning of various organs and systems of the organism, interpret the state of regulatory processes, depending on the level of physical activity, analyze the causes and mechanisms of functional and metabolic deviations in the functioning of organs and systems of the organism under changing the environment; to provide natural and scientific substantiation of the principles of an individual approach to the patient, the main provisions of medicinal ethics and medical deontology, psychoprophylaxis and psychotherapy.

**Prerequisites.** Educational discipline "Physiology" is based on studying by students of Medical Biology, Latin Language, Ethics, Philosophy, Ecology, Medical and Biological Physics, Medical Chemistry, morphological disciplines and integrates with these disciplines.

**The purpose of the course and its significance for professional activities.** The purpose of the "Physiology" discipline is to study the functions of various cells, tissues, organs and systems as a whole in order to use the acquired knowledge in the study of the following medical disciplines, and in future professional activities. Physiology is the base to understand the concept of health, a healthy lifestyle and prevention of dysfunctions in the process of life.

**Postrequisites.** Physiology is the basis for studying by students of such disciplines of professional training as Pathophysiology, Pathomorphology, Deontology and Propaedeutics of clinical disciplines, which involves integrating teaching with these disciplines and the formation

of skills in the use of Physiology in the process of further education and professional activities; it lays the foundations of a healthy lifestyle and prevention of violations of the structure and functions in the process of life.

**3. Learning outcomes. After successful study of the discipline the applicant will be able to:**

1. Formulate conclusions about the state of physiological functions of the organism, its systems and organs.
2. Analyze the age characteristics of the functions of the organism and their regulation.
3. Analyze regulated parameters and draw conclusions about the mechanisms of nervous and humoral regulation of physiological functions of the organism and its systems.
4. Analyze human health under different conditions on the basis of physiological parameters.
5. Interpret the mechanisms and patterns of functioning of excitable structures of the body.
6. Explain the meaning of sensory processes in human life.
7. Analyze the mechanisms of integrative activity of the organism.

**4. Content and logistic of the discipline**

Module 1 <b>Physiology of excitable tissues, sensory systems, nervous and endocrine regulation of functions</b>	III semester 150 hours / 5 credits	Lectures № 1-12 Practical classes №№ 1-26 Topics for self- study №№ 1-3
Module 2 <b>Physiology of the visceral systems and higher nervous activity.</b>	IV semester 150 hours/5 credits	Lectures № 13-26 Practical classes №№ 27-62 Topics for self- study №№ 4-12

The course includes 62 topics, which are divided into 2 thematic modules.

**Module 1. Physiology of excitable tissues, sensory systems, endocrine regulation of functions and higher nervous activity.**

Theme 1. Subject and tasks of physiology. Methods of physiological research. Properties of excitable structures.

Theme 2. Main stages of development of physiology

Theme 3. The resting membrane potential. The action potential. Ion mechanisms

Theme 4. Irritative action of direct current on excitable tissues.

Theme 5. Conducting the excitation along nerve fibers and through neuromuscular synapse.

Theme 6. Properties and mechanisms of the skeletal muscles contraction.

Theme 7. Reflex principle of regulation of functions. Reflex arc.

Theme 8. An excitation and inhibition in the central nervous system.

Theme 9. Properties of nerve centers. Coordination of reflex activity.

Theme 10. The role of the spinal cord in the regulation of motor functions.

Theme 11. The role of the brain stem in the regulation of motor functions.

Theme 12. The role of the strio-pallidal system and the cerebellum in the regulation of motor functions.

Theme 13. Structural and functional organization of the autonomous nervous system, its role in regulating of visceral functions.

Theme 14. Humoral regulation, factors, mechanisms of action of hormones on target cells, regulation of secretion of hormones.

Topic 15. The role of hormones in regulating growth processes, mental, physical development and maintaining homeostasis.

Theme 16. The role of hormones in nonspecific adaptation of the body

Theme 17. The role of hormones in regulation of sexual functions. Female cycle. Hormones of pregnancy.

Theme 18. General characteristics of sensory systems. Somato-sensory system. Physiology of pain. Anti-nociceptive system.

Topic 19. Visual sensory system. Refracting eye environments.

Theme 20. Physiology of the visual sensory system. Retina functions.

Theme 21. Physiology of auditory sensory system

Theme 22. Physiology of the vestibular sensory system

Theme 23. Taste and olfactory sensory systems

## **Module 2. Physiology of visceral systems and higher nervous activity**

Theme 1. Higher nervous activity (HNA), physiological bases of behavior. Conditional reflexes.

Theme 2. Physiology of emotions. Their types. The stages of emotional tension. Features of a human HNA. Types of HNA.

Theme 3. Sleep, its biological role. Memory. Memory mechanisms.

Theme 4. Labor activity, theory of development of fatigue, optimal regimes.

Theme 5. Blood system. Blood functions, physiology of erythrocytes.

Theme 6 Hemoglobin, its functions. Hemoglobin compounds.

Theme 7. Blood protective functions. Physiology of leukocytes.

Theme 8. Blood plasma. Physical and chemical properties of blood.

Theme 9. Blood plasma proteins. Active blood reaction.

Theme 10. Types and physiological mechanisms of hemostasis in damaging the vessel wall. Physiology of platelets.

Theme 11. Blood groups. Rh factor.

Theme 12. Structural and functional features of the conducting heart system. Automatism of cardiac activity.

Theme 13. Physiological properties of cardiac muscle. Phases of excitability. Dynamics of heart excitation. ECG.

Theme 14. Phase analysis of the cardiac cycle. The work of valves.

Theme 15. External manifestations of cardiac activity. Heart sounds. ECG analysis.

Theme 16. System of circulation, hemodynamic laws, vascular role in blood circulation. Arterial pressure, its types.

Theme 17. Properties of human arterial pulse. Venous pulse. Microcirculation. Basic laws of hemodynamics.

Theme 18. Regulation of cardiac activity, vascular tone and hemodynamics. Nervous and humoral mechanisms.

Theme 19. Depots of blood.

Theme 20. Regional blood circulation.

Theme 21. To create a circuit of a contour of regulation of systemic arterial pressure

Theme 22. Blood circulation in physical activity.

Topic 23. General characteristics of the respiratory system. Lung ventilation

Topic 24. Static and dynamic indexes of pulmonary ventilation.

Theme 25. Gas exchange in the lungs and tissues. Transport of gases along blood.

Theme 26. Regulation of breathing.

Theme 27. Breathing in changed conditions. Breathing under physical activity.

Theme 28. Functional respiratory tests.

Topic 29. To create a scheme of the contour of regulation of sustainability of the parameters of gas homeostasis.

Theme 30. General characteristics and functions of the digestive system. Digestion in the oral cavity.

Theme 31. Digestion in the stomach.

Theme 32. Digestion in duodenum. The role of pancreatic juice and bile in digestive processes.

Theme 33. Digestion in the small and large intestine. Absorption. Functions of the large intestine. The role of microflora. GIT motility. Types of contractions. GIT motility regulation.

Theme 34. To create a scheme of contours of regulation of hunger and saturation processes

Theme 35. Energy exchange and methods of its examination. Metabolism.

Theme 36. Body temperature and regulation of its sustainability.

Theme 37. General characteristics of the excretory system. The role of kidneys in the processes of excretion, mechanisms of urine formation.

Theme 38. The role of kidneys in maintaining homeostasis. Regulation of kidneys activity.

Theme 39. To create a circuit of homeostasis regulation contours with kidney participation

The lecture course discovers the problematic issues of the relevant sections of Physiology.

Practical classes provide:

- 1) implementation of practical works on the study of the functions of the human body; in particular, the study of clinically important reflexes of the spinal cord, the calculation of the number of erythrocytes, determination of the amount of hemoglobin, determination of blood groups, registration of electrocardiogram for its analysis, determination of volumes of pulmonary air with the help of a spirometer, hearing of human heart sounds, examination of acuity and field of vision, results of clinical-laboratory tests for analysis (blood/urine tests, pH-metry); curves for analysis (spirogram, cardiogram, electrocardiogram).
- 2) evaluation of the results of clinical and laboratory studies; solving physiological situational problems of experimental and clinical direction.

In practical classes, students write down protocols of their research in workbooks, make a summary on the topic and solve clinically-oriented situational tasks and tests.

The student's independent work involves preparation for practical classes and development of practical skills, study of topics for independent extracurricular work, preparation of presentations, tables, processing of scientific literature and writing reviews of the provided topics for individual work. Control of mastering the topics of independent extracurricular work is carried out at intermediate control classes and final control of the discipline.

Thematic plans of lectures, calendar plans of practical classes, thematic plan of independent extracurricular work, volume and directions of individual work are published on the site of the department.

The route for obtaining materials: Normal Physiology Department / for students / Full-time education / medicine / 2 course / Educational materials / or through the link <https://www.vnmue.edu.ua/> Normal Physiology Department#. Access to the materials is carried out through the student's corporate account [s000XXX@vnmue.edu.ua](mailto:s000XXX@vnmue.edu.ua).

## 5. Forms and methods of monitoring academic performance

Current control in practical studies	Methods: oral or written survey, testing, electronic survey, solving situational problems, conducting laboratory studies, interpreting them and evaluating their results (drawing up a protocol in a workbook)
Control of mastering the thematic section of the discipline at intermediate control classes	Methods: oral or written questioning, electronic testing, solving situational problems, control of practical skills
Final semester control (credit) at the end of 3 and 4 semesters	According to the Regulation of the Academic process in VNMU named after M.I. Pirogov (link <a href="https://www.vnmue.edu.ua/General">https://www.vnmue.edu.ua/General</a> information)
Final control of the Physiology discipline - ( <i>exam</i> )	Methods: pre-examination testing, oral questioning (according to the Regulation of the Academic process in VNMU named after M.I. Pirogov (link

	<a href="https://www.vnmdu.edu.ua/General">https://www.vnmdu.edu.ua/General</a> information)
Learning success diagnostic tools	Theoretical questions, tests, clinically-oriented situational tasks, practical tasks, practical skills demonstration

## 6. Assessment criteria

Knowledge assessment is carried out in accordance with the Regulations of the Academic process in VNMU named after M.I. Pirogov (link <https://www.vnmdu.edu.ua/General> information)

Continuous assessment	On a four point system of traditional assessments: 5 «excellent», 4 «good», 3 «satisfactory», 2 «unsatisfactory»
Midpoint separation assessment	On a four-point system of traditional assessments
Control of practical skills	According to the four-point system of traditional assessments
Pass-fail exam (credit)	On a 200-point scale (the arithmetic average grade for the semester is converted into points) Credited: 122 to 200 points Not credited: less than 122 points (See Grading Scale)
Final control of the discipline	Sum of points for pre-examination testing (12-20 points) and oral questioning (38-60 points) Final exam grade: 71-80 points - "excellent" 61-70 points - "good" 50-60 points - "satisfactory" Less than 50 points - "unsatisfactory" / did not pass
Discipline assessments:	Current academic assessment - from 72 to 120 points (conversion of the average traditional assessment of practical class on a 120-point scale): 60% of the grade for the discipline Final control - from 50 to 80 points: 40% of the grade for the discipline Individual work - from 1 to 12 points From 122 to 200 points in total.

## Discipline Score Scale: National and ECTS

The sum of grades for all types of educational activities	Score ECTS	Score on a national scale	
		For exam, course project (work), practice	for credit test
180-200	<b>A</b>	excellent	credited
170-179,9	<b>B</b>	good	
160-169,9	<b>C</b>		
141-159,9	<b>D</b>	satisfactory	

122-140,99	<b>E</b>	satisfactory	
61-121,99	<b>FX</b>	unsatisfactory with the possibility of reassembly	is not credited with the possibility of reassembling
1-60	<b>F</b>	unsatisfactory with a mandatory reexamination of discipline	is not credited with mandatory reexamination of discipline

### Criteria for student knowledge assessment

#### Assessment of oral / written response during the current assessment

The grade "**excellent**" is given to a student who has deeply and comprehensively mastered the theoretical material, competently and logically teaches it. He is fluent in Latin terminology, clearly answers non-standard questions on the topic of the lesson, is able to link the material of the topic with previously studied sections, which indicates knowledge of the recommended literature and the ability to analyze the material studied, and clearly demonstrates the importance of theoretical knowledge for practice medicine

The grade "**good**" is given to a student who knows and has a good theoretical material, teaches it correctly, does not allow inaccuracies in the answer, is able to reveal the topic from the standpoint of its medical significance and practical application, but the answers do not go beyond the textbook, guidelines.

A grade of "**satisfactory**" is given to a student who knows the basic concepts and definitions of the studied topic, but admits significant inaccuracies or has difficulty in formulating the answer, does not understand the medical aspects of the topic, can not relate theoretical material to practice.

The grade "**unsatisfactory**" is given to a student who does not know the theoretical foundations of the topic, makes gross mistakes in answering, does not understand the basic concepts and definitions, can not explain the importance of theoretical material for practical medicine.

#### Assessment of practical skills during the current assessment

The grade "**excellent**" is given to a student who knows the course and sequence of independent practical work to perform a practical task, finds the best options for setting up a physiological experiment, demonstrates the correct implementation of the necessary practical skills, and correctly formulates generalizations and conclusions, draws up a protocol.

A grade of "**good**" is given to a student who admits inaccuracies in the performance of physiological practice, but is able to identify errors and can demonstrate the implementation of practical skills in general, carefully draws up research results in the protocol of the practical lesson.

Assessment of "**satisfactory**" is given to a student who knows the basics of the practical task, but has difficulty at performing physiological practice, can not demonstrate the correct sequence of practical skills, can not fully interpret the results of research, sloppy protocol.

The grade "**unsatisfactory**" is given to a student who cannot demonstrate the performance of practical skills, experiences significant difficulties in performing physiological practice, violates the procedure for performing practical work, does not register the progress of work in the protocol.

#### **Evaluation of testing during the current assessment**

The grade "**excellent**" is given to the student who at carrying out test control is allowed no more than 10% of incorrect answers (volume of correct answers 90-100%). Provides correct answers to all test questions when solving clinically-oriented test tasks.

A grade of "**good**" is given to a student who makes no more than 20% of mistakes during the test (volume of correct answers 80-89%). Provides correct answers to most test questions when solving clinical-oriented test tasks.

The grade "**satisfactory**" is given to a student who makes mistakes in no more than 40% of test tasks (the amount of correct answers is 60.5-79%). When solving clinically-oriented test tasks, it provides the correct answers to only some questions to the test.

A grade of "**unsatisfactory**" is given to a student who correctly solves less than 60% of the test tasks in a test survey. When solving clinical-oriented test tasks, he cannot provide the correct answers to the test questions.

#### **Assessment of intermediate control (credit)**

Intermediate control is credited if the student has mastered a certain section of the discipline in full, as evidenced by the current assessment of each practical lesson, and attended a lecture course. To assess the intermediate control, the calculation of the arithmetic average mark of the traditional assessment for the semester is performed.

#### **Assessment of the oral answer during the final control (exam)**

The grade "**excellent**" is given to the student competently and in a logical sequence provides answers to the questions of the exam card. During the answer demonstrates the ability to analyze theoretical material, makes thorough conclusions about the importance of theoretical material for practical medicine, provides clear correct answers to additional non-standard questions, can explain how to study the functional state of the organism and systems of the human body practically.

The grade "**good**" is given to a student who has a good knowledge of theoretical material and in a logical sequence provides answers to the questions of the examination card, but admits minor inaccuracies, which are quickly corrected when answering clarifying questions of the examiner. During the answer, the principles of the study of the functional state of the organs and systems of the human body are known.

A grade of "**satisfactory**" is given to a student who demonstrates knowledge of basic concepts and definitions when answering an exam card, admits significant inaccuracies or has difficulties in answering questions about the functional state of the human organs and systems of the human body, it allows inaccuracies to respond to the specific issues of the examiner.

The grade "**unsatisfactory**" is given to a student who does not know the answer to one of the questions of the exam card, makes serious mistakes when answering questions on methods of examination of functional state of organs and systems of human body, does not know the answers to additional clarifying questions of the examiner.



The calculation of individual points is carried out on the basis of the Regulation of the Academic process in VNMU named after M.I. Pirogov (link <https://www.vnmu.edu.ua/General> information).

12 points - added to the assessment of the discipline for a student who won a prize at the interuniversity competitions in the discipline or a prize at the Ukrainian competition of student research reports or a prize at the interuniversity / international scientific conference with the published work;

11 points - are added to the assessment of the discipline for a student who won the first prize at the intra-university Olympiad in the discipline or the first place at the student scientific conference with the published work, or participated in the Ukrainian competition of student research papers;

10 points - are added to the assessment of the discipline for a student who won a prize (II-III) at the intra-university Olympiad in the discipline or at the student scientific conference with the availability of printed work; or for participation (without a prize place) in interuniversity competitions in the discipline or a prize place in an interuniversity / international scientific conference with the availability of published work.

9 points - are added to the assessment of the discipline for a student who participated (without a prize) in the intra-university Olympiad in the discipline or student scientific conference with the presence of published work

8 points - are added to the assessment of the discipline for a student who actively participated in the student scientific group, published a paper with results of scientific and practical research, but did not personally participate in the student scientific conference, prepared a poster report.

6-7 points - are added to the assessment of the discipline for a student who has made at least 20 smears or at least 3 tables, or an educational video to replenish the visual support of teaching the discipline (taking into account the volume and importance of work performed).

## **7. Policy of discipline / course**

The student has the right to receive high-quality educational services, access to contemporary scientific and educational information, qualified tutoring during the study of discipline and mastering practical skills. The policy of the department during the providing of educational services is a student-centered, based on normative documents of the Ministry of Education and the Ministry of Health of Ukraine, the Statute of the University and the Procedure for the Providing of Educational Services regulated by the main principles of the organization of the educational process in VNMU named after M.I.Pirogov and the principles of academic integrity ( link <https://www.vnmu.edu.ua/General> information).

### **Adherence to the rules of VNMU, safety techniques rules of behavior at the "AIR ALARM" signal in practical classes.**

Observance of the rules of the VNMU regulations, safety precautions at practical classes. Instruction on biosafety, safety of handling chemical reagents and burners is conducted at the first practical lesson by the teacher. The instructed students are registered in the Safety Instruction Journal.

At the "AIR ALARM" signal, students must quickly take their things and descend into the vault. During the descent, behave with dignity and patience. Stay in the bomb shelter for the entire duration of the air raid together with the teacher. After its completion, return to the classroom (if the class time has not ended).

**Requirements for preparation for practical classes.**

The student should be prepared for a practical lesson, testing tasks for the current topic should be solved in a workbook, diagrams and tables are filled.

A student should come to class on time, without delay. A student who is more than 10 minutes late is not allowed to the practical class and must work it in the prescribed manner.

In practical classes, the student must be dressed in a work uniform (medical gown, hat). Students who do not have a work uniform are not allowed to practice.

The student must follow the rules of safety in practical rooms and at the department.

When discussing theoretical issues, students should demonstrate tolerance, courtesy and respect for their colleagues and the teacher; when performing practical tasks, the workplace should be kept in order and be cleaned after performing practical work.

**Lectures are not taught in classrooms. Lecture material (from the entire course) is presented on the website of the department.**

**Usage of mobile phones and other electronic devices.**

The use of mobile phones and other electronic devices in the classroom is allowed only during electronic testing.

**Academic integrity.** When studying the discipline, the student must be guided by the Code of Academic Integrity and Corporate Ethics of VNMU named after M.I. Pirogov (link : [https://www.vnmdu.edu.ua/General information/](https://www.vnmdu.edu.ua/General%20information/) Code of Academic Integrity).. In case of violation of the norms of academic integrity during the current and final controls student receives a grade of "2" and must work it out to his teacher in the prescribed manner within two weeks after receiving an unsatisfactory assessment).

**Missed classes.** Missed classes are working out in the manner prescribed by Regulations of the Academic process in VNMU named after M.I. Pirogov (link [https://www.vnmdu.edu.ua/General information](https://www.vnmdu.edu.ua/General%20information/)) at the time of work out schedule (published on the website of the department [https://www.vnmdu.edu.ua/ Department of Physiology #](https://www.vnmdu.edu.ua/Department%20of%20Physiology%20#)) to the teacher on duty. To work out missed lesson student must provide a completed workbook protocol on the relevant topic, take a test and answer questions in writing or orally to the topic of the lesson. The reworking of missed lectures is carried out after providing a thesis of lecture material, or writing an abstract, or preparing own presentation on the topic of missed lecture.

**The procedure for admission to the discipline final control** is given in the Regulation of the Academic process in VNMU named after M.I. Pirogov (link [https://www.vnmdu.edu.ua/General information](https://www.vnmdu.edu.ua/General%20information/)). Students who do not have missed practical classes and lectures and received an average traditional grade of at least "3" are allowed to final control.

**Additional points.** Individual points in the discipline that student can receive for individual work, is determined by the results of his individual work according to Regulation of the Academic process in VNMU named after M.I. Pirogov (link [https://www.vnmdu.edu.ua/General information](https://www.vnmdu.edu.ua/General%20information/)) and policy of the course.

**Conflict resolution.** In case of misunderstandings and complaints to the teacher because of the quality of educational services, knowledge assessment and other conflict situations, student should submit his / her claims to the teacher. If the issue is not resolved, the student has a right to apply to the head of the department according to Complaints Consideration Procedure ([https://www.vnmdu.edu.ua/ General information / Basic documents](https://www.vnmdu.edu.ua/General%20information/Basic%20documents/)).

**Politics in terms of remote learning.** Distance learning regulated by the Regulations of the elements of remote learning in VNMU named after Pirogov M.I. ([https://www.vnmdu.edu.ua/ General information](https://www.vnmdu.edu.ua/General%20information/)). The main training platforms for studying are Microsoft Team and Google Meets. Practical classes and lectures, exercises and consultations during distance learning are published on the website of the department ([https://www.vnmdu.edu.ua/ Department of Physiology / Student](https://www.vnmdu.edu.ua/Department%20of%20Physiology%20Student) or [https://www.vnmdu.edu.ua/Department of Physiology / News](https://www.vnmdu.edu.ua/Department%20of%20Physiology%20News)).

**Feedback** from teachers is via messengers (Viber, Telegram, WhatsApp) or e-mail (at the teacher's choice) during working hours.

## 8. Educational resources.

Educational and methodological support of the discipline is published on the website of the department (<https://www.vnmue.edu.ua/> Department of Normal physiology/ To students).

### 1).Recommended literature:

1. Guyton A.C., Hall J.E.: Textbook of Medical Physiology, 10th ed. Saunders.- 2016.- 1120 p.
2. Moroz V.M., Shandra O.A., Vastyanov R.S., Yoltukhivsky M.V., Omelchenko O.D. Physiology : Textbook / Edited by V.M.Moroz, O.A.Shandra. – 5th edition. – Vinnytsia: Nova Knyha Publishers, 2020. –728 p.
3. William F. Ganong Review of Medical Physiology.- 2011.- 782 p.
4. Linda S. Costando Physiology (Board Review Series).- 2018, 280 p.
5. Stuart Ira Fox Human Pysiology .- 2018, 832 p.
6. V.M.Moroz, M.V.Yoltukhovsky O.D.Omelchenko, O.V.Bogomaz, I.V.Gusakova, O.O.Nikolaenko O.V.Vlasenko PHYSIOLOGY// Study Guide of the Practical Course for the students of Medical faculty. Module 3: Physiology of the Digestion, Metabolism, Thermoregulation, Excretion. Vinnitsia – 2019.- 30p.
7. PHYSIOLOGY Handbook for the students of medical faculty, Part 1: General Physiology// Moroz V.M., Yoltukhivsky M.V., Omel'chenko O.D., Suprunov K.V., Dovgan' O.V., Shapoval O.M., Bogomaz O.V. - Vinnitsa-2014. – 60p.
8. PHYSIOLOGY. Handbook for students of medical faculty. Physiology of Visceral Systems // Moroz V.M., Yoltukhivsky, Omel'chenko O.D., M.V.,Vlasenko O.V., Gusakova I.V., Rokyniets, Bogomaz O.V. - Vinnitsia-2014.– 91p.

### 2). Electronic resources:

1. The university website: <http://www.vnmue.edu.ua>
  2. The Normal Physiology department website: [http://www.vnmue.edu.ua/ department](http://www.vnmue.edu.ua/department) of normal physiology
  3. The university library website <http://library.vsmu.edu.ua>
  4. Index search engines  
<http://www.altavista.com>  
<http://www.askjeeves.com>  
<http://www.excite.com>
  5. Medical thematic-subject catalogs  
<http://www.einet.net/galaxy/Medicine.html>  
<http://healthweb.org>
  6. Special medical information search systems  
<http://www.kfinder.com>  
<http://www.medwebplus.com>
- In English:  
Dr. NajeebLectures<https://www.youtube.com/channel/UCPHpx55tgrbm8FrYYCflAHw>  
MEDCRAM- Medical Lectures explained clearly  
<https://www.youtube.com/user/MEDCRAMvideos>  
<https://pubmed.ncbi.nlm.nih.gov/>

- 3). Presentations of lectures, methodical recommendations for practical classes and ISWs. Consultations (twice a week in accordance with the schedule of consultations)

**9. The timetable and distribution of groups** with assigned teachers are published on the web page of the department ((<https://www.vnmu.edu.ua> / Department of normal physiology / To students).

**10. Questions to the intermediate and final semester control (credit) of the discipline** are published on the web page of the department (<https://www.vnmu.edu.ua>/ Department of normal physiology / To students).

The syllabus of the discipline "Physiology" was discussed and approved at the meeting of the Normal Physiology department (record № 1, dated "29" August 2023)

Responsible for the academic  
discipline Physiology”



Assoc. prof. of HEI Oksana  
OMEL'CHENKO

Head of the Normal Physiology department



Prof. of HEI  
Mykhaylo YOLTUKHIVSKYY