

Odessa National Medical University
Medicine faculty
Physiology Department

Syllabus of the "Physiology" course

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| Credit volume | 10 credits ECTS, 300 hours |
| Semester, year of study | Semester I-II, year of study - 2 |
| Deys, time, place | In accordance with the schedule of classes, study rooms 1-5 of the Physiology Department - Olgievskaya st., 4. |
| Professors: | <ol style="list-style-type: none"> 1. Shandra Oleksiy Antonovich - Head. department, prof. 2. Boyko Yuri Olexandrovich - Ph.D., Associate Professor (part-time) 3. Volokhova Galina Oleksandrivna - Ph.D., Associate Professor 4. Kashchenko Olga Anatolyivna - Ph.D., Associate Professor - head teacher of the department: 0677969753 5. Lyashenko Svetlana Leonidivna - Ph.D., Associate Professor 6. Onufrienko Oksana Viktorivna - Ph.D., Associate Professor 7. Denisenko Oksana Viktorovna - assistant 8. Kirilenko Natalya Anatolyivna - Ph.D., assistant (part-time) 9. Kopyova Nadezhda Viktorivna - Ph.D., assistant 10. Rusakova Maria Yuryivna - Ph.D., Associate Professor (part-time) 11. Strezeva Marina Mikhailovna - assistant |
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| E-mail | <u>oll.reliable@gmail.com</u> – head teacher of the department – docent Kashchenko O.A. <u>ksenea15@gmail.com</u> – docent Onufrienko O.V. |
| Workplace | All workplaces - at the Department of Physiology - Olgievskaya st, 4. |
| Consultations | Thursday 14.30-16.00 Saturday 09:00 -13.00 Consultations and reworking of missed classes: <u>https://teams.microsoft.com/l/meetupjoin/19%3a70116aa307e54c9a8e4f72b8eab32f70%40thread.tacv2/1601643276469?context=%7b%22Tid%22%3a%2264002d9c-27dd-451a-8107-70f9ee4f6c2d%22%2c%22Oid%22%3a%226694f2df-30b4-4273-b655be2cf7f3da44%22%7d</u> |

COMMUNICATION

Study classes are held on the territory of the Physiology Department and in the conditions of distance learning using:

- Internet platforms: Microsoft Teams, Google Meet
- messengers: Zoom, Viber, Telegram, Skype
- social networks: Facebook
- Department website: <http://info.odmu.edu.ua/chair/physiology>
- e-mail of teachers: oll.reliable@gmail.com, ksenea15@gmail.com, aleksey.shandra@gmail.com

Phone of the head teacher of the department: +38 067 796 97 53 docent Olga Kashchenko

ANNOTATION OF THE COURSE

The subject of the discipline is the functions of human organs and systems and the mechanisms of their regulation.

Prerequisites: the Physiology discipline is included in the cycle of disciplines of general training. Based on the study of: medical biology - which provides knowledge of biological processes in the human body and the ability to assess their regularity; medical chemistry - which provides knowledge of human biochemical processes and the ability to assess their condition and role in the human body; biological chemistry - which provides knowledge of the structure in the functions of chemical compounds in the human body and the ability to assess their activity and role; human anatomy - which provides knowledge of the structure and functions of organs and systems of the body and the ability to apply the knowledge gained in clinical practice; histology, cytology and embryology - which provides knowledge of the structure and functions of cells and tissues of organs and body systems.

Postrequisites: lays the foundations for students to study pathological physiology, pharmacology, propedeutics of internal and children's diseases, surgery, therapy, hygiene, neurology, medical rehabilitation and social assistance, which provides for the integration of teaching with these disciplines and the formation of skills to apply knowledge of physiology in the process of further education and in professional activities;

The purpose of the course is to form general knowledge about the mechanisms of functioning of the systems of the human body to ensure homeostasis when interacting with the external environment.

Discipline objectives:

- to reveal the mechanisms of functioning of the main physiological systems of the human body.

- to reveal the mechanisms of neuro-humoral regulation of functions.
- to form students' general ideas about the mechanisms of adaptation of the human and animal organism to various environmental conditions.

Expected results:

The student must know the basic concepts of the mechanisms of basic physiological processes such as respiration, digestion, excretion, metabolism and energy; to acquaint students with the regularities of the functioning of nervous and muscle tissues, the regularities of cell irritation, the mechanisms of the onset and propagation of excitement. Expand understanding of the functions of various parts of the central nervous system. To form practical skills and abilities of a physiological experiment that students acquire in the process of studying the discipline according to the OPP:

- PRN 1 - possess the skills of communication and clinical examination of the patient. Collect data on patient complaints, medical history, life history.
- PRN 2 - evaluate information regarding the diagnosis, applying a standard procedure, based on the results of laboratory and instrumental studies. Determine the list of necessary clinical, laboratory and instrumental studies and evaluate their results (according to list 4).
- PRN 8 - perform medical manipulations (according to list 5).
- PRN 9 - provide counseling on family planning, determine the tactics of physiological pregnancy, physiological childbirth and the postpartum period
- PRN 14 - keep medical records
- PRN 18 - comply with the requirements of ethics, bioethics and deontology in their professional activities

DESCRIPTION OF THE COURSE

Forms and methods of teaching

The course will be presented in the form of lectures (50 hours) and practical (130 hours), organization of students' independent work (120 hours).

Teaching methods used in teaching of the discipline: frontal, individual, explanatory and illustrative. Problematic teaching is used by the teacher when solving situational problems using innovative methods (case method and business game). Partially the search (heuristic) method serves the purpose of gradually bringing students closer to the independent solution of typical professional problems by preliminary mastering several ways to solve them. The educational process provides for the following forms of studying the course: lectures, practical and seminars, as well as independent work of students with the recommended literature.

Content of the discipline

- Topic 1. Subject and tasks of physiology. The concept of "function", "health", "norma". Physiological research methods.
- Topic 2. Membrane potentials. Physiological mechanism of resting potential formation.
- Topic 3. Membrane potentials. Action potential research.
- Topic 4. Research of mechanisms of electrical stimulation and conduction of excitation by excitable tissues.
- Topic 5. Mechanisms of conduction of excitation through the neuromuscular synapse.
- Topic 6. Properties of skeletal muscles and mechanisms of their contraction, relaxation and fatigue.
- Topic 7. Research of biological regulation. Contours of biological regulation of functions. Reflex principle of the central nervous system. Synapses of the central nervous system.
- Topic 8. Excitation and inhibition in the central nervous system. Properties of nerve centers.
- Topic 9. Frontier control on the physiology of excitable tissues and the general central nervous system.
- Topic 10. The role of the spinal cord in the regulation of the body's motor functions.
- Topic 11. The role of the hindbrain, midbrain and reticular formation in the regulation of the body's motor functions.
- Topic 12. The role of the forebrain and cerebellum in the regulation of the body's motor functions.
- Topic 13. Regulation of the systemic activity of the body. The role of the limbic system and cerebral cortex in the formation of the systemic activity of the body.
- Topic 14. Autonomic nervous system. Its structural and functional organization.
- Topic 15. Autonomic nervous system. Its role in the regulation of visceral functions.
- Topic 16. Humoral regulation, its factors, mechanism of hormone action on target cells, regulation of hormone secretion.
- Topic 17. The role of hormones in the regulation of the processes of mental and physical development and growth of the body.
- Topic 18. The role of hormones in the regulation of homeostasis and reproductive function.
- Topic 19. The role of hormones in the regulation of adaptation of the body to stress factors.
- Topic 20. Cross-border control in the physiology of the private central nervous system, ANS and humoral regulation of visceral functions.
- Topic 21. Physiological foundations of behavior. The structure of a holistic behavioral act according to P.K. Anokhin. Instincts. The role of needs, motivations

and emotions in the formation of behavior. Study of the formation and inhibition of conditioned reflexes.

Topic 22. Features of human GNI. Functional asymmetry of the cerebral cortex. Language. Thinking. Consciousness.

Topic 23. Memory, types, mechanisms of formation. Physiological role of peptides in the regulation of memory and learning. Sleep, its types, biological role.

Topic 24. Physiological foundations of work and sports. Optimal modes. A study of fatigue and recovery during muscular work and adaptation of the body to work. Theories of the development of fatigue.

Topic 25. General characteristics of sensory systems. Study of the somatosensory system.

Topic 26. Physiological foundations of pain and pain relief.

Topic 27. Research of the visual sensory system.

Topic 28. Study of the auditory and vestibular sensory system.

Topic 29. Intermediate control on the physiology of GNI, labor activity and sensory systems.

Topic 30. General characteristics of the blood system. Research of functions, physical and chemical properties of blood.

Topic 31. Physiology of erythrocytes and hemoglobin.

Topic 32. Investigation of the protective properties of blood. The functions of leukocytes.

The concept of immunity, its types.

Topic 33 Physiological foundations of methods for the study of blood groups and the principles of blood transfusion.

Topic 34. Types and mechanisms of hemostasis. Platelet physiology.

Topic 35. General characteristics of the circulatory system. Physiological properties of the heart muscle.

Topic 36. Pumping function of the heart. Cardiac cycle, physiological methods of its study.

Topic 37. Research of sound and mechanical manifestations of heart activity. Analysis of the phonocardiogram.

Topic 38. Electrical manifestations of the heart. Physiological foundations of electrocardiography (ECG).

Topic 39. Mechanisms of nervous regulation of the heart.

Topic 40. Mechanisms of humoral regulation of the heart.

Topic 41. Systemic circulation. The laws of hemodynamics, the role of blood vessels in blood circulation. Research of blood pressure and human pulse.

Topic 42. Research of human arterial and venous pulse. Analysis of the sphygmo- and phlebogram.

Topic 43. Research on the regulation of blood circulation. Regulation of vascular tone.

Topic 44. Research of microcirculation and features of regional blood circulation.

Topic 45. Study of the dynamics of lymph flow.

Topic 46. Intermediate control of the physiology of the blood and circulatory system.

Topic 47. General characteristics of the respiratory system. Study of the mechanism of inhalation and exhalation. Examination of external respiration.

Topic 48. Research of indicators of spirometry, spirometry, pneumotachometry.

Topic 49. Mechanisms of gas exchange in the lungs and transportation of gases by blood.

Topic 50. Research on the nervous and humoral regulation of respiration.

Topic 51. General characteristics and functions of the digestive system. Digestion in the oral cavity. The role of the gustatory and olfactory sensory system in the digestion process.

Topic 52. Digestion in the stomach. Methods for the study of digestion in the stomach.

Topic 53. Digestion in the duodenum. The role of pancreatic juice and bile in digestion.

Topic 54. Digestion in the intestine. Physiological bases of hunger and satiety.

Topic 55. Motor activity of the stomach and intestines. Suction processes.

Topic 56. Intermediate control on the physiology of respiration and digestion.

Topic 57. Energy and basic exchange and methods of their assessment.

Topic 58. Physiological foundations of rational nutrition.

Topic 59. Body temperature and regulation of its constancy. Physiological foundations of hardening.

Topic 60. Allocation system. The role of the kidneys in the processes of excretion, the mechanism of urination.

Topic 61. Regulation of kidney function.

Topic 62. The role of the kidneys in maintaining homeostasis. Mechanisms for maintaining acid-base and water-salt balance.

Topic 63. Changes in the physiology of organs and systems in the context of aging of the body.

Topic 64. Frontier control on the physiology of metabolism, thermoregulation and excretion

Topic 65. Rector's control of knowledge in the discipline "Physiology"

List of recommended literature

Main:

1. Гжегоцький М. Р. Фізіологія : навчально-методичний посібник до практичних занять та самостійної роботи / М. Р. Гжегоцький [та ін.]. Вінниця : Нова книга. 2019. 464 с.
2. Фізіологія. Короткий курс. 2-ге вид. / Мороз В.М., Йолтухівський М.В., Шандра О.А. [та ін.]. за ред. Мороз В.М., Йолтухівський М.В. Вінниця : Нова книга. 2019. 392 с.
3. Moroz V. M., Shandra O.A. Physiology. 4th ed. Vinnytsya: Nova Kniga. 2019. 728p.
4. Філімонов В. І. Фізіологія людини: підручник. 3є вид., К.: Медицина, 2015. 488 с.
5. Фізіологія : підручник для студ. вищ. мед. навч. закл. / В. Г. Шевчук [та ін.], за ред. В. Г. Шевчука. Вид. 4, випр. і доповн. Вінниця : Нова книга. 2018. 447 с.

Additional:

1. Costanzo L. S. Physiology. Elsevier. 6th ed., 2017. 528 p
2. Barrett K. E., Barman S. M., Yuan J., Brooks H. L. Ganong's Review of Medical Physiology. McGraw Hill Professional. 26th edition, 2019. 752 p.
3. Guyton A., Hall J. E. Textbook of Medical Physiology. Elsevier. 14th Edition, 2021. 1820 p.
4. Koeppen B. M., Stanton B. A. Berne and Levy Physiology. Elsevier. 7th edition, 2018. 880 p.
5. Sembulingam K., Sembulingam P. Essentials of Medical Physiology. Jaypee Brothers Medical Publishers. 8th ed., 2019. 1186 p.

EVALUATION

According to the Regulations on the organization of the educational process at the Odessa National Medical University, the results of students' academic performance in the discipline "Physiology" are presented in the form of an assessment on the national scale, 200-point and ECTS scale, and have standardized generalized criteria for assessing knowledge:

- the mark "excellent" is given to a student who systematically worked during the semester, showed versatile and in-depth knowledge of the program material during the exam, is able to successfully complete the tasks provided for by the program, has mastered the content of the main and additional literature, realized the relationship of individual sections of the discipline, their significance for future profession, discovered creativity in understanding and using educational and program material, showed the

ability to independently update and replenish knowledge; level of competence - high (creative)

- the mark "good" is given to a student who has discovered a complete knowledge of the educational and program material, successfully fulfills the tasks provided for by the program, has mastered the basic literature recommended by the program, has shown a sufficient level of knowledge in the discipline and is capable of independently updating them in the course of further education and professional activity; level of competence - sufficient (constructive and variable)

- the mark "satisfactory" is given to a student who has knowledge of the basic educational and program material in the amount necessary for further study and subsequent work in the profession, copes with the tasks provided for by the program, made some mistakes in the answers on the exam and when performing exam tasks, but has the necessary knowledge to overcome the mistakes made under the guidance of a scientific and pedagogical worker; competence level - average (reproductive)

- the mark "unsatisfactory" is given to a student who did not reveal sufficient knowledge of the main educational and program material, made fundamental mistakes in performing the tasks provided for by the program, cannot use knowledge in further training without the help of a teacher, and could not master the skills of independent work; the level of competence is low (receptive-productive).

The conversion of the traditional grade in the discipline into a 200-point grade is carried out by the information and computing center of the university according to the formula: average grade in the discipline x 40. That is, "5" - 185-200 points, "4" - 151-184 points, "3" - 120-150 points. The ECTS rating scale evaluates the achievements of students in the discipline who study in one course of one specialty, according to the points they received, by ranking, namely: "A" - the best 10% of students, "B" - the next 25% of students, "C" - the next 30% of students, "D" - the next 25% of students, "E" - the last 10% of students. Students who have received grades "FX" and "F" ("2") are not included in the list of ranked students. Such students automatically receive an "E" score after retaking. The mark "FX" is given to students who have scored the minimum number of points for the current educational activity, but who are not credited with the final control. Grade "F" is given to students who attended all classroom lessons in the discipline, but did not score an average score (3.00) for the current educational activity and were not admitted to the final control.

The assessment of the *current progress* in studying the topics of the discipline is carried out according to the traditional 4-point scale. In a practical lesson, students are interviewed at least once every 2-3 practical classes (no more than 75% of students), and in a seminar - at least once every 3-4 classes (no more than 50% of students). At the end of the semester, the average number of students' grades in a group is the same.

At the end of each lesson, the teacher announces their grades to the students, makes an appropriate entry in the Student Attendance and Achievement Record and the Student Grade and Attendance Record. At the end of the study of the discipline, the current performance is calculated - the average current score (the arithmetic mean of all current grades on the traditional scale, rounded to two decimal places).

Semester credits are received by students who have attended all types of classes in the discipline in the current semester (there are no missing lectures and practical and seminars). When issuing a semester test, the average grade is not calculated. For such students, the teacher puts "passed" in the student's record book in the last lesson in the discipline of the semester.

At the end of the study of the discipline, only those students who have completed all types of work stipulated by the curriculum (do not have gaps) are allowed to the final certification (exam), their average score for current educational activities is 3.00 or more. For the discipline Physiology, which is included in the Krok-1 integrated test exam, a compulsory component of the curriculum is the **final test control** in the discipline, which includes 50 test questions (30 minutes each), as an indicator of the students' assimilation of the acquired knowledge. The delivery of the final test control takes place at the last practical lesson in the discipline in the University computer center according to the schedule of the educational department, approved by the rector of the university. The student must give correct answers for at least 90% (45 questions). The teacher files the statement in the Journal of Attendance and Student Progress and gives grades to the current performance for the last lesson in the discipline, converting the results according to the following scale: "excellent" grade - 50 correct answers; rating "good" - 47-49 correct answers; "Satisfactory" grade - 45-46 correct answers; the rating "unsatisfactory" - 44 correct answers and less. A student who has not passed the final test control in the discipline is considered to have not completed the program in the discipline.

The exam is held at the stage of completion of the student's study of the academic discipline, during the preparation of which the student shows the level of understanding of the program material as a whole, the logic and relationships between individual sections, the ability to creatively use the accumulated knowledge, the ability to form his attitude to a specific problem of the academic discipline, and the like. A student is not allowed to take an exam in a discipline if he has not completed all types of work stipulated by the working curriculum for a semester from this academic discipline and has not passed the final test control for the discipline.

Independent work of students

The work program for the discipline provides for out-of-class and classroom forms of independent work. During the extracurricular form of independent work, the

student completes homework, prepares for lectures, practical and seminars, tests and tests. During independent work under the supervision of the teacher, the student takes part in scientific circles, conferences, performs research work, prepares scientific theses, reports, reviews the work of other students, takes part in competitions, olympiads, quizzes, making visual materials, preparing technical teaching aids. During classroom practical lessons, most of the time (at least 60%) is devoted to the main stage of the lesson: students' independent work under the guidance of a teacher on professionally oriented tasks (real objects of future professional activity - situational tasks, laboratory research results, radiographs or models). The rest of the time is for analysis and joint discussion of the results of students' independent work with error correction. Independent work of students, which is provided by the topic of the lesson along with classroom work, is assessed during the current control of the topic in the corresponding lesson. The assimilation of topics that are taken out only for independent work is checked during the exam (differential credit).

COURSE POLICY

According to the Regulation on the organization of the educational process at the Odessa National Medical University, a student who missed classes has the right, within two weeks from the date of absence, to work out them without the permission of the dean of the faculty, regardless of the reasons for the absence. A student who has not eliminated the absence of classes without the permission of the dean of the faculty for classes and work at the department within two weeks is not allowed. A student who has missed classes for valid reasons receives permission to work out classes according to an individual schedule for no more than one class per day. Classes are considered completed if the student received a positive mark. The missed practical lessons are worked out according to the schedule of the department work: during the semester - twice a week (on a working day from 14.30 to 16.00 and Saturday - the day of work and consultations from 9.00 to 13.00).

During the semester, no more than one lesson is worked out on a working day, on Saturday - no more than three in total. A student who has not completed the curriculum in full at the end of the semester in a timely manner without a valid reason has the right, only with the permission of the dean of the faculty, to eliminate the current academic debt after its completion within the examination session. After the end of the semester, working off at the departments takes place daily. The student has the right to work no more than three lessons a day. The deadline for the elimination of the current academic debt is no later than 2 days before the start of retake exams in accordance with the retake schedule approved by the rector. The student is obliged to retake unsatisfactory grades in the discipline if the average score of his current academic performance does not reach the minimum level - 3.00, but no later than the

day of the final control. The student has the right to retake the test assignments in the discipline at the CIAHCAO only three times. The deadline for eliminating debt is the date of the first retake of the exam in this discipline.

Academic Integrity Policy:

Respect for academic integrity by education seekers includes:

- independent fulfillment of educational tasks, tasks of current and final control of learning outcomes (for persons with special educational needs, this requirement is applied taking into account their individual needs and capabilities);
- links to sources of information when using ideas, developments, statements, information;
- observance of the norms of legislation on copyright and related rights;
- provision of reliable information about the results of their own (scientific, creative) activities, the research methods used and sources of information.

Unacceptable in educational activities for participants in the educational process are:

- the use of family or official ties to obtain a positive or highest grade in the implementation of any form of control of learning outcomes or advantages in scientific work;
- use of prohibited auxiliary materials or technical means (cribs, notes, earpieces, phones, smartphones, tablets, etc.) during control activities;
- passing the procedures for monitoring the learning outcomes by dummies.

Attendance and late arrival policy:

Attendance by students of all types of training sessions is compulsory. The mark of student attendance is carried out by the teacher in the student attendance and progress register and by the headman in the student progress and attendance register. According to the charter and internal regulations for persons studying at the university, it is necessary to comply with the schedule of the educational process and the requirements of the curriculum, in particular:

- attend lectures, practical, seminars and laboratory classes;
- do not be late for classes, come to classes in accordance with the schedule of classes;
- within two days, in any form convenient for the student, inform the dean's office about the reasons that make it impossible to attend classes and perform other tasks stipulated by the curriculum.

Mobile devices: Do not use wireless devices during the session.

Behavior in the classroom: In the classroom, the student must behave in accordance with the rules of ethics and behavior defined in the Regulations on the organization of the educational process by applicants for higher education at ONMedU and the Regulations on the organization of humanitarian education and educational work at the Odessa National Medical University.