

Odesa national Medical University
V.V. Pidvysoyskyi Department of General and Clinical Pathologic Physiology

Syllabus of the Course
“Clinical Pathologic Physiology”

Amount	120 hrs / 4.0 ECTS
Semester, year of study	III semester, II year of study
Days, time, place	4A, Olhyivska Str, Main Building of Odesa National Medical University, V.V. Pidvysotskyi Department of General and Clinical Pathological Physiology. Days and times of classes: according to the schedule
Teachers	Prof. Vastyanov R.S. Prof. Kotyuzhinska S.G. Ass. Prof. Pospelov O.M. Ass. Prof. Lapshin D.Ye. Ass. Prof. Babyi V.P. Ass. Prof. Kuzmenko I.A. Senior Asst. Goncharova L.V. Asst. Ostapenko I.O. Asst. Kirchev V.V. Asst. Sarakhan V.M.
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Consultations	According to the schedule located on the information desk of the department

COMMUNICATION

Communication with applicants will take place in the classroom.

During distant learning, communication is carried out using the ‘Microsoft Teams’ platform as well as through e-mail correspondence, using Viber, Telegram, WhatsApp messengers and Zoom.

COURSE ABSTRACT

The subject of the discipline – to study the general regularities of the sick person functioning which arise at different levels of organism organization as a whole and to determine the mechanisms of diseases initiation, development, suppression and consequences.

Course prerequisites: the discipline is based on the basic principles and knowledge of anatomy, histology, medical and biological physics, bioinorganic, bioorganic and biological chemistry, biology (general, molecular and medical), physiology, microbiology, pathomorphology and pharmacology and is integrated with these disciplines.

Course post-requisites: to develop professional abilities for clinical thinking; to provide the possibility of diagnosis, treatment, prevention of diseases initiation and development; to create theoretical foundations for postgraduate students to master clinical disciplines (therapy, surgery, obstetrics and gynecology, clinical pharmacology, pediatrics, anesthesiology, etc.) which involves both the integration of teaching with the main clinical disciplines and the acquisition of pathophysiology in-depth knowledge, to use this knowledge in the process of further education and in professional activities to solve clinical problems.

The aim and tasks of the educational discipline

THE AIM: to acquire an in-depth set of knowledge, abilities, skills from the list of general and special competences, sufficient for producing new ideas, solving complex tasks in this discipline, mastering the methodology of scientific and pedagogical activity, conducting own scientific research.

As a result of the discipline “Pathological Physiology” studying a postgraduate student should know:

- Basic concepts of general nosology, typical pathological processes, pathophysiology of organs and systems;
- Typical pathological processes general biological significance, their role in pathology;
- General regularities underlying pathological processes.

As a result of the discipline “Pathological Physiology” studying, a postgraduate student should be able to:

- To analyze cause-and-effect disorders, pathological and adaptive-compensatory reactions, local and general, specific and non-specific in pathogenesis, to find the leading link of pathogenesis;
- Apply the necessary methods for modeling and analysis of typical pathological processes;
- Solve calculation and situational problems, analyze data of real clinical situations.

As a result of the discipline “Pathological Physiology” studying a postgraduate student should master the following skills:

- experimental animals fixation;
- intravenous administration of solutions to experimental animals;
- intravital microscopy of the blood circulation of a frog's tongue;
- putting a ligature on the vessels of experimental animals;
- method of blood sampling from experimental animals;
- introduction of medicinal substances into the heart cavity;
- ECG recording in the experiment
- rheovasography recording in the experimental conditions;
- ECG analysis in case of different pathology;
- analysis of blood smears in case of different pathology;
- analyzing the spirogram.

Program competences which formation is ensured by the discipline:

Integral competence: The ability to solve complex problems of professional activity, to perform original scientific research, to carry out research and innovation activities in the field of health care which involves a deep rethinking of existing and creation of new integral knowledge/skills and their practical implementation

General competences (GC):

1. The ability to improve and develop one's own intellectual and general cultural level.
2. Ability to work autonomously, respecting research ethics, academic integrity and copyright.
3. Ability to search, process and analyze information from various sources.
4. Ability to communicate and work in a professional environment and with representatives of other professions in a national and international context.
5. The ability to identify, pose and solve problems, the ability to generate new ideas.
6. The ability to evaluate and ensure the quality of performed works.
7. Ability to plan and manage time

Professional competencies of the speciality (PC):

1. Deep knowledge and systematic understanding of the subject area by direction and topic of scientific research in the field of medicine, future professional activity in the field of higher medical education.
2. Ability to determine the need for additional knowledge in the field of scientific research, formulate research questions, generate scientific hypotheses in the field of medicine.
3. Ability to develop and manage scientific projects in the field of medicine.
4. The ability to choose methods and criteria for evaluating researched phenomena and processes in the field of medicine in accordance with the goals and objectives of the scientific project.
5. Possession of modern methods of scientific research.
6. The ability to conduct correct analysis and generalization of the results of scientific research.
7. Ability to interpret opportunities and limitations of research, its role in society.
8. Introduction of new knowledge (scientific data) into the educational process and health care practice.
9. To publish the results of scientific research in oral and written form in accordance with national and international standards.
10. To organize and implement pedagogical activities in higher medical education, manage the scientific and pedagogical (scientific) team.

Program learning outcomes (PLO)

PLO 1. To apply scientific and professional knowledge; to formulate ideas, concepts for the purpose of use in educational and scientific work.

PLO 2. To demonstrate knowledge of research methodology in general and methods of a certain field of scientific interests, in particular.

PLO 3. To interpret and analyze information, correctly evaluate new and complex phenomena and problems with scientific accuracy critically, independently and creatively.

PLO 4. To identify unsolved problems in the subject area of medicine and determine ways to solve them)

PLO 5. To formulate scientific hypotheses, the purpose and tasks of scientific research.

PLO 6. To analyze synthesize the scientific data independently and critically.

PLO 7. To develop the design and plan of scientific research using appropriate research methods in the field of medicine.

PLO 8. To implement and improve modern methods of research in the chosen direction of the scientific project and educational activity.

PLO 9. To invent new methods of diagnosis, treatment and prevention of human diseases.

PLO 10. To use the results of scientific research in medical practice, educational process and society.

PLO 11. To interpret the possibilities and limitations of scientific research, its role in the development of the system of scientific knowledge and society as a whole.

PLO 12. To present the results of scientific research in oral and written form in the scientific community and society as a whole, in accordance with national and international standards.

PLO 16. Use ethical principles in working with patients, laboratory animals, observe scientific ethics.

PLO 17. To demonstrate academic integrity and act responsibly regarding the reliability of the obtained scientific results

COURSE DESCRIPTION

Forms and methods of education

The course will be taught in the form of lectures (20 hrs), practical (40 hrs) and students' independent work organization (60 hrs).

The main forms of discipline teaching are the following: lectures, practical classes, seminar classes, independent work of students. The following teaching methods are used during the teaching of the discipline: lectures, explanations, conversations, multimedia presentations, laboratory work, problem solving, oral survey, testing, etc.

Independent work of students consists in processing the material of lectures, as well as in preparation for the implementation and defence of practical works, preparation for current and final control, execution of training tests, search for information from literary sources and the Internet, and conducting elements of scientific work.

Scientific work of students is carried out in the work of groups, preparation and speeches at scientific student conferences, writing articles.

Content of the academic discipline:

1. Clinical pathophysiology. The concept of a clinical experiment, research methodology in clinical pathophysiology. Clinical syndromes as a manifestation of disease pathogenesis. Features of the pathogenesis of diseases in the presence of concomitant pathology: summation, sensitization and cross-reactivity as a state of the body's adaptive potential
2. Disease and typical pathological process. Hereditary factor in the occurrence and development of the disease. Features of typical pathological processes. Dysregulation and pathological changes of effectors as causes of disorders of functional systems
3. Typical pathological processes: inflammation, fever, acute phase reactions. Inflammation and body regulation systems. Pyrotherapy. Clinical classification of types of fever

4. Hypoxia. Levels of adaptation to hypoxia. Mechanisms of adaptation. Mountain sickness - pathogenesis, protective and compensatory reactions.
5. Pathogenetic significance of disturbances of acid-alkaline balance and water-electrolyte exchange. Regulation and parameters of the acid-base state.
6. Cancerogenesis. Mechanisms of tumor cell transformation. Oncogene activation. Pathogenesis of the tumor process. Pathophysiological justification of the principles of prevention and therapy of tumor growth.
7. Starvation. Disturbances of homeostasis during starvation. Physiological adaptation to exogenous starvation. Pathogenetic principles of artificial medical nutrition.
8. Typical disorders of lipid metabolism. Hyperlipidemia (hyperlipoproteinemia). Lipid hypothesis of atherosclerosis. Pathogenetic significance of atherosclerosis.
9. Obesity as a risk factor and cause of arterial hypertension. Features of pathogenesis: a) primary idiopathic; b) morbid; c) hypothalamic. Metabolic disorders in obesity. Displacement of endocrine regulation in obesity.
10. Anemia. General characteristics. Compensation of hemic hypoxia associated with anemia. Classification. Anemias caused by disorders of hemoglobin synthesis and iron metabolism: a) associated with iron deficiency; b) sideroblastic anemia; c) thalassemia. Macrocytic anemia: main mechanisms, etiopathogenesis of megaloblastic anemia. Normochromic normocytic anemias - causes and mechanisms: a) hypo-aplastic and myelophthous anemias; b) posthemorrhagic and hemolytic anemias.
11. Clinical pathophysiology of heart failure. Pathogenesis of congestive heart failure. Pathogenesis of acute left ventricular failure as a cause of cardiogenic pulmonary edema. Pathogenetic principles of cardiogenic pulmonary edema therapy.
12. Pathophysiology of ischemic heart disease. Pathogenesis of myocardial infarction and cardiogenic shock. Pathophysiological changes in myocardial infarction. Clinical and pathophysiological characteristics of complications and rehabilitation period of myocardial infarction.
13. Pathogenesis of the most frequent types of arterial hypertension. Arterial hypertension as a cause of heart failure and some pathogenetic principles of pharmacotherapy of patients with severe arterial hypertension and its complications. Pathogenetic principles of hypertensive crisis.
14. Disturbances of peripheral blood and lymph circulation. Ischemia, etiology and pathogenesis, consequences. Embolism, clinical manifestations of embolism. Disturbances of microcirculation, their pathogenetic significance. Sludge phenomenon, stasis. Insufficiency of lymphatic circulation. Pathogenetic significance. Disseminated intravascular blood clotting. Etiological factors. Dysfunctions of the hemostasis system and links of pathogenesis.
15. Deep vein thrombosis and pulmonary embolism. Features of thrombogenesis. Diseases and pathological conditions with a particularly high risk of thrombosis. Pathogenesis of external breathing disorders due to thromboembolism of the pulmonary artery and its branches.

16. Respiratory failure and arterial hypoxemia. Respiratory acidosis and alkalosis. Pathogenetic principles of artificial lung ventilation. Bronchial asthma and asthmatic status. Pathogenesis of bronchial asthma and asthmatic status. The immunological link of the pathogenesis of bronchial asthma and the reaction of the late phase.
17. Pathophysiology of gastric secretion, gastritis, gastric ulcer and duodenal ulcer. Pathogenesis of dysfunctions of the digestive system at the intestinal level. Pathogenesis of acute and chronic pancreatitis.
18. Clinical pathophysiology of the liver. Pathogenesis of cholestatic syndrome. Jaundice: disturbances of bilirubin metabolism, pathogenetic mechanisms. Metabolic disorders as a result of liver failure. Impairment of consciousness and encephalopathy associated with liver failure. Liver cirrhosis, portal hypertension and ascites.
19. Kidney failure. Etiological factors. Links of pathogenesis. Prerenal azotemia. Glomerulonephritis. Nephrotic syndrome. D acute tubular necrosis. Uremic syndrome (uremia). Obstructive uropathy.
20. Diabetes. Development of demyelination of nerve fibers under conditions of diabetes. The main disorders of various types of metabolism and acid-alkaline balance in diabetes. Pathogenesis of micro- and macroangiopathy, their consequences. Pathogenesis of diabetic coma. Hypoglycemia, its pathogenesis, hypoglycemic coma. Pathophysiology of the most frequent endocrine disorders.
21. Hypersensitivity reactions. Immunodeficiencies. Autoimmune mechanism of disease development.
22. Pathophysiology of disorders of functional systems and disturbances of homeostasis in the acute period after severe combat wounds and during the development of military-traumatic shock.
23. Clinical pathophysiology of the nervous system. General patterns of activity of the higher departments of the central nervous system and the importance of their disturbances in the pathogenesis of nervous disorders. Experimental methods of reproducing the pathology of higher nervous activity. The role of disorders of the trophic function of the nervous system in the occurrence of pathological processes.
24. Subject and methods of clinical pathophysiology. Clinical-diagnostic criteria of the body's activity and the pathogenetic validity of their application in pathological conditions. Achievements of modern clinical physiology.
25. Disorders of bioelectrogenesis in excitable tissues under pathological conditions. Physiological foundations of diagnostics using electrical devices.
26. Pathogenetic role of stressful stimuli from the point of view of clinical pathophysiology
27. Pathophysiology of pain. Clinical features of various types of pain syndrome, research and control methods.
28. Clinical pathophysiology of the cardiovascular system.
29. Clinical pathophysiology of the respiratory system.
30. Clinical pathophysiology of the digestive system.
31. Clinical pathophysiology of the excretory system.

32. Disorders of neuroendocrine regulation. Clinical pathophysiology of endocrinopathies.
33. Clinical pathophysiology of neuropathological syndromes. The theory of generative, determinant and systemic mechanisms of neuropathological disorders.
34. Pathogenic effect of biological factors.
35. Pathogenic effect of chemical factors. Intoxication.
36. The role of heredity and constitution. Aging.
37. Inflammation.
38. Clinical pathophysiology of reactivity. Disturbances of immune homeostasis.
39. Allergy.
40. Immunodeficiency states
41. Starvation.
42. Disorders of vitamin metabolism.
43. Extreme conditions.
44. Clinical pathophysiology of hypothalamic-pituitary - adrenal system.
45. Extramyocardial heart failure
46. Coronary insufficiency
47. Portal hypertension syndrome
48. Dysfunction of the pancreas
49. Hypertension of a small circle of blood circulation. Arterial hypotension
50. Clinical pathophysiology of gonads
51. Clinical pathophysiology of higher nervous activity
52. Disturbances of the nociceptive function of the nervous system.

List of recommended literature

1. Pathophysiology: textbook for medical universities students / Yu.V. Byts, H.M. Butenko [et al.]; Ed. by: M.N. Zayko, Yu.V. Byts, M.V. Kryshal. - 6th ed. - Kyiv: Medicine, 2017. - 737 p. [In Ukrainian].
2. Pathophysiology: textbook / Yu.V. Byts, H.M. Butenko, A.I. Gozhenko et al.; Ed. N.N. Zayko, Yu.V. Byts, N.V. Kryshal. – Kyiv : VSY “Medicine”, 2015. - 744 p. [In Ukrainian].
3. General and clinical pathophysiology: textbook for medical universities students, of IV level of accreditation /A.V. Kubyshkin et al.; Ed. by A.V. Kubyshkin, A.I. Gozhenko. - 2nd ed. – Vinnytsya : Nova Knyha Publishers, 2016. - 656 p.
4. Pathophysiology: textbook for medical universities students, of IV level of accreditation. Approved by the Ministry of Education and Science; Ed. by M.V. Krystal, V.A. Mikhnev. – Kyiv : Medicine, 2017. - 656 p. [In Ukrainian].
5. Simeonova N.K. Pathophysiology: textbook for students of higher medical educational institutions of the III-IV accreditation levels. Ed. by V.A. Mikhnev. - 3rd ed. – Kyiv : AUS Medicine Publishing, 2017. - 544 p.

6. Ataman O.V. Pathophysiology: textbook for students of higher medical educational institutions. In 2 vol. – Vol. 1: General pathology. - 2nd edition. – Vinnytsya : Nova Knyha Publishers, 2016. - 580 p. [In Ukrainian].
7. Ataman O.V. Pathophysiology: textbook for students of higher medical educational institutions. In 2 vol. – Vol. 2: Pathophysiology of organs and systems. - 2nd edition. – Vinnytsya : Nova Knyha Publishers, 2016. - 448 p. [In Ukrainian].

KNOWLEDGE EVALUATION

The mark for the discipline is determined on the basis of the sum of the marks of the current educational activity (arithmetic average of current success) and the examination mark (traditional mark) which is given when evaluating theoretical knowledge and practical skills in accordance with the lists determined by the discipline program.

Thus, the parts of the results of the assessment of the current educational activity and the exam are 50 and 50 percent, respectively.

The current evaluation of postgraduate students on the relevant topics is carried out according to the traditional 4-point system (excellent, good, satisfactory, unsatisfactory).

Mark “excellent” is assigned when the postgraduate student knows the program in its entirety, illustrating the answers with various examples; gives exhaustively accurate and clear answers without any leading questions; teaches the material without errors and inaccuracies; performs practical tasks of varying degrees of complexity;

Mark “good” is given on the condition that the postgraduate student knows the entire program and understands it well, answers the questions correctly, consistently and systematically, but they are not exhaustive, although the graduate student answers additional questions without errors; performs practical tasks, experiencing difficulties only in the most difficult cases;

Mark “satisfactory” is assigned to a postgraduate student based on his knowledge of the entire scope of the program in the subject and a satisfactory level of understanding of it. a graduate student is able to solve simplified tasks with the help of leading questions; performs practical skills, experiencing difficulties in simple cases; is not able to give a systematic answer on his own, but answers directly to directly asked questions correctly

Mark “unsatisfactory” is issued in cases where the postgraduate student's knowledge and skills do not meet the requirements for a "satisfactory" grade (does not know any of the above questions, or knows less than 50% of the questions).

At the end of the discipline study the current success rate is calculated as the average score of all marks received by the postgraduate student on a traditional scale rounded to 2 (two) decimal places.

The assimilation of the topics of the postgraduate students' independent work, which is provided for by the program, is checked during the exam.

Postgraduate students who have completed the program of the discipline, have no academic debt, received at least 3.00 for the current activity and passed the complex of practical skills in the discipline according to the list are admitted to the exam. The grade on the exam consists of the graduate student's answer to the questions from the list of

questions provided by the discipline program. The exam is evaluated on a 4-point (traditional) scale. In the future, the postgraduate student receives two marks: the first - according to the traditional 4-point scale and the second according to the 200-point system.

The multi-point scale characterizes the actual success rate of each postgraduate student in mastering the academic discipline. The conversion of a traditional grade from a discipline to a 200-point grade is performed by the information and computing centre of the university using the “Contingent” program according to the formula:

the average score of success (current/ from the discipline) x 40

National mark	Points
“5”	185-200
“4”	151-184
“3”	120-150

According to the *ECTS rating scale*, the achievements of postgraduate students in the discipline are evaluated according to the points they received, by ranking, namely:

ECTS mark	Statistical indicator
“A”	the best 10% of postgraduate students
“B”	the next 25% of postgraduate students
“C”	the next 30% of postgraduate students
“D”	the next 25% of postgraduate students
“E”	the last 10% of postgraduate students

The ECTS scale establishes whether a postgraduate student belongs to the best or worst group among the reference group of fellow students (faculty, speciality), i.e. his rating. When converting from a multi-point scale, as a rule, the limits of grades “A”, “B”, “C”, “D”, “E” do not coincide with the limits of grades “5”, “4”, “3” according to the traditional scale. An “A” mark according to ECTS scale cannot be equal to an “excellent” mark, a “B” grade - to a “good” mark, etc.

COURSE POLICY

Deadlines and Rescheduling Policy

Postgraduate students are expected to attend all lectures and practical sessions. If they missed the class, it is necessary to make up for it (according to the schedule posted on the information stand of the department and according to the permission of the dean's office, if it is needed).

The rescheduling of practical skills mastery tests is carried out during the semester in an individual manner with a decision on the time of practice.

Unsatisfactory grades are rewritten in the last month of studying the discipline, provided that the average score for the current educational activity is less than 3.00 (it is carried out according to the schedule posted on the information stand of the department).

Academic Integrity Policy

Compliance with the rules of academic integrity by postgraduate students provides the following:

- independent performance of educational tasks, tasks of current and final control (current controls and discipline exam) of learning results (for persons with special educational needs, this requirement is applied taking into account their individual needs and capabilities);
- references to sources of information in the case of using ideas, developments, statements, information;
- provision of reliable information about the results of one's own (scientific, creative) activity, used research methods and sources of information.

The use of prohibited auxiliary devices or technical means (cheat sheets, notes, micro-earphones, telephones, smartphones, tablets, etc.) during control measures is unacceptable in educational activities for participants of the educational process.

For academic integrity violations, postgraduate students can be attracted to such academic excellence:

- decrease in the evaluation results of the control work, exam, credit, etc.;
- repeated assessment (test, exam, credit, etc.);
- additional control measures preamble (additional individual tasks, control works, tests, etc.).

Attendance and Tardiness Policy

Attending lectures and practical classes is obvious. If you are late for more than 15 min the lesson is considered missed and you need to make up for it.

Mobile devices

Smartphone, tablet or other device use for storing and processing information during practical classes, is allowed only with the teacher's permission. The use of mobile devices and their accessories during any form of control is strictly prohibited.

Behaviour inside the classrooms

During classes it is allowed to: leave the audience for a short time if necessary and with the teacher's permission; take photos of presentation slides; take an active part in the lesson.

During classes it is forbidden to: eat (with the exception of persons whose special medical condition requires otherwise - in this case, medical confirmation is required);

smoke, use alcoholic and low-alcohol drinks or narcotic drugs; speak obscenely or use words that insult the honor and dignity of colleagues and teaching staff; gaff; to cause damage to the material and technical base of the university (damage inventory, equipment; furniture, walls, floors, litter premises and territories); making noise, shouting or listening to loud music in the classrooms and even in the corridors during classes.

Composers:

Head of General and Clinical Pathological Physiology
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Ostapenko I.O.

Ass. Prof. of General and Clinical Pathological Physiology
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Lapshin D.Ye.