

**Odessa National Medical University**  
**Faculty of Pharmacy**  
**Department of General and Clinical Pathological Physiology**  
**named after V.V. Podvysotsky**

**Syllabus of course**  
**"Pathological physiology"**

<b>Amount</b>	150 hours / 5,0 ECTS
<b>Semester, year of study</b>	Faculty of Pharmacy 3rd semester, II year of study
<b>Days, time, place</b>	street Olgiivska, 4a (Main building of ONMedU), Department of General and Clinical Pathological Physiology named after V.V. Podvysotsky  Days and times of classes: according to the schedule of the educational department
<b>Teachers</b>	<ol style="list-style-type: none"> <li>1. Prof. Vastyanov RS</li> <li>2. Prof. Kotyuzhynska SG</li> <li>3. Assoc. Pospelov OM</li> <li>4. Assoc. Lapshin DE</li> <li>5. Assoc. Babiy VP</li> <li>6. Assoc. Yermuraki PP</li> <li>7. Assoc. Kuzmenko IP</li> <li>8. Assist. Goncharova LV</li> <li>9. Assist. Ostapenko IO</li> <li>10. Assist. Kirchev VV</li> <li>11. Assist. Sarahan VM</li> <li>12. Assist. Rusnak SV</li> </ol>
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<b>Consultations</b>	According to the schedule posted on the information stand of the department

## COMMUNICATION

Communication with students will be in the classroom.

During distance learning, communication is through the Microsoft Teams platform, as well as via e-mail, via Viber, Telegram, WhatsApp, Zoom.

## COURSE ANNOTATION

The discipline "Pathophysiology" is studied in accordance with the Standard of higher education of the second (master's) level of knowledge 22 "Health" specialty 226 "Pharmacy, industrial pharmacy" master's degree program .

**The subject of the discipline** - the general patterns of functioning of the sick person, which occur at different levels of the living organism as a whole and determine the mechanisms of origin, development, completion and consequences.

**Prerequisites of the discipline:** discipline based on previously studied by students the basic principles and knowledge of anatomy, histology, medical and biological physics, bioinorganic, bioorganic and biological chemistry, biology (general, molecular and medical), normal physiology, microbiology, integrates with these disciplines, as well as with pathomorphology and pharmacology.

**Prerequisites of the discipline:** the study of pathological physiology forms students' ability to interpret the basic concepts of general nosology, interpret the causes, mechanisms of development and manifestations of typical pathological processes and the most common diseases, analyze, draw conclusions about the causes and mechanisms of functional, metabolic and structural disorders organs and systems of the body in diseases; provides fundamental training and acquisition of practical skills for the subsequent professional activity of a pharmacist.

### 1. The purpose and objectives of the discipline

1.1. The purpose of teaching the discipline "Pathological Physiology" is the formation of the ability to interpret the basic concepts of general nosology, interpret the causes, mechanisms of development and manifestations of typical pathological processes and the most common diseases, analyze, draw conclusions about the causes and mechanisms of functional, metabolic and structural disorders. in diseases.

1.2. The main objectives of the discipline "Pathological Physiology" are

- to understand the importance of pathophysiology for medicine and health care, its place in the system of medical knowledge;
- to have an idea of clinical pathophysiology as a modern direction of development pathophysiological science;
- understand the role of the experimental method in the study of pathological processes and diseases, its possibilities, limitations and prospects;
- interpret the basic concepts of general nosology;

- apply theoretical knowledge of nosology , pathophysiology of the cell, typical metabolic disorders, typical pathological processes in studies of etiology and pathogenesis, manifestations and consequences of disorders of functional systems (organs) and the most common human diseases, metabolic, structural disorders of organs and systems of the body in diseases;
- be able to combine the achievements of clinical research and modern experimental approaches in solving current problems of etiology and pathogenesis of diseases; and mastering the latest advances in modern medical science.

1.3. Competences and learning outcomes, the formulation of which is facilitated by the discipline (relationship with the normative content of training of higher education, formulated in terms of learning outcomes According to the requirements of the standard, the discipline provides students with discipline:

### **General Competences (GC):**

3. The desire to preserve the environment.
4. The ability to think abstractly, analyze and synthesize, learn and be
11. Ability to evaluate and ensure the quality of work performed.

### **Specialty Competencies (SC):**

2. Ability to provide advice on over-the-counter and prescription drugs, medical devices and other products of the pharmacy range; pharmaceutical care during the selection and sale of over-the-counter drugs.
3. Ability to provide home care to patients and victims in extreme situations and emergencies.
6. Ability to detect drugs xenobiotics, toxins and its metabolites in body fluids and tissues, to conduct chemical and toxicological studies to diagnose acute poisoning, drug and alcohol intoxication.
11. Ability to analyze socio-economic processes in pharmacy.

### **Program learning outcomes (PLO):**

2. Apply knowledge of general and professional disciplines in professional activities.
3. Adhere to the norms of sanitary and hygienic regime and safety requirements in carrying out professional activities.
6. Argue information for decision-making, be responsible for them in standard and non-standard professional situations; adhere to the principles of deontology and ethics in professional activities.
11. Use methods for assessing performance indicators; identify reserves to increase labor efficiency.
29. Ensure competitive positions and effective development of pharmaceutical organizations on the basis of research work on all elements of the marketing complex.
30. Ensure quality control of medicines and document its results. Carry out quality risk management at various stages of the life cycle of medicines.

## **COURSE DESCRIPTION**

### **Forms and methods of teaching**

The course will be presented in the form of lectures (30 hours), practical (50 hours), organization of independent work of students (70 hours).

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

Students' independent work is to study the material of lectures, as well as in the preparation to perform and defend practical work, prepare for current and final control, perform training tests, search for information from literature sources and the Internet and conduct elements of scientific work, student conferences, writing articles.

### *Course content*

#### **Course section 1. General pathology**

Topic 1. Subject, methods and tasks of pathophysiology. History of its development. General etiology and pathogenesis. Initial level of knowledge.

Topic 2. Typical cell responses to damage: types, mechanisms of development. Apoptosis and necrosis. Typical disorders of peripheral circulation and microcirculation: classification, etiology and pathogenesis.

Topic 3. Inflammation: etiology, pathogenesis. Mediators. Local signs. Exudation and proliferation. General microcirculation disorders in the inflammatory focus.

Topic 4. Thermoregulatory disorders: hypo- and hyperthermia. Fever: etiology, pathogenesis.

Topic 5. Allergy: classification, etiology, pathogenesis. Allergic reactions of I - IV types. Pseudoallergic reactions. Autoimmune reactions.

Topic 6. Pathophysiology of tissue growth. Tumors: etiology, pathogenesis.

Typical pathological processes. Current control of knowledge

Topic 7. Disorders of water-salt metabolism: etiology, pathogenesis. Dyshydria, edema.

Topic 8. Pathophysiology of acid-base metabolism: acidosis, alkalosis. Pathophysiology of energy and basic metabolism. Etiology and pathogenesis. Fasting.

Topic 9. Pathophysiology of fat: etiology and pathogenesis. Atherosclerosis. Pathophysiology of carbohydrate metabolism: etiology and pathogenesis

Topic 10. Pathophysiology of extreme conditions. Etiology and pathogenesis of shock and colaptoid conditions.

General metabolic disorders. Current control of knowledge

#### **Section of the discipline 2. Pathophysiology of organs and systems**

Topic 11. Pathophysiology of the blood system. Changes in total volume. Blood loss. Erythrocytosis. Anemia: etiology and pathogenesis. Classification of anemias. Posthemorrhagic anemia, etiology, pathogenesis. Hemolytic, B12 - folate deficiency, iron deficiency anemia, etiology, pathogenesis

Topic 12. Leukocytosis and leukopenia: etiology, pathogenesis. Blood picture. Leukemoid reactions. Leukemia: etiology, classification, pathogenesis. Blood picture.

Topic 13. Pathophysiology of the hemostasis system: hemorrhagic syndrome, thrombosi.

Topic 14. Pathophysiology of the systemic circulation. Heart failure: classification, mechanisms of overload. Coronary insufficiency. Necrosis myocardium. General characteristics of arrhythmias: etiology, classification, pathogenesis.

Topic 15. Circulatory disorders caused by vascular dysfunction. General characteristics of hypertension. Pathogenesis of atherosclerosis.

Topic 16. Pathophysiology of external respiration. Respiratory failure.

Pathophysiology of the cardiovascular and respiratory systems. Current control of knowledge.

Topic 17. Digestive disorders in the gastrointestinal tract. Peptic ulcer disease. Pathophysiology of the intestine. Pancreatitis.

Topic 18. Pathophysiology of the liver. Hepatic failure. Coma. Jaundice.

Topic 19. Pathophysiology of the kidneys. Disorders of basic kidney function. Kidney failure. Nephrotic syndrome.

Topic 20. General etiology and pathogenesis of endocrine disorders. Pathophysiology of the pituitary and adrenal glands. Pathophysiology of the nervous system. General signs and pathogenesis of disorders. Pathophysiology of higher nervous activity.

Pathophysiology of digestion and neurohumoral regulation. Current knowledge control.

Final test control.

### ***List of recommended literature***

1. Патофізіологія : підруч. для студ. вищ. мед. навч. закл. / Ю. В. Биць, Г. М. Бутенко [та ін.] ; за ред.: М. Н. Зайка, Ю. В. Биця, М. В. Кришталя. - 6-е вид., перероб. і допов. - Київ : Медицина, 2017. - 737 с.

2. Патофизиология: учебник / Ю.В. Быць, Г.М. Бутенко, А.И. Гоженко и др. ; под ред. Н.Н. Зайко, Ю.В. Биця, Н.В. Крышталя. — К. : ВСИ “Медицина”, 2015. — 744 с.

3. General and clinical pathophysiology : textbook for students of higher educational institutions, of IV th level of accreditation / A. V. Kubyshkin [et al.] ; ed. by.: A. V. Kubyshkin, A. I. Gozhenko ; рец.: N. V. Krishtal, N. K. Kazimirko. - 2nd ed. - Vinnytsya : Nova Knyha Publishers, 2016. - 656 p.

4. Патофізіологія : підручник для мед. ВНЗ IV р. а. Затверджено МОН / за ред. М.В. Кришталя, В.А. Міхньова. - Київ : Медицина, 2017. - 656 с.

5. Simeonova N. K. Pathophysiology=Патофізіологія : textbook for students of higher medical educational institutions of the III-IV accreditation levels / N. K. Simeonova ; ed. by V. A. Mikhnev. – 3rd ed. - Kyiv : AUS Medicine Publishing, 2017. - 544 p.
6. Атаман О. В. Патофізіологія : підруч. для студ. вищ. мед. навч. закл. У 2-х т. Т. 1 : Загальна патологія / О. В. Атаман. - - 2-ге вид. - Вінниця : Нова книга, 2016. - 580 с.
7. Атаман О. В. Патофізіологія : підруч. для студ. вищ. мед. навч. закл. У 2-х т. Т. 2 : Патофізіологія органів і систем / О. В. Атаман. - 2-ге вид. - Вінниця : Нова книга, 2016. - 448 с.

## EVALUATION

**Current control:** oral examination, testing, solving situational clinical problems, assessment of activity in the classroom.

**Final control:** oral examination, testing.

### Criteria for current assessment in the practical lesson:

«5»	It is presented in the case when the student knows the program in full, illustrating the answers with various examples; gives comprehensively accurate and clear answers without any leading questions; spreads the material without errors and inaccuracies; performs practical tasks of varying complexity.
«4»	It is set provided that the student knows the whole program and understands it well, answers the questions correctly, consistently and systematically, but they are not exhaustive, although the student answers additional questions without errors; performs practical tasks, experiencing difficulties only in the most difficult cases.
«3»	Applied to the student on the basis of his knowledge of the entire volume of the program on the subject and a satisfactory level of understanding. The student is able to solve simplified problems with the help of leading questions; performs practical skills, experiencing difficulties in simple cases; is not able to systematically state the answer on his own, but answers the directly asked questions correctly.
«2»	Exhibited in cases where the student's knowledge and skills do not meet the requirements of "satisfactory" assessment (does not know any of the above questions, or knows less than 50% of the questions).

**Students who have completed the discipline program, have no academic debt, received at least 3.00 for current activities and passed a set of practical skills in the discipline according to the list are admitted to the exam. The grade on the exam consists of the student's answer to the questions from the list of questions provided by the discipline program. The exam is graded on a 4-point (traditional) scale. In the future, the student receives two grades: the first - on the traditional 4-point scale and the second on a 200-point system.**

### **Structure of exam**

The content of the evaluated activity	Amount
Solving a clinical problem with the evaluation of laboratory and instrumental studies.	1
Answer to theoretical questions.	2

### **Criteria for assessing the learning outcomes of students in the exam:**

«5»	Exhibited to a student who worked systematically during the semester, showed during the exam versatile and deep knowledge of the program material, is able to successfully perform the tasks provided by the program, mastered the content of basic and additional literature, realized the relationship of individual sections of the discipline, their importance for future profession. showed creative abilities in understanding and using educational material, showed the ability to independently update and replenish knowledge; level of competence - high (creative);
«4»	It is presented to a student who has shown full knowledge of the curriculum, successfully performs the tasks provided by the program, mastered the basic literature recommended by the program, showed a sufficient level of knowledge of the discipline and is able to independently update and renew during further study and professional activities; level of competence - sufficient (constructive-variable)
«3»	Exhibited to a student who has shown knowledge of the basic curriculum in the amount necessary for further study and further work in the profession, copes with the tasks provided by the program, made some mistakes in answering the exam and when performing exam tasks, but has the necessary knowledge to overcoming mistakes under the guidance of a research and teaching staff; level of competence - average (reproductive)

«2»	Exhibited to a student who did not show sufficient knowledge of the basic curriculum, made fundamental mistakes in performing the tasks provided by the program, can not without the help of the teacher to use the knowledge in further study, failed to master the skills of independent work; level of competence - low (receptive-productive)
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### Distribution of scores received by higher education students

**The grade for the discipline consists of 50.0% of the grade for current performance and 50.0% of the grade for the exam.**

The average score for the discipline is translated into national mark.

Conversion of a traditional grade for a discipline into a 200-point scale is carried out by the information and computer center of the university by the program "Contingent".

Table of conversion of traditional grade into a multi-point scale:

National Assessment	Points
«5»	185-200
«4»	151-184
«3»	120-150

The ECTS rating scale evaluates the achievements of students in the discipline who study in one course of one specialty, in accordance with the points obtained by them, by ranking , namely:

#### ECTS score Statistical indicator

ECTS assessment	Statistical indicator
"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

The ECTS scale establishes the student's belonging to the group of the best or worst among the reference group of classmates (faculty, specialty), ie 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" on the traditional scale.

Students who receive grades " Fx " and "F" ("2") are not included in the list of ranked students . Such students automatically receive a score of "E" after re-assembly. The grade " Fx " is given to students who scored the minimum number of



points for the current educational activity, but who did not pass the final control. Grade "F" is given to students who have attended all classes in the discipline, but did not score an average score (3.00) for current academic activities and are not admitted to the final control.

## **COURSE POLICY**

**Deadline and recompilation policy :** Timely completion of the tasks set by the teacher in a timely manner is mandatory. For late performance of the task during the current / final control of knowledge the student receives an unsatisfactory grade. Reassignment is carried out according to the approved schedule with the permission of the dean's office.

Academic Integrity Policy

### **Observance of academic integrity by students provides:**

independent performance of educational tasks, tasks of current and final control (current controls and exam in the discipline) of learning outcomes (for persons with special educational needs this the requirement is applied taking into account their individual needs and capabilities);

links to sources of information in case of use of ideas, developments, statements, information;

providing reliable information about the results of their own (scientific, creative) activities, used research methods and sources of information.

Unacceptable in educational activities for participants in the educational process is use during control activities prohibited aids or technical means (cheat sheets, notes, headphones, phones, smartphones, tablets, etc.).

For violation of academic integrity, students may be held subject to the following academic liability: work, exam, test, etc .;

- re-assessment (test, exam, test, etc.);
- appointment of additional control measures (additional individual tasks, control works, tests, etc.)

### **Policy on attendance and delays**

Attendance of lectures and practical classes is mandatory. If you are more than 15 minutes late, the lesson is considered missed and requires practice.

### **Mobile devices**

During practical classes, the use of a smartphone, notebook or other device for storing and processing information is allowed only with the permission of the teacher. When conducting any form of control over the use of mobile devices and accessories are strictly prohibited.

### **Behavior in the classroom**

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

During classes it is forbidden: to eat (except for persons whose special medical condition requires another - in this case, medical confirmation is required); smoking, drinking alcoholic and low-alcohol beverages or drugs; to use obscene language or use words that offend the honor and dignity of colleagues and faculty; gaff; to damage the material and technical base of the university (damage inventory, equipment; furniture, walls, floors, litter the premises and territories); shouting, shouting or listening to loud music in classrooms and even in corridors during classes.