

# **EUROPEAN MEDICAL UNIVERSITY**

## **SYLLABUS OF THE EDUCATIONAL DISCIPLINE " PATHOPHYSIOLOGY "**

|                                    |                                                               |
|------------------------------------|---------------------------------------------------------------|
| <b>Cycle of Higher Education:</b>  | <b>second cycle of higher education<br/>(Master's degree)</b> |
| <b>Field of Study:</b>             | <b>22 «Healthcare»</b>                                        |
| <b>Specialty:</b>                  | <b>222 «Medicine»</b>                                         |
| <b>Educational qualification:</b>  | <b>Master of Medicine</b>                                     |
| <b>Professional qualification:</b> | <b>doctor</b>                                                 |

**Teacher's:**

Head of the Department of Fundamental Disciplines with the course of traditional and alternative medicine, Dr. Sci. (Biol.), professor S.S. Ostrovska

Doctor of Philosophy Marazha I.A.

Lecturer Tereshchenko N.M.

**1. Name, Code of the discipline and number of credits**

Syllabus of the discipline "Pathophysiology"

Cycle of Higher Education: second cycle of higher education (Master's degree)

Field of Study: 22 «Healthcare»

Specialty: 222 «Medicine» (3 course)

Educational qualification: Master of Medicine

Professional qualification: doctor

Semester: 5,6.

Number of credits ECTS (number of hours): 8 credits ECTS (240 hours).

Distribution by types of trainings and hours of study – Lectures 18 hours, Practical lessons – 111 hours, Independent work – 111 hours.

**2. Time and place of educational discipline**

Semester: 5, 6.

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3, Akademika H. Dzyaka St., Dnipro.

**3. Prerequisites and Postrequisites of educational discipline**

Prerequisites: physiology, microbiology, virology, immunology, biological and bioinorganic chemistry, human anatomy, clinical biochemistry, clinical physiology, pharmacology, medical biology, hygiene and ecology.

Post-qualifications: surgery, obstetrics and gynecology, otorhinolaryngology, ophthalmology, neurology, urology, dermatology, venereology, internal medicine, oncology, infectious diseases.

**4. Characteristic of the educational discipline****4.1. Purpose and definition of the educational discipline:**

**The purpose** of teaching the discipline "Pathophysiology" is to develop in-depth theoretical knowledge and practical skills to understand the basic concepts of general nosology, the role of destructive (destructive) and protective-compensatory phenomena in the development of the disease, analysis of typical pathological processes and their general patterns of development, interpretation of the basic principles of etiological and pathogenetic prevention and recovery from the disease.

**"Pathophysiology"** is a normative discipline that forms an understanding of the general patterns and mechanisms of occurrence, development and completion of various disorders of the body; analysis of the etiology and pathogenesis of functional disorders of organs and body systems in various nosologies, typical pathological conditions.

#### **4.2. Objectives of the discipline:**

- 1) to study the basic concepts of general nosology: health, disease, pathological process, typical pathological process, pathological reaction, pathological condition, etiology, pathogenesis;
- 2) to explain the basic concepts of etiology: causal factors, risk factors, conditions of occurrence and development of the disease; 3) to analyze various options for the development of cause and effect relationships in pathogenesis;
- 4) evaluate the importance of modern research methods (experimental and clinical) for pathophysiology; 5) analyze the role of environmental factors in the occurrence of diseases;
- 6) explain the mechanisms of pathogenic action of physical, chemical and biological environmental factors;
- 7) to substantiate the cause and effect relationships, while separating local and general changes, pathological and adaptive-compensatory in the pathogenesis of manifestations of environmental factors (overheating, cooling, burns, frostbite, radiation sickness, decompression and compression diseases);
- 8) to define the concept and analyze typical disorders of immunological reactivity: immunodeficiency states, allergies, autoimmune reactions (diseases);
- 9) apply various principles to classify disorders of the immune system; 10) characterize the causative factors, risk factors and conditions of occurrence, mechanisms of development of typical disorders of the immune system;
- 11) analyze the causes, mechanisms of development and manifestations of infectious diseases;
- 12) analyze the mechanisms of cell damage in the pathogenesis of allergic and autoimmune reactions;
- 13) be able to analyze the cause and effect relationships in the pathogenesis of major disorders of the immune system.

#### **4.3. Competencies and Program learning outcomes.**

*General competencies (GC):*

|       |                                                                                               |
|-------|-----------------------------------------------------------------------------------------------|
| GC 1  | Ability to think abstractly, analyses and synthesize.                                         |
| GC 2  | Ability to learn and master modern knowledge.                                                 |
| GC 3  | Ability to apply knowledge in practical situations.                                           |
| GC 4  | Knowledge and understanding of the subject area and understanding of professional activities. |
| GC 6  | Ability to make justified decisions.                                                          |
| GC 10 | Ability to use information and communication technologies.                                    |
| GC 11 | Ability to search, process and analyses information from various sources.                     |
| GC 12 | Certainty and perseverance in relation to the tasks set and responsibilities assumed.         |

*Special (professional, subject) competencies (SC):*

|       |                                                                                                                            |
|-------|----------------------------------------------------------------------------------------------------------------------------|
| SC 2  | Ability to determine the necessary list of laboratory and instrumental studies and evaluate their results.                 |
| SC 23 | Ability to develop and implement scientific and applied projects in the healthcare sector.                                 |
| SC 24 | Compliance with ethical principles when working with patients and laboratory animals.                                      |
| SC 25 | Compliance with professional and academic integrity, being responsible for reliability of the obtained scientific results. |

*Program learning outcomes (PLO):*

|        |                                                                                                                                                                                                                                                                                             |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PLO 1  | Have a thorough knowledge of the structure of professional activity. Be able to carry out professional activities that require updating and integrating knowledge. Be responsible for professional development, the ability to further professional training with a high level of autonomy. |
| PLO 2  | Understanding and knowledge of fundamental and clinical biomedical sciences at a level sufficient to solve professional problems in the field of healthcare.                                                                                                                                |
| PLO 3  | Specialized conceptual knowledge that includes scientific achievements in the field of healthcare and is the basis for conducting research, critical understanding of problems in the field of Medicine and related interdisciplinary problems.                                             |
| PLO 7  | Prescribing and analyzing additional (mandatory and optional) examination methods (laboratory, functional and/or instrumental) (according to list 4), patients with diseases of organs and body systems for differential diagnosis of diseases (according to list 2).                       |
| PLO 21 | Searching for the necessary information in professional literature and databases of other sources, analyzing, evaluating and applying this information.                                                                                                                                     |

## **4.4 Content of the discipline**

### **Topics of lectures (L)**

#### **5th semester**

1. Subject and tasks of Pathophysiology. The general doctrine of the disease. Etiology and pathogenesis.
2. Allergy.
3. Typical disorders of peripheral circulation and microcirculation.
4. Inflammation.
5. Tumors.
6. Hypoxia.
7. Disorders of carbohydrate metabolism.
8. Disorders of water-salt metabolism.

9. Violation of the acid-base state.

### **Topics of practical classes (PC)**

1. Subject and tasks of pathophysiology. Methods of pathophysiological research. The main stages of development of pathophysiology.
2. The doctrine of disease, etiology and pathogenesis.
3. Pathogenic effect of physical factors.
4. The role of heredity, constitution, age-related changes in pathology.
5. Pathology of reactivity. Disorders of immunological reactivity.
6. Allergy.
7. Final lesson on the topic "General nosology".
8. Typical disorders of peripheral circulation and microcirculation.
9. Inflammation.
10. Fever.
11. Tumors.
12. Hypoxia.
13. Starvation.
14. Final lesson on the topic "Typical pathological processes"
15. Disorders of carbohydrate metabolism.
16. Disorders of water-salt metabolism.
17. Violation of the acid-base state.
18. Final lesson on the topic "Typical metabolic disorders"
19. Test control.
20. Anemia caused by blood loss.
21. Hemolytic anemias and anemias with erythropoiesis disorders.
22. Leukocytosis. Leukopenia. Leukemia. Disorders of the hemostatic system
23. Final lesson on the topic. Test control and practical skills on the topic "Blood pathology"
24. Pathophysiology of systemic circulation.
25. Heart failure.
26. Coronary insufficiency.
27. Arrhythmias of the heart.
28. Pathophysiology of blood vessels.
29. Pathophysiology of external respiration.
30. Respiratory failure
31. Final lesson on the topic. Test control and practical skills on the topic "Pathophysiology of the circulatory system and external respiration".
32. Pathophysiology of the digestive system. Digestive insufficiency.
33. Pathophysiology of the liver. Liver failure.
34. Pathophysiology of the kidneys. Renal failure.
35. Final lesson on the topic. Test control and practical skills on the topic "Pathophysiology of digestive and excretory systems".

36. Pathophysiology of the nervous system. Pathophysiology of extreme conditions.
37. Pathophysiology of the endocrine system. Test control of knowledge.

### **Topics for independent work (IW)**

1. The doctrine of the disease. The general doctrine of etiology and pathogenesis of arterial hypertension.
2. The role of heredity, constitution, age-related changes in pathology.
3. Pathology of reactivity. Disorders of immunological reactivity.
4. Allergy.
5. Typical disorders of peripheral circulation and microcirculation.
6. Inflammation.
7. Fever.
8. Tumors.
9. Hypoxia.
10. Hunger strike.
11. Pathology of tissue growth.
12. Disorders of carbohydrate metabolism.
13. Disorders of protein metabolism.
14. Disorders of fat metabolism.
15. Disorders of energy metabolism.
16. Violation of vitamin metabolism.
17. Disorders of water and electrolyte metabolism.
18. Violation of the acid-base state.
19. Pathophysiology of the blood system. Qualitative and quantitative changes in red blood cells.
20. Posthemorrhagic and hemolytic anemia.
21. Leukemia. Quantitative changes in leukocytes in a complete blood count.
22. Disorders of physicochemical properties of blood and hemostasis system.
23. Circulatory failure. Heart failure.
24. Coronary insufficiency.
25. Arrhythmias.
26. Pathophysiology of blood vessels.
27. Pathophysiology of external respiration.
28. Pathophysiology of the digestive system.
29. Pathophysiology of the liver.
30. Pathophysiology of the kidneys.
31. Pathophysiology of the nervous system.
32. Pathophysiology of the endocrine system.
33. Dysfunction of the thyroid, parathyroid, adrenal and gonads.
34. Pathophysiology of extreme conditions.

### **4.5 Credit structure of “Pathophysiology” discipline.**

| Table of contents section 1. General nosology                                                         |          |                                                                                                                                  |       |                                                                             |       |
|-------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------|-------|
| Lecture                                                                                               | Hours    | Practical lessons                                                                                                                | Hours | Independent work                                                            | Hours |
| Subject and tasks of Pathophysiology. The general doctrine of the disease. Etiology and pathogenesis. | 2        | Subject and tasks of pathophysiology. Methods of pathophysiological research. The main stages of development of pathophysiology. | 3     | The doctrine of disease. The general doctrine of etiology and pathogenesis. | 3     |
| -                                                                                                     | -        | The study of disease, etiology and pathogenesis.                                                                                 | 3     | -                                                                           | -     |
| -                                                                                                     | -        | Pathogenic effect of physical factors.                                                                                           | 3     | -                                                                           | -     |
| -                                                                                                     | -        | The role of heredity, constitution, and age-related changes in pathology.                                                        | 3     | The role of heredity, constitution, and age-related changes in pathology.   | 4     |
| -                                                                                                     | -        | Pathology of reactivity. Disorders of immunological reactivity.                                                                  | 3     | Pathology of reactivity. Disorders of immunological reactivity.             | 4     |
| Allergy.                                                                                              | 2        | Allergy.                                                                                                                         | 3     | Allergy.                                                                    | 4     |
|                                                                                                       |          | Final lesson on the content section "General nosology"                                                                           | 3     | -                                                                           | -     |
| Hours                                                                                                 | 4        |                                                                                                                                  | 21    |                                                                             | 15    |
| Total hours                                                                                           | 40 hours |                                                                                                                                  |       |                                                                             |       |
| Content section 2: "Typical pathological processes"                                                   |          |                                                                                                                                  |       |                                                                             |       |
| Typical disorders of peripheral circulation and microcirculation.                                     | 2        | Typical disorders of peripheral circulation and microcirculation.                                                                | 3     | Typical disorders of peripheral circulation and microcirculation.           | 4     |

|                                                  |          |                                                                                                         |    |                                       |    |
|--------------------------------------------------|----------|---------------------------------------------------------------------------------------------------------|----|---------------------------------------|----|
| Inflammation                                     | 2        | Inflammation.                                                                                           | 3  | Inflammation.                         | 4  |
| -                                                | -        | Fever.                                                                                                  | 3  | Fever.                                | 4  |
| Tumors.                                          | 2        | Tumors.                                                                                                 | 3  | Tumors.                               | 3  |
| Hypoxia.                                         | 2        | Hypoxia.                                                                                                | 3  | Hypoxia.                              | 3  |
| -                                                | -        | Hunger strike.                                                                                          | 3  | Hunger strike.                        | 3  |
| -                                                | -        | Final lesson on the section "Typical pathological processes"                                            | 3  | Tissue growth pathology.              | 3  |
| Hours                                            | 8        |                                                                                                         | 21 |                                       | 24 |
| Total hours                                      | 53 hours |                                                                                                         |    |                                       |    |
| Content section 3. "Typical metabolic disorders" |          |                                                                                                         |    |                                       |    |
| Disorders of carbohydrate metabolism.            | 2        | Disorders of carbohydrate metabolism.                                                                   | 3  | Disorders of carbohydrate metabolism. | 4  |
| -                                                | -        | -                                                                                                       | -  | Protein metabolism disorders.         | 3  |
| -                                                | -        | -                                                                                                       | -  | Disorders of fat metabolism.          | 3  |
| -                                                | -        | -                                                                                                       | -  | Disorders of energy metabolism.       | 3  |
| -                                                | -        | -                                                                                                       | -  | Vitamin metabolism disorders.         | 3  |
| -                                                | -        | Disorders of water-salt metabolism.                                                                     | 3  | Disorders of water-salt metabolism.   | 4  |
| -                                                | -        | Violation of the acid-base state.                                                                       | 3  | Violation of the acid-base state.     | 4  |
| Disorders of water-salt metabolism.              | 2        | Final lesson on the topic. Test control and practical skills on the topic "Typical metabolic disorders" | 3  | -                                     | -  |
| Violation of the acid-base state.                | 2        | Final test control                                                                                      | 3  | -                                     | -  |
| Hours                                            | 6        |                                                                                                         | 15 |                                       | 24 |
| Total hours                                      | 45 hours |                                                                                                         |    |                                       |    |
| Content section 4. "Blood pathology"             |          |                                                                                                         |    |                                       |    |

|                                                                                 |          |                                                                                               |    |                                                                                               |    |
|---------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------------------|----|
| -                                                                               | -        | Anemia caused by blood loss.                                                                  | 3  | Pathophysiology of the blood system. Qualitative and quantitative changes in red blood cells. | 3  |
| -                                                                               | -        | Hemolytic anemias and anemias with impaired erythropoiesis.                                   | 3  | Posthemorrhagic and hemolytic anemia.                                                         | 3  |
| -                                                                               | -        | Leukocytosis. Leukopenia. Leukemia. Disorders of the hemostatic system.                       | 3  | Leukemia. Quantitative changes in leukocytes in a complete blood count.                       | 3  |
| -                                                                               | -        | Final lesson of the section "Blood pathology"                                                 | 3  | Disorders of the physical and chemical properties of blood and the hemostatic system.         | 3  |
| Hours                                                                           | -        |                                                                                               | 12 |                                                                                               | 12 |
| Total hours                                                                     | 24 hours |                                                                                               |    |                                                                                               |    |
| Content section 5. "Pathophysiology of the circulatory and respiratory systems" |          |                                                                                               |    |                                                                                               |    |
| -                                                                               | -        | Pathophysiology of systemic circulation.                                                      | 3  | Circulatory failure. Heart failure.                                                           | 3  |
| -                                                                               | -        | Heart failure.                                                                                | 3  | -                                                                                             | -  |
| -                                                                               | -        | Coronary insufficiency.                                                                       | 3  | Coronary insufficiency.                                                                       | 3  |
| -                                                                               | -        | Arrhythmias of the heart.                                                                     | 3  | Arrhythmias.                                                                                  | 3  |
| -                                                                               | -        | Pathophysiology of blood vessels.                                                             | 3  | Pathophysiology of blood vessels.                                                             | 3  |
| -                                                                               | -        | Pathophysiology of external respiration.                                                      | 3  | Pathophysiology of external respiration.                                                      | 3  |
| -                                                                               | -        | Respiratory failure.                                                                          | 3  | -                                                                                             | -  |
| -                                                                               | -        | The final lesson in the section "Pathophysiology of the circulatory and respiratory systems". | 3  | -                                                                                             | -  |

|                                                                                                                  |           |                                                                                       |     |                                                                            |     |
|------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------|-----|
| Hours                                                                                                            | -         |                                                                                       | 24  |                                                                            | 15  |
| Total hours                                                                                                      | 39 hours  |                                                                                       |     |                                                                            |     |
| Chapter 6: Pathophysiology of the digestive and excretory systems                                                |           |                                                                                       |     |                                                                            |     |
| -                                                                                                                | -         | Pathophysiology of the digestive system.                                              | 3   | Pathophysiology of the digestive system.                                   | 3   |
| -                                                                                                                | -         | Pathophysiology of the liver. Liver failure.                                          | 3   | Pathophysiology of the liver.                                              | 3   |
| -                                                                                                                | -         | Pathophysiology of the kidneys. Renal failure.                                        | 3   | Pathophysiology of the kidneys.                                            | 3   |
| -                                                                                                                | -         | Final lesson in the section "Pathophysiology of the digestive and excretory systems". | 3   | -                                                                          | -   |
| Hours                                                                                                            | -         |                                                                                       | 12  |                                                                            | 9   |
| Total hours                                                                                                      | 23 hours  |                                                                                       |     |                                                                            |     |
| Content section 7. "Pathophysiology of the nervous and endocrine systems. Pathophysiology of extreme conditions" |           |                                                                                       |     |                                                                            |     |
| -                                                                                                                | -         | Pathophysiology of the nervous system.                                                | 2   | Pathophysiology of the nervous system.                                     | 3   |
| -                                                                                                                | -         | Pathophysiology of the endocrine system.                                              | 2   | Pathophysiology of the endocrine system.                                   | 3   |
| -                                                                                                                | -         | -                                                                                     | -   | Impaired function of the thyroid, parathyroid, adrenal and gonadal glands. | 3   |
| -                                                                                                                | -         | Pathophysiology of extreme conditions.                                                | 2   | Pathophysiology of extreme conditions.                                     | 3   |
| Hours                                                                                                            | -         |                                                                                       | 6   |                                                                            | 12  |
| Total hours                                                                                                      | 22 hours  |                                                                                       |     |                                                                            |     |
| Всього за дисципліну                                                                                             | 18        |                                                                                       | 111 |                                                                            | 111 |
|                                                                                                                  | 240 hours |                                                                                       |     |                                                                            |     |

**Topics of the lecture course:** reveal problematic issues in the relevant sections “Pathophysiology”.

**Practical classes** provide theoretical justification of the main issues of the topic and acquiring **the following practical skills:**

**List of practical skills:**

1. Conduct pathophysiological analysis of clinical, laboratory, experimental and other data and formulate on their basis a conclusion about the possible causes and mechanisms of development of pathological processes (diseases).
2. To plan and conduct (in compliance with the relevant rules) experiments on animals, to process and analyze the results of experiments, to correctly understand the significance of the experiment for the study of clinical forms of pathology (model of inflammation in the maxillofacial area, hypoxia, fever, etc.)
3. Using Starr's formula, calculate the stroke and minute volumes of the heart by the value of blood pressure (SBP, DBP, DBP) and heart rate. Assess the state of myocardial contractility by the value of these two indicators.
4. According to the finished electrocardiogram to be able to:
  - determine the type of cardiac arrhythmia: a) arrhythmias due to impaired automaticity (sinus tachycardia, sinus bradycardia); b) arrhythmias due to impaired excitability (extrasystole, paroxysmal tachycardia, ventricular fibrillation); c) arrhythmias due to conduction disorders (complete and incomplete atrioventricular heart block);
  - what changes in the ECG indicate these types of cardiac arrhythmias;
  - name possible mechanisms of these types of cardiac arrhythmias.
5. To know:
  - the method of determining the number of red blood cells per unit volume of blood;
  - method of determining hemoglobin in a unit volume of blood;
  - methods for determining the total number of leukocytes per unit volume of blood.
6. Based on the finished hemogram, make:
  - a) make a conclusion about the presence of anemia:
    - be able to calculate and then assess anemia by the value of the color index;
    - assess anemia by the type of hematopoiesis;
    - assess anemia by bone marrow function;
  - b) conclusion on the presence of leukocytosis, leukopenia:

- assess the leukocyte formula by the percentage of certain types of leukocytes;
- evaluate the leukocyte formula for the presence or absence of a "nuclear" shift of neutrophils, its nature (taking into account the total number of leukocytes);
- name two or three diseases in dental practice that may have a similar blood test;

c) a conclusion about the presence of leukemia:

- its type by morphological characteristics;
- its type by clinical course;
- its type by the number of leukocytes per unit volume of blood.

7. According to the biochemical analysis of blood, urine and feces, be able to distinguish the main types of jaundice (mechanical, hemolytic, parenchymal).

8. According to ready-made urine and blood tests and some functional parameters of body systems, determine the presence of typical renal dysfunction (nephritic, nephrotic syndromes), glomerular filtration and tubular reabsorption disorders.

9. Based on the prepared temperature curves, be able to:

- determine the type of temperature curve (indicate the Russian and Latin names);
- characterize daily temperature fluctuations;
- name the diseases in which this type of temperature curve occurs.

10. To be able to determine the type of hypoxia by the indicators of oxygen transport function of blood.

11. Be able to determine the type of periodic respiration shown on the spirogram. Explain the causes and mechanism of development.

12. To be able to determine the typical disorders of gastric secretory function according to the analysis of gastric juice:

- hypersecretion with hyperchlorhydria;
- hyposecretion with hypochlorhydria;
- hyposecretion with achlorhydria.

13. Name the basic principles of therapy of acute inflammatory process in the maxillofacial region.

**Independent work of a student** provides for preparation for practical classes and final control, studying topics for independent out-of-class work, preparing abstract reports, presentations, tables. Control of learning results of topics of independent out-of-class work is carried out during the class and during final control in the discipline.

**Individual work** includes the study of scientific literature, preparation of reviews on the submitted topics for presentation, implementation of scientific and practical research, participation in specialized competitions, scientific and practical conferences, competitions of student scientific papers.

*Calendar plans of practical classes, thematic plan of independent extracurricular work, scope and directions of individual work are published on the website of the Department.*

**Route for receiving materials:** Website of EMU/Student/ Department of Fundamental Disciplines with the course of traditional and alternative medicine/ Educational and methodological support of the Department/ Pediatrics / or follow the link Department of Fundamental Disciplines with a course in traditional and alternative medicine discipline "Pathophysiology". Materials are accessed from the student's Office 365-based corporate account.

## 5. Forms and methods of monitoring learning success

|                                                                                             |                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current control in practical classes                                                        | Methods: individual oral survey, structured written works, test tasks with the choice of correct answers.                                                                    |
| Control of mastering the thematic section of the discipline in intermediate control classes | Methods: oral or written survey, electronic testing, <i>methods of self-control and self-assessment</i> .                                                                    |
| Final semester control                                                                      | According to the regulation on control measures in EMU (regulation of EMU)                                                                                                   |
| Final control of the discipline - <i>exam</i>                                               | Methods: by exam cards in the form of an oral exam, monitoring of acquiring of practical skills (According to the Regulation on control measures in EMU (Regulation of EMU). |
| Tools for diagnosing learning success                                                       | Theoretical questions, tests, clinically oriented situational tasks, practical tasks, demonstration of practical skills.                                                     |

## 6. Evaluation criteria

Knowledge assessment is carried out according to regulation on control measures in EMU (regulation of EMU).

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current control                  | According to the four-point system of traditional grades: 5 "Excellent", 4 "Good", 3 "Satisfactory", 2 "Unsatisfactory"                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Control of practical skills      | According to the four-point system of traditional grades                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Exam                             | Based on a 200-point scale (the sum of points for the current academic activity of the student, the result of passing the exam and for successful completion of an individual task, if any)<br>Credited: 120 to 200 points<br>Not credited: less than 120 points (see Rating scale)                                                                                                                                                                                                                                                                                                                 |
| Final control for the discipline | The final control of students' academic performance is carried out after completing the study of the discipline and is implemented in the form of an exam.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Discipline assessment:           | The score on the discipline is determined based on the results of assessment of current activities and is expressed using a <b>fourpoint scale:</b> ("Excellent", "Good", "Satisfactory", "Unsatisfactory"), multi-point scale and ECTS. The assessment in the discipline consists of an assessment of the current academic performance and the result of passing the exam (in points), which is set when evaluating theoretical knowledge and practical skills in accordance with the list defined by the discipline program. The number of points that the applicant scored for current academic. |
|                                  | performance in the discipline is defined as the arithmetic mean of the number of points that the applicant received during the study of the discipline (practical, seminar, laboratory classes, etc.). The resulting value of the average traditional rating is converted to points according to the scale of conversion of traditional ratings to rating points. The maximum number of points is 200.                                                                                                                                                                                              |

Matching grades on a 200-point scale, a 4-point (traditional) scale, and ECTS scale

| On a 200-point scale | Rating on a 4-point scale |
|----------------------|---------------------------|
| 180–200              | Excellent                 |
| 140–179              | Good                      |
| 120–139              | Satisfactory              |
| 0–119                | Unsatisfactory            |

| On a 200-point scale | ECTS evaluation |
|----------------------|-----------------|
| 192–200              | A               |
| 172–191              | B               |
| 148–171              | C               |

|         |   |
|---------|---|
| 128–147 | D |
| 120–127 | E |
| 0–119   | F |

### **Discipline/course policy**

The student has the right to receive high-quality educational services, access to up-to-date scientific and educational information, qualified advice during the study of the discipline and mastering practical skills. The policy of the department in the provision of Educational Services is student-centered, based on the regulatory documents of the Ministry of Education and the Ministry of Health of Ukraine, the Charter of the EMU and the procedure for providing educational services regulated by the regulation on the organization of the educational process in the EMU and the principles of academic integrity.

### **Compliance with the EMU schedule, safety precautions in the classroom.**

#### **Requirements for preparing for practical classes.**

Students should arrive at classes on time, without being late. A student who is more than 10 minutes late for classes is not allowed in and must work it out in accordance with the established procedure. During practical classes, the student must wear a work uniform (medical gown, cap). Students who do not have a work uniform are not allowed to attend classes. The student must follow the safety rules during practical classes and while staying in the Department's premises. When discussing theoretical issues, students should demonstrate tolerance, politeness and respect for their colleagues and the teacher; when performing practical tasks, the workplace should be kept in order and cleaned after completing practical work.

**Use of mobile phones and other electronic devices.** The use of mobile phones and other electronic devices in the classroom is not allowed, only during Distance Learning, provided that it is technically necessary.

**Academic integrity.** When studying the discipline, the student should be guided by the following regulations: on academic integrity of EMU (regulation of EMU). In

case of violation of the regulations of academic integrity during the current and final controls, the student receives a grade of "2" and must work it out to the teacher in accordance with the established procedure.

Regulation on control measures in EMU (Regulation of EMU).

**Skipping classes.** Missed classes should be worked out in accordance with the procedure established in the regulations on control measures in the EMU (regulation of EMU) during the time determined by the work schedule (Department of Fundamental Disciplines with a course in traditional and alternative medicine) to the teacher on duty. To work out a missed lesson the student must pass a test and answer in writing or verbally the question on the topic of the lesson.

**Procedure for admission to the final control** in the discipline is given in the regulations on control measures and regulations on the organization of the educational process in the EMU (regulation of EMU) and regulations on control measures in the TNM DMI (regulation of EMU). Students who do not have missed not worked out practical classes and lectures and have received an average traditional grade of at least "3" are allowed to participate in the final control.

**Additional individual points.** Points are awarded subject to the mandatory participation of the head, head teacher and teacher. These points are encouraging and are added once to the total score of the current academic performance and the result of passing the comprehensive exam. Their total number for one student should not exceed 10, and the final amount of points for an academic discipline should not exceed 200 points.

**Individual tasks include:**

- 1) writing essays and creating multimedia presentations with reports at meetings of the student scientific group of the department – 3 points;

- 2) participation in the creation of tables, graphological structure, posters on the topics of practical classes – 2 points;
- 3) participation in the student competition in the discipline at the First Stage – 1 point;
- 4) participation/prize-winner of the All-Ukrainian student competition in the discipline - 7/10 points;
- 5) author or co-author of abstracts/article – 2/5 points;
- 6) author or co-author of an oral/information stand report at a scientific conference – 6/3 points;
- 7) author of a student scientific paper accepted for participation or awarded by a diploma of I-III degree in the All – Ukrainian competition of student scientific papers at Stage II - 8 (participation) or 10 (diploma) points.

**Resolving conflict issues.** If there are misunderstandings and complaints against the teacher due to quality of educational services provided, knowledge assessment, and other conflict situations, the student must first report his/her claims to the teacher. If the conflict issue is not resolved, the student has the right to submit an appeal to the head of the department in accordance with the regulations on consideration of applications from applicants for higher education in EMU (regulation of EMU), Regulations on consideration of applications, complaints, and proposals of students in EMU (regulation of EMU), Regulations on meeting the requirements of the organization of the educational process (regulation of EMU), Regulation on the appeal of the results of the final control of knowledge of applicants for higher education in EMU (regulation of EMU), Regulations on safe educational environment in EMU (regulation of EMU).

**Policy in the context of distance learning.** The procedure for distance learning is regulated by regulation of EMU. The main training platforms for conducting training sessions are Microsoft Teams, Zoom. The procedure for conducting practical classes and lectures, working out and consultations during Distance Learning is published on the Department's Web page Department of Fundamental Disciplines with a

course in traditional and alternative medicine. Feedback from the teacher is provided directly during the lesson and/or consultation, and is also possible via email (in case of force majeure) during working hours.

### **1. Training resources**

Educational and methodological support of the discipline is published on the website of the Department (Department of Fundamental Disciplines). Consultations are held according to the consultation schedule.

**2. Schedule and distribution of groups by teacher** are published on the Department's Web page (Department of Fundamental Disciplines).

**3. Questions for intermediate and final control of the discipline** are published on the Department's Web page (Department of Fundamental Disciplines).

### **Exam questions:**

1. Pathophysiology as a science: definition, tasks, object and methods of research.
2. Etiology as a science: definition, types of causes and conditions.
3. Pathogenesis. The main provisions of pathogenesis.
4. Health, disease. Periods of disease development.
5. Terminal state, periods of development, their characteristics.
6. Principles of disease classification. Pathological process, pathological condition, pathological reaction.
7. Experiment, its types, examples. Stages of modeling the experiment.
8. Mutations and mutagens, definition, types. Types of inheritance of pathological traits, their characteristics and examples.
9. Monogenic and polygenic hereditary diseases. Chromosomal diseases.
10. Reactivity and resistance: definition, types, examples.
11. Biological barriers: external, internal, their characteristics and role in providing protective and adaptive reactions.
12. Tumors, causes of occurrence. Differential diagnosis of benign and malignant tumors.
13. Stages of tumor growth, their characteristics.
14. Arterial hyperemia: causes, types, mechanism of development, consequences.
15. Venous hyperemia: causes, mechanism of development, consequences.
16. Ischemia: causes, types, mechanism of development, consequences.
17. Thrombosis, causes and mechanism of occurrence. Virchow's triad.
18. Embolism. Classification of emboli. Mechanism of development and consequences of embolism.

19. Inflammation, causes of occurrence. Local and general signs of inflammation.
20. Alternation in inflammation: primary, secondary. Inflammatory mediators, classification, mechanism of action.
21. Vascular reactions in inflammation: sequence and mechanism of occurrence.
22. Leukocyte emigration: sequence, mechanisms.
23. Types of exudates. The difference between exudate and transudate.
24. Mechanism of proliferation in inflammation. Types of inflammation.
25. Allergy, causes of occurrence. Classification of allergens.
26. Classification of allergic reactions.
27. Stages of allergic reactions, their characteristics. Allergy mediators, their types and mechanism of action.
28. Anaphylactic type of allergic reactions: causes and mechanism of development. The concept of anaphylactic shock, urticaria, atopic bronchial asthma, pollenosis.
29. Allergic reactions of cytotoxic type, causes and mechanism of development, nosological units.
30. Allergic reactions of immunocomplex type, causes and mechanism of development, nosological units.
31. Allergic reactions of delayed type, causes and mechanism of development, nosological units.
32. Specific and nonspecific hyposensitization. Diagnosis of allergies.
33. Fever: causes and mechanism of development.
34. Stages of fever, their characteristics. Hypoxia. Types of hypoxia. Mechanisms of compensation.
35. Quantitative and qualitative changes in red blood cells. Erythrocytosis.
36. Anemia. Classification of anemia. General manifestations.
37. Blood loss: types, causes, stages of compensation for acute blood loss.
38. Acute posthemorrhagic anemia: mechanisms of development. Blood picture.
39. Hereditary hemolytic anemias: causes, mechanisms of development, blood picture.
40. Acquired hemolytic anemias: causes and mechanisms of development.
41. Iron deficiency anemia: causes, mechanisms of development, blood picture.
42. Megaloblastic anemia: causes, mechanisms of development, blood picture. Addison-Birmer anemia.
43. Leukocytosis, types and mechanisms of development.
44. Leukopenia, types and mechanisms of development.
45. Leukemia: its types, causes and mechanism of development.
46. Leukemic failure, its diagnostic value. Leukemoid reactions.
47. Changes in platelet count: thrombocytosis, thrombocytopenia, causes, mechanism of development, consequences. Thrombocytopathy.
48. ICE syndrome: etiology, stages of development.
49. Disorders of vascular and coagulation hemostasis: etiology, pathogenesis.
50. Circulatory failure. Heart failure from overload, compensation mechanisms.

51. Heart failure from myocardial damage. Ischemic heart disease: acute (myocardial infarction) and chronic (angina pectoris, cardiosclerosis) forms, causes, conditions and mechanisms of occurrence.
52. Hypertension: types, pathogenetic variants, causes and mechanisms of development, consequences.
53. Atherosclerosis: definition of the concept, causes and conditions of occurrence, mechanisms of development and consequences.
54. Disorders of external respiration, types, causes and mechanism of development of ventilation disorders.
55. Diffusion and perfusion disorders, causes and mechanisms of their development.
56. Disorders of digestion in the oral cavity. Hypersalivation and hyposalivation.
57. Disorders of digestion in the stomach in hyper- and hypoacidic states.
58. Peptic ulcer of the stomach and duodenum: causes, types, mechanisms of development, consequences.
59. Liver failure: types, causes.
60. Jaundice: types, causes, diagnostic criteria.
61. Subhepatic jaundice: mechanisms of development, consequences.
62. Digestive disorders in the intestines. Maldigestion syndrome.
63. Intestinal obstruction: types, causes, mechanism of development, consequences. Intestinal autoinflammation.
64. Quantitative and qualitative changes in urine composition. The main forms of diuresis disorders.
65. Glomerulonephritis: types, causes, mechanism of development.
66. Acute and chronic renal failure: causes, stages, mechanisms of development. Uremia.
67. Pyelonephritis: definition, causes, mechanism of development, consequences.
68. Urolithiasis: definition, causes, mechanism of development, clinical symptoms, consequences.
69. Stress as an adaptation syndrome, types of stressors, stages of development, their characteristics.
70. Hyperfunction of the thyroid gland. Causes and mechanism of development of toxic goiter.
71. Hypofunction of the thyroid gland. Etiology and pathogenesis of cretinism, myxedema, endemic goiter.
72. Pathology of the pituitary gland: hyper- and hypofunction of tropic hormones.

### **List of practical tasks and papers for the exam:**

1. Study the pathological and compensatory reactions of the body during overheating.
2. Study the blood picture in an experimental animal (rabbit) in case of radiation sickness.
3. To study apoptosis caused by the effect of an antitumor agent (etoposide) on prostate cancer cells from the DU145 cell line.

4. Study of phagocytosis in peritoneal exudate smears.
5. Investigation of anaphylactic reaction of basophilic granulocytes of sensitized rat.
6. Analysis of blood gas composition and determination of the type of hypoxia.
7. Analysis of the capillarogram.
8. Analysis of angiogram.
9. Analysis of hemogram in acute inflammation.
10. Analysis of the temperature curve.
11. Acquaintance with the method of tumor lysis with cell suspension.
12. Together with the teacher, analysis of the pathogenesis of chronic myeloid leukemia.
13. Assessment of the glycemic profile.
14. Analysis of the acid-base state of the blood.
15. The role of lowering oncotic blood pressure in the development of edema (Starling's experiment)
16. The role of acidity of the environment in the development of edema (Fisher's experiment)
17. The role of the pituitary gland in the body's ability to tolerate water load.
18. Analysis of proteinogram
19. Characteristics of the blood picture in acute posthemorrhagic anemia.
20. Characterization of the blood picture in chronic posthemorrhagic anemia.
21. Study of blood composition features in different types of anemia.
22. Study of blood smears of patients with various types of leukocytosis and leukopenia.
23. Examination of bone marrow smears of patients with various types of leukemia.
24. Analysis of the rabbit thromboelastogram.
25. Analysis of the results of modeling acute heart failure from overload.
26. Analysis of electrocardiogram
27. Examination of micro preparations of vessels affected by arteriosclerosis.
28. Study of spirogram indicators.
29. Analysis of gastric secretion.
30. Determination of the types of parenchymal jaundice.
31. Determination of glomerular filtration rate and relative tubular reabsorption.
32. Study of the basic metabolism in the experiment.
33. Study of symptoms of postural reflex disorders.
34. Study of the Romberg test.
35. Analysis of EEG changes during an epileptic seizure.
36. Calculation of the Algover index.

## **7. Recommended literature**

1. Basic and Pathophysiology: textbook. for students. higher honey. textbook lock / Yu. V. Byts, GM Butenko [etc.]; edited by: MN Zaika, Yu. V. Bytsya, MV Kryshnal. - 6th ed., Reworked. and add. - Kyiv: Medicine, 2017. - 737 p.

2. Essentials of Pathophysiology: Concepts of Altered Health States. - [4th ed.] Porth, K.J. Gaspard. - Philadelphia: Wolters Kluwer, 2015. - 1222 p.
3. Kubyshkin A.V. / General and Clinical Pathophysiology. - 4th ed. Textbook. - 2020. - 696 p.
4. Molecular biology of the cell / Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, Peter Walter - Sixth edition, 2015.
5. Oral Pathology: Clinical Pathologic Correlations / J.A. Regezi, J.J. Sciubba, R.C.K. Jordan -Elsevier Health Sciences, 2016. - 496 p.
6. Robbins and Cotran Pathologic Basis of Disease [9th ed.] V. Kumar, A.K. Abbas, J.C.Aster. - Philadelphia: Elsevier/Saunders, 2015. - 1408 p.
7. Rogers L. Julia Pathophysiology. Elsevier. 2023.

## **8. Information resources:**

### **Basic:**

[www.ExamConsult.co.uk](http://www.ExamConsult.co.uk)  
[www.medicalstudent.com](http://www.medicalstudent.com)  
[www.puthguy.com](http://www.puthguy.com)  
[www.bloodline.net](http://www.bloodline.net).  
[www.tdmu.edu.ua](http://www.tdmu.edu.ua)  
<http://www.librare.gov.ua>  
<http://nbuv.gov.ua>

### **Auxiliary:**

<https://nmapo.edu.ua>  
<http://www.medbioworld.com>  
<http://roar.eprints.org/>  
<http://www.sciencekomm.at/>  
<http://testcentr.org.ua/>