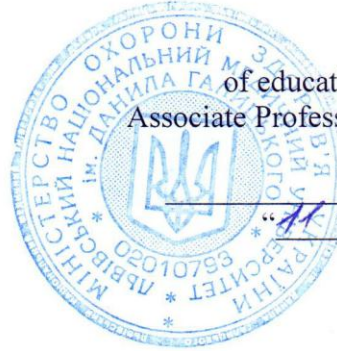


MINISTRY OF HEALTH OF UKRAINE  
DANYLO HALYTSKYI LVIV NATIONAL MEDICAL UNIVERSITY  
Department of Pathological Anatomy and Forensic Medicine



CONFIRM  
First Vice-Rector  
of educational and scientific work  
Associate Professor Iryna SOLONYNKO

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2023

EDUCATIONAL PROGRAM  
in  
«**PATHOMORPHOLOGY**»  
for 3<sup>rd</sup> year students of General Medicine Faculty  
for preparation of specialists of the second (master's degree) level of higher education  
OK16  
area of knowledge 22 «Public Health»  
specialty 222 «Medicine»

**Discussed and approved** at the  
Methodological meeting of the  
Department of Pathological Anatomy  
and Forensic Medicine,  
protocol № 9 from 14.03.2023

Chief of the Department  
Prof. Yurii POSPISHIL



**Confirmed**  
by profile Methodological Committee  
in medical and biological subjects  
protocol № 2 from 23.03.2023

Chief of the profile Methodological Committee  
Prof. Alexander LUTZYK

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Lviv-2023

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## INTRODUCTION

### ***Educational program in “Pathomorphology”***

was created according to the academic standards of the *second (master’s) level*

area of knowledge 22 ***“Public Health”***

specialty 222 ***“Medicine”***

educational qualification ***“Master of Medicine”***

professional qualification ***“Physician”***

### **The Description of Subject (Summary)**

The working education program of “Pathomorphology” for third-year students of Medical Faculty, specialty 222 “Medicine”, has been set up based on Regulations on the organization of the educational process in Danylo Halytsky Lviv National Medical University established by the University’s Academic Council dated February 18, 2015, record №1 – BP, as well as by orders of the Rector concerning the optimization of the educational process. The Regulations are aimed at standardizing the content, sequence and organizational forms and methods of continuous and the assessment of their knowledge.

A working education program of a subject is a statutory document of the University, which is developed by the teaching staff of the department for each subject on the basis of higher education standards according to the curriculum.

The working education program should provide: conformity to branch academic standards through direct links of a subject content with the goals of higher education (skills and abilities of a specialist defined in Educational Qualifying Descriptions (EQD)); conformity to licensing and accrediting conditions and requirements; conformity to “Standards and recommendations on how to maintain quality in the area of European Education”; the ability to use disciplinary competency as the information basis for diagnostic means; stringent criteria for the assessment of educational process.

The working education program is a document covering: the amount of factual knowledge that students should acquire according to the requirements of an educational qualifying description of a future specialist; the algorithm of a subject study, taking into consideration interdisciplinary links and excluding the duplication of teaching material while considering the same issues in different years of study; the adoption of appropriate teaching methods, constituents and techniques for the assessment of students progress.

The working education program of a subject is statutory document of the University which forms the base of ideology and educational content and organization of educational process, defines teaching-methodical principles of the department; it is based on the developed teaching materials for educational process including student’s self-reliant work.

Pathomorphology as an educational discipline:

a) bases on the study of medical biology, medical and biological physics, medical chemistry, biological and bioorganic chemistry, normal anatomy, histology, cytology and embryology, genetics, immunology, and is integrated with these disciplines; the study of discipline is based also on modern information of morphological research (electronic microscopy, immunohistochemistry, autoradiography, histochemistry and cytochemistry);

b) makes the basis of the foundation of cellular pathology and general pathological processes, which determine of the morphological manifestations of different diseases in the aggregate;

c) makes the basis of the foundation of knowledge of morphology of diseases on the different stages of their development (morphogenesis), structural bases of convalescence, complications and consequences;

d) studies the variants of pathomorphosis of diseases, resulting in connection with changes of life’s conditions and as a consequence of the varied medical measures (pathology of therapy);

e) makes the basis of the foundation for knowledge about organization of pathomorphological service and realization of its function.

Comparison of morphological and clinical manifestations of disease on all stages of their development allows to the students to get skills of clinical-anatomical analysis, synthetic generalization of diagnostic signs of diseases and their faithful interpretation in causal-sequent relationships.

## Description of the curriculum of discipline “Pathomorphology”

Structure of educational discipline	Amount of hours, including				Academic semester	Type of control
	Total	Auditorial		SRW		
		Lectures	Practical classes			
<b>Pathomorphology In 2 Parts</b>	<b>7,0 credits / 210 hours</b>	<b>34</b>	<b>70</b>	<b>106</b>	<b>3 year (V,VI semester)</b>	<b>Credit, exam</b>
<b>Part 1 General Pathomorphology</b>	<b>3,2 credits /96 hours</b>	<b>16</b>	<b>30</b>	<b>50</b>	<b>V</b>	<b>-</b>
<b>Part 2 Systemic Pathomorphology</b>	<b>3,8 credits /114 hours</b>	<b>18</b>	<b>40</b>	<b>56</b>	<b>VI</b>	<b>Credit, Exam</b>

**1. THE AIM AND OBJECTIVES OF THE EDUCATIONAL DISCIPLINE**

**1.1** The overall aim of the teaching process of Pathomorphology is determined by the goals of the program outlining educational-professional training of higher medical institutions, as well as by the content of systemic competence and practical skills required for the doctor. The knowledge received during the study of Pathomorphology is basic for a range of subjects providing both natural-science (NS unit) and professional-practical (PP unit) preparation.

**1.2. The ultimate goals of discipline:**

To analyze structurally-functional intercommunications and sequence of stages of general pathological processes.

To interpret pathology of cells and to ground clinical-morphological characteristics of general pathological processes which stipulate the disease’s manifestations.

To interpret etiology, pathogenesis and morphological changes on the different stages of development diseases, structural base of convalescence, complications and consequences of diseases.

**1.3.** Competency and training results developed by the subject (the correlation with the normative content of training acquired by those who are obtaining higher education formulated in the terms of study results of Higher Educational Standards).

According to the requirements of Higher Education Standards, the subject provides the development of the following competence

➤ **integral**: the ability to solve complex problems, including those of a research and innovation nature in the field of medicine; the ability to continue learning with a high degree of autonomy.

➤ **general**:

- ability to abstract thinking, analysis and synthesis;
- ability to learn and master modern knowledge;
- ability to apply knowledge in practical situations;
- knowledge and understanding of the subject field and understanding of professional activity;
- ability to adapt and act in a new situation;
- ability to make informed decisions;
- ability to work in a team;
- ability for interpersonal interaction;
- ability to communicate in a foreign language;
- ability to use information and communication technologies;

- ability to search, process and analyze information from various sources;
- determination and perseverance regarding the assigned tasks and assumed duties;
- awareness of equal opportunities and gender issues;
- the ability to preserve and multiply the moral, cultural, scientific values and achievements of society based on an understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technologies, to use different types and forms of motor activity for active recreation and leading a healthy lifestyle.

➤ **special (professional, subject):**

- ability to collect medical information about the patient and analyze clinical data;
- ability to determine the necessary list of laboratory and instrumental studies and evaluate their results;
- ability to establish a preliminary and clinical diagnosis of the disease;
- ability to develop and implement scientific and applied projects in the field of health care;
- compliance with ethical principles when working with patients and laboratory animals;
- observe professional and academic integrity, bear responsibility for the reliability of the obtained scientific results.

Details of the competences are set out below in the matrix table of competences according to HPK descriptions.

### The Matrix of Competences

№	Competence	Knowledge	Skills	Communication	Autonomy and responsibility
<b>Integral competence</b>					
The ability to solve complex problems, including those of a research and innovation nature in the field of medicine; the ability to continue learning with a high degree of autonomy.					
<b>General competences</b>					
1.	<b>Ability to abstract thinking, analysis and synthesis (GC1)</b>	To know the methods of analysis, synthesis and further modern education	Be able to analyze information, make informed decisions, be able to acquire modern knowledge	Ability to effective communication in the course of analytical-synthetic activity	To be responsible for the analysis of acquired modern knowledge and their synthesis
2.	<b>The ability to learn and master modern knowledge (GC2)</b>	To know ways of further education in order to obtain modern knowledge	Be able to analyze the received information, make informed decisions, be able to acquire modern knowledge	Establish relevant connections to achieve goals	To be responsible for the timely acquisition of modern knowledge
3.	<b>Ability to apply knowledge in practical situations (GC3)</b>	Have knowledge of the appropriate level in theoretical and clinical disciplines	To be able to apply knowledge of medical disciplines in practical situations	The ability to effectively form a communication strategy in professional activity; ability to share professional knowledge	To be responsible for the correct application of relevant knowledge in practical situations
4.	<b>Knowledge and understanding of the subject field and understanding of professional activity (GC4)</b>	Know and understand the subject field, understand the basic principles of professional activity	To be able to use the acquired knowledge in the subject area and their understanding in professional activities	The ability to effectively form a communication strategy in professional activity	To be responsible for knowledge and understanding subject area and understanding of the principles of

					professional activity
5.	<b>Ability to adapt and act in a new situation (GC5)</b>	Know ways to adapt and act in new situations	To be able to choose methods of adaptation and actions in new situations	To use the possibilities of communication in order to adapt and act in new conditions	To be responsible for timely adaptation and actions in new situations
6.	<b>The ability to make informed decisions (GC6)</b>	Possess knowledge of the appropriate level for making informed decisions	Be able to justify the decisions made	Ability to communicate effectively within a professional team in order to make informed decisions	Be responsible for the decisions made
7.	<b>Ability to work in a team (GC7)</b>	Know tactics and strategies of communication, laws and methods of communicative behavior	Be able to choose communication methods and strategies to ensure effective teamwork	Use communication strategies and interpersonal skills	To be responsible for the choice and tactics of the method of communication
8.	<b>The ability for interpersonal interaction (GC8)</b>	Know tactics and strategies of communication, laws and methods of communicative behavior	Be able to choose communication methods and strategies to ensure effective teamwork	Use communication strategies and interpersonal skills	To be responsible for the results interpersonal interaction
9.	<b>The ability to communicate in a foreign language (GC9)</b>	Have basic knowledge of a foreign language	Be able to apply knowledge of a foreign language both orally and in writing	Use a foreign language in professional activities	To be responsible for the level of foreign language proficiency, for the constant development of professional knowledge
10	<b>The ability to use information and communication technologies (GC10)</b>	Have deep knowledge in the field of information and communication technologies, which are used in professional activities	Be able to use information and communication technologies in a professional field that requires updating and integration of knowledge	Use information and communication technologies in professional activities	To be responsible for the development of professional knowledge and skills in the field of information and communication technologies
11	<b>The ability to search, process and analyze information from various sources (GC11)</b>	Know search platforms for obtaining relevant professional information	To be able to provide a quality search for information sources, process and analyze the received data	To establish contacts to ensure high-quality execution of the search for the necessary information, its processing and analysis	To be responsible for the results of the search, processing and analysis of professional information
12	<b>Determination and perseverance regarding the assigned tasks and assumed duties (GC12)</b>	Know the responsibilities and ways of performing assigned tasks	To be able to determine the goal and task, to be reliable and conscientious in the performance of duties	Establish interpersonal relationships for effective performance of tasks and duties	To be responsible for the high-quality performance of assigned tasks; to be responsible for the fulfillment of obligations

13	<b>Awareness of equal opportunities and gender issues (GC13)</b>	Know about equal opportunities and be aware of gender issues	Adhere to equal opportunities and be able to avoid gender issues	Establish equal opportunities and understand potential gender issues during assignments	Be responsible for ensuring equal opportunities and avoiding potential gender issues
15	<b>Ability to preserve and multiply the moral, cultural, scientific values and achievements of society based on an understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technologies, to use different types and forms of motor activity for active recreation and leading a healthy lifestyle (GC15)</b>	To know about the necessity to preserve and multiply moral, cultural and scientific values, based on an understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society, the development of society, technology and technologies	Preserve and multiply moral, cultural and scientific values, based on an understanding of the history and patterns of development of the subject field and its place in the general system of knowledge about nature	Use all opportunities to preserve and increase moral, cultural and scientific heritage	To be responsible for the preservation and multiplication of moral, cultural and scientific values, based on the understanding of the importance of the subject field as a science and its place in the general system of natural knowledge
<b>Special (professional) competences</b>					
	<b>Ability to collect medical information about the patient and analyze clinical data (PC1)</b>	To know the methods of obtaining medical information about the patient, to have knowledge about the analysis of clinical data	Be able to collect relevant medical information about a patient and analyze clinical data	To be able to establish communication links with the patient in order to obtain the necessary medical information about him	Be responsible for the received medical information in each specific case; be responsible for the correctness of clinical data analysis
	<b>The ability to determine the necessary list of laboratory and instrumental studies and their evaluation results (PC2)</b>	Know about the necessary laboratory and instrumental research methods	Be able to determine the necessary list of laboratory and instrumental research methods; to be able to evaluate their results	Use communication methods in the process of determining the necessary list of laboratory and instrumental research methods, as well as in the process of evaluating their results	Be responsible for the selected list of necessary laboratory and instrumental research methods, as well as for evaluating their results
	<b>Ability to establish a preliminary and clinical diagnosis of the disease (PC3)</b>	To have specialized (professional) knowledge necessary for establishing preliminary and clinical diagnoses of the disease	Be able to formulate preliminary and clinical diagnoses of the disease	To be able to communicate effectively with other members of the professional team in order to establish the correct preliminary and clinical diagnoses of the disease	To be responsible for the established preliminary and clinical diagnosis of the disease
	<b>The ability to develop and</b>	Know the main stages of	Be able to apply specialized knowledge	To be able to communicate	To be responsible for development

<b>implement scientific and applied projects in the field of health care (PC23)</b>	implementation of scientific and applied projects in the field of health care	at various stages of development and implementation of scientific and applied projects in the field of health care	effectively at various stages of the development and implementation of scientific and applied projects in the field of health care	and the realization of scientific and practical ones of projects in the field of health care
<b>Compliance with ethical principles when working with patients and laboratory animals (PC24)</b>	Know about ethical principles when working with patients and laboratory animals	Be able to apply the principles of ethics when working with patients and laboratory animals	Justified use principles of ethics when working with patients and laboratory animals	Be responsible for observing ethical principles when working with patients and laboratory animals
<b>Observe professional and academic integrity, bear responsibility for the reliability of the obtained scientific results (PC25)</b>	Know about the necessity to follow the principles of professional and academic integrity, responsibility for the reliability of the obtained scientific results	Be able to apply principles of professional and academic integrity, responsibility for the reliability of the obtained scientific results	Justified use of the principles of professional and academic integrity, responsibility for the reliability of the obtained scientific results	Carry out responsibility for adherence to the principles of professional and academic integrity, reliability of received scientific results

**Program learning outcomes determined by the standard of higher education of the specialty**

<b>№</b>	<b>Program learning outcomes (PLO) – (ИПН)</b>
<b>PLO1 (ИПН1)</b>	To have thorough knowledge of the structure of professional activity. To be able to carry out professional activities that require updating and integration of knowledge. To be responsible for professional development, the ability for further professional training with a high level of autonomy
<b>PLO2 (ИПН2)</b>	Understanding and knowledge of fundamental and clinical biomedical sciences at a level sufficient for solving professional tasks in the field of health care
<b>PLO3 (ИПН3)</b>	Specialized conceptual knowledge, which includes scientific achievements in the field of health care and is the basis for conducting research, critical understanding of problems in the field of medicine and related interdisciplinary problems
<b>PLO7 (ИПН7)</b>	To prescribe and to analyze additional (mandatory and additional) examination methods (laboratory, functional and/or instrumental) for patients with diseases of organs and body systems for differential diagnosis
<b>PLO21 (ИПН21)</b>	To find the necessary information in the professional literature and databases of other sources, analyze, evaluate and adequately apply this information
<b>PLO23 (ИПН23)</b>	To assess the impact of the environment on human health to assess population morbidity
<b>PLO27 (ИПН27)</b>	To communicate freely in the national and English languages both orally and in writing to discuss professional activities, research and projects
<b>PLO28</b>	To make effective decisions about health care problems, evaluate the necessary resources, take into



(IPPH28)	account social, economic and ethical consequences
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## 2. Informational content of the educational discipline “Pathomorphology”

There are 210 hours – 7,0 credits ECTS for learning Pathomorphology course.

Program is structured in two semesters:

**V semester** – Part 1 “General Pathomorphology”

**VI semester** – Part 2 “Systemic Pathomorphology”

## 3. The structure of discipline “Pathomorphology”

### 3.1. Part 1 “General Pathomorphology”

Theme	Lectures	Practicals	SRW	Individual work
<b>Part 1 «General Pathomorphology»</b>				
<i>Theme 1.</i> Introduction into pathomorphology. Methods of pathomorphological examination. Historic stages in development of pathomorphology. Pathologic factors and the main types of cellular responses.	1	2	2	
<i>Theme 2.</i> Ultrastructural pathology of cell. Cellular-matrix interactions. Adjustment of intracellular and extracellular mechanisms of metabolism.	-	-	2	
<i>Theme 3.</i> Reversible and irreversible injury of cells and tissues. Necrosis and apoptosis. Bases of thanatology. Death, definition, signs of death	1	2	2	
<i>Theme 4.</i> Chronic cell injury. Intracellular accumulations of proteins, lipids and carbohydrates. Dystrophy.	1	2	3	
<i>Theme 5.</i> Desorganization of connective tissue. Hyaline changes. Amyloidosis	1	2	2	
<i>Theme 6.</i> Morphology of endogenous and exogenous pigments accumulation, disorders of mineral metabolism and calcinosis (metastatic, dystrophic)	-	2	3	
<i>Theme 7.</i> Disorders of blood circulation. Hyperemia, hemorrhage. Edema. Heart failure: morphologic equivalents. Lymph stasis. Disorders of water-electrolytic balance.	1	2	2	
<i>Theme 8.</i> Disorders of hemostasis. Thrombosis. Shock, DIC-syndrome Embolism. Infarction.	1	2	2	
<i>Theme 9.</i> Gross view changes and microscopical features of different types of cell injuries and disorders of blood and lymph flow. Postmortem examination	-	2	-	
<i>Theme 10.</i> Defense mechanisms and their morphological equivalents. General information about inflammation. Exudative inflammation. Morphology of exudative inflammation.	1	2	4	
<i>Theme 11.</i> Chronic inflammation. Morphology of chronic inflammation. Granulomatosis.	1	2	2	
<i>Theme 12.</i> Pathomorphology of immune system. Reactions and mechanisms of hypersensitivity. Autoimmune diseases. Immunodeficiency syndromes.	2	2	4	
<i>Theme 13.</i> Processes of adaptation and compensation. Regeneration, repair. Sclerosis.	2	2	2	

<i>Theme 14.</i> Neoplasia. Nomenclature and morphology of epithelial tumors.	2	2	4	
<i>Theme 15.</i> Nomenclature and morphology of mesenchymal tumors.	0,5	1	3	
<i>Theme 16.</i> Nomenclature and morphology of neuroectodermal tumors.	0,5	1	3	
<i>Theme 17.</i> Nomenclature and morphology of blood cell tumors.	1	2	4	
<i>Theme 18.</i> Tumors and tumor-like lesions of infancy and childhood	-	-	4	
<i>Theme 19.</i> Gross view changes and microscopical features of different types of inflammation, immunopathological processes, adaptation, regeneration, tissue repair and tumors of different origin. Postmortem examination.	-	2	-	
<b>Total amount of hours in the part I– 96/Credits – 3,2</b>	<b>16</b>	<b>30</b>	<b>50</b>	

### 3.2. Part 2 “Systemic Pathomorphology”

Theme	Lectures	Practical	SRW	Individual work
<i>Part 2. Systemic Pathomorphology</i>				
<i>Theme 20.</i> Introduction to nosology. Disease: definition, classification. Diagnosis^ definition, structure. Pethomorphosis.	-	0,5	2	
<i>Theme 21.</i> Anemias. Hemorrhagic syndromes: vasopathies, trombocytopathies, trombocytopenias, coagulopathies.	-	1,5	2	
<i>Theme 22.</i> Atherosclerosis. Hypertension disease and symptomatic hypertensions. Ischemic heart disease. Cerebro-vascular disease. Cardiomyopathy.	2	4	3	
<i>Theme 23.</i> Rheumatic fever. Systemic diseases of connective tissue with auto-immunization. Systemic vasculitis. Diseases of endo-, myocardium	-	2	4	
<i>Theme 24.</i> Acute inflammatory diseases of respiratory system. Chronic obstructive and restrictive pulmonary diseases. Cor pulmonale. Lung cancer	2	4	3	
<i>Theme 25.</i> Diseases of oropharynx, esophagus, stomach. Diseases of small and large intestine.	2	2	3	
<i>Theme 26.</i> Diseases of liver, biliary system and pancreas.	2	2	2	
<i>Theme 27.</i> Gross view changes and microscopical features of blood system diseases, diseases of cardio-vascular, respiratory and digestive systems. Postmortem examination.	-	2	-	
<i>Theme 28.</i> Diseases of kidneys: glomerulopathies, tubulopathies, interstitial kidneys diseases, congenital malformations. Chronic renal failure.	2	2	4	
<i>Theme 29.</i> Diseases of female and male reproductive systems, pathology of pregnancy and postpartum period.	-	2	4	
<i>Theme 30.</i> Pre- and perinatal pathology.	-	2	4	
<i>Theme 31.</i> Diseases of endocrine system.	2	2	2	
<i>Theme 32.</i> Diseases of central and peripheral nervous system.	1	1	2	
<i>Theme 33.</i> Diseases of skeletal and muscular system	1	1	2	
<i>Theme 34.</i> Diseases of skin.	-	-	4	
<i>Theme 35.</i> Diseases connected with nutrition. Pathomorphological changes in some hypo- and avitaminoses. Radiation disease, professional diseases, hospital disease and others.	-	-	4	

<i>Theme 36. Infectious and parasitic diseases. Description of infectious process.</i>	2	0,5	1	
<i>Theme 37. Intestinal infections.</i>	-	1,5	2	
<i>Theme 38. Bacterial infections</i>	-	2	2	
<i>Theme 39. Viral infections</i>	-	2	2	
<i>Theme 40. Sepsis. HIV-infection. Tuberculosis</i>	2	2	2	
<i>Theme 41. Infections caused by rickettsia, protozoa, fungi.</i>	-	-	4	
<i>Theme 42. Gross view changes and microscopical features of endocrine, skeletal, nervous systems, infectious diseases. Postmortem examination.</i>	-	2	-	
<b>Total amount of hours in the part 2 – 114 / Credits – 3,8</b>	<b>18</b>	<b>40</b>	<b>56</b>	
<b>Total amount of hours in discipline –210/7,0 credits ECTS</b>	<b>34</b>	<b>70</b>	<b>106</b>	
<b>Final control of discipline</b>	<b>Credit + Exam</b>			

#### 4. Thematic plan of the lectures

##### General Pathomorphology

№	THEME	Amount of hours
<i>Part 1. General Pathomorphology</i>		
1.	Introduction to pathology. Cellular responses to injury. Necrosis. Apoptosis.	2
2.	Chronic injury. Intracellular and extracellular accumulations. Desorganisation of connective tissue.	2
3.	Hemodynamic disorders.	2
4.	Defence mechanisms and their morphologic signs. Morphology of acute and chronic inflammation.	2
5.	Immune pathology.	2
6.	Adaptations. Repair.	2
7.	Neoplasia Epithelial tumors.	2
8.	Mesenchymal tumors. Tumors of blood cells.	2
	<i>Total amount of hours</i>	<i>16</i>

##### Systemic Pathomorphology

№	THEME	Amount of hours
<i>Part 2. Systemic Pathomorphology</i>		
9	Introduction into nozology. Atherosclerosis. Hypertension disease. Ischemic heart disease	2
10	Diseases of the respiratory system	2
11	Diseases of the gastrointestinal system	2
12	Diseases of the liver and biliary system	2
13	Diseases of the kidney and urinary tract	2
14	Diabetes mellitus, diseases of the thyroid gland	2
15	Diseases of nervous system, skeletal muscle, bones and joints	2
16	Infectious diseases. Sepsis	2
17	Viral infections. Tuberculosis.	2
	<i>Total amount of hours</i>	<i>18</i>
	<i>Total amount of hours of discipline</i>	<i>34</i>

## 5. Thematical plan of the practical lessons.

### *General Pathomorphology*

№	THEME	Amount of hours
	<i>Part 1. General Pathomorphology</i>	
1.	Introduction to pathology. Cellular responses to injury. Autopsy.	2
2.	Reversible and irreversible injuries. Necrosis. Apoptosis.	2
3.	Intracellular accumulations. Adaptatoin. Subcellular alterations in cellular injury Connective tissue disorganization. Amyloidosis. Hyaline changes.	2
4.	Pigment accumulations. Pathologic calcification.	2
5.	Edema. Hyperemia. Congestion. Hemorrhage.	2
6.	Thrombosis. Embolism. Infarction. Disseminated intravascular coagulation. Shock.	2
7.	Gross view changes and microscopical features of alteration and hemodynamic disorders.	2
8.	Defensive mechanisms and their morphologic equivalents. Acute inflammation.	2
9.	Chronic inflammation.	2
10.	Disorders of immune system.	2
11.	Adaptive reactions. Repair. Wound healing. Regeneration Sclerosis.	2
12.	General principles and classifications of tumor growth. Epithelial tumors. Clinical course.	2
13.	Molecular basis of cancerogenesis. Diagnostic methods. Mesenchymal tumors. Neuroectodermal tumors.	2
14.	Tumors of blood cells.	2
15.	Gross view changes and microscopical features of different types of inflammation, immunopathological processes, adaptation, regeneration, tissue repair and tumors of different origin. Postmortem examination.	2
	<b>Total amount of hours</b>	<b>30</b>

### *Systemic Pathomorphology*

№	THEME	Amount of hours
	<i>Part 2. Systemic Pathomorphology</i>	
16.	Introduction to special pathology. Blood cell diseases.	2
17.	Arteriosclerosis. Atherosclerosis. Hypertension disease. Secondary hypertension.	2
18.	Ischemic heart disease. Cerebrovascular diseases. Cardiomyopathies.	2
19.	Valvular heart diseases. Rheumatic diseases.	2
20.	Acute respiratory diseases.	2
21.	Chronic diseases of the respiratory system.	2
22.	Diseases of the upper and lower gastrointestinal tract.	2
23.	Diseases of the liver, biliary system and pancreas.	2
24.	Gross view changes and microscopical features of cardiovascular, respiratory and digestive systems.	2
25.	Diseases of the kidney – glomerulopathies, tubulopathies. Renal failure.	2
26.	Diseases of the kidney – tubulopathies. Pyelonephritis. Nehrolithiasis.	2
27.	Diseases of the genital tract. Gestational disorders.	2
28.	Diseases of the infancy and childhood.	2
29.	Diseases of the endocrine system.	2
30.	Diseases of central nervous and skeleton-muscular systems.	
31.	Infectious and parasitic diseases. General characteristic of infectious process.	2

	Intestinal infectious diseases of different origin.	
32.	Bacterial infectious diseases. Diphtheria. Scarlet fever. Meningococcal infection. Whooping cough.	2
33.	Viral diseases. Acute viral respiratory infections. Covid-19. Pediatric viral infectious diseases. Measles. Rubella. Infectious mononucleosis. Varicella (chickenpox). Mumps. Poliomyelitis.	2
34	Infectious with multiorgans' lesions. Sepsis as special form of infection. HIV. Tuberculosis.	2
35.	Gross view changes and microscopical features of endocrine, skeletal, nervous systems, infectious diseases. Postmortem examination.	2
	<b>Total amount of hours for Systemic Pathology</b>	<b>40</b>
	<b>Total amount of hours in discipline</b>	<b>70</b>

## 6. Thematical plan of the students' self-reliant work.

### *General Pathomorphology*

№	THEME	Amount of hours	Type of control
	<i>Part 1. General Pathomorphology</i>		
1.	Death of the organism from biological, social and medical positions. Determination of fetal death. Thanatogenesis. Mechanisms and morphological manifestations of cessation of vital organs in the natural course of the disease.	2	Current control
2.	Selective death of specialized cells in a living organism.	2	-“-
3.	Genetic diseases are caused by enzyme defects: lysosomal diseases, accumulation diseases (thesaurismosis). Lesions caused by disorders of folding and intracellular transport of proteins.	4	-“-
4.	Clinical and morphological features of different forms of amyloidosis	2	-“-
5.	Mechanisms of accumulation of exogenous pigments. Jaundice: etiological factors, definitions, classifications, mechanisms. Metabolic disorders of iron (hereditary and acquired hemochromatosis) and copper (Wilson's disease). Stone formation: localization, types of stones, consequences and complications of stone formation.	2	-“-
6.	Violation of ion-osmotic and water balance. Hyper- and hypokalemia: a role in thanatogenesis. Water imbalance, hypo- and hypernatremia: role in thanatogenesis of intercellular and cellular dehydration.	2	-“-
7.	The role of the vascular wall, blood coagulation system in physiological hemostasis and thrombosis. Hypercoagulable states	2	-“-
8.	Pathogenesis and main stages of development of different types of shock, typical morphological changes in organs during shock. DIC syndrome: pathogenesis, stages, their morphological features, significance.	2	-“-
9.	Fundamentals of the immune response. Morphological manifestations of immune reactions in peripheral lymphoid organs, thymus. The concept of innate and acquired immunity. Features of the immune response in children. Accidental and age-related involution of the thymus.	2	-“-
10.	The role of neutrophils in the development of acute inflammation. Stages of development and resolution of acute inflammation. Differences between acute and chronic inflammation. Features of fibrinous and purulent inflammation in different organs: morphological changes and consequences.	4	-“-
11.	Macrophages and their role in chronic inflammation. Mechanisms of granuloma formation. Features of granulomatous inflammation in leprosy, scleroma, syphilis, felinosis, sarcoidosis: morphological changes and consequences.	4	-“-
12.	Immunological tolerance and mechanisms of its formation. Pathogenesis of	2	-“-

	autoimmune diseases. Graft rejection reactions (superacute, acute and chronic); graft reaction against the host). Immunodeficiency states: primary and secondary. The mechanism of immunodeficiency in HIV infection.		
13.	Molecular basis of cell and tissue proliferation. Stem cells and their role at different stages of embryo- and ontogenesis. Features of cell proliferation in different organs. Mechanisms of wound healing and repair of individual tissues. Pathomorphology of organ failure.	4	-“-
14.	Molecular basis and main stages of carcinogenesis. Tumor progression, tumor dissemination. Local and general effects of tumors on the body. Violation of homeostasis of the body during tumor growth. Secondary changes in the tumor. Cancerous cachexia, paraneoplastic syndromes. Modern methods of morphological diagnosis of tumors. Rules for collection and referral of biopsy material for histological examination.	4	-“-
15.	Morphology of tumors of exo- and endocrine glands and epithelial coverings.	2	-“-
16.	Nomenclature and morphological features of tumors of mesenchymal origin	2	-“-
17.	Nomenclature and morphological features of tumors of nervous and melanin-forming tissues	2	-“-
18.	Features of tumor growth in childhood. Tumors from cambial embryonic tissues. Childhood tumors that develop by the type of adult tumors.	3	-“-
19.	Basic principles of morphological diagnosis of blood cell tumors. Features of some forms of myeloid, lymphoid and histiocytic tumors.	3	-“-
	<b>Total amount of hours for General Pathomorphology</b>	<b>50</b>	

### *Systemic Pathomorphology*

№	THEME	Amount of hours	Type of control
	<i>Part 2. Systemic Pathomorphology</i>		
1.	The concept of "disease", manifestations and complications of diseases. Principles of disease classification. The concept of "diagnosis", the structure of the diagnosis. The concept of "pathomorphosis" of the disease. Types of pathomorphosis	2	Current control
2.	Some forms of hereditary anemia (spherocytosis, sickle cell anemia, thalassemia) and hemorrhagic diathesis (hemophilia, von Willebrand disease)	2	-“-
3.	Diseases of the cardiovascular system. Aortic aneurysms (atherosclerotic, stratifying). Symptomatic hypertension. Subarachnoid hemorrhage and malformations of cerebral vessels. Reperfusion syndrome	2	-“-
4.	Systemic vasculitides: nodular periarteritis, Takayasu's arteritis, temporal (giant cell) arteritis, obliterative thromboangiitis, Kawasaki disease, Shenlein-Genoch purpura, Raynaud's disease and syndrome. ANCA-associated vasculitides: microscopic polyangiitis, granulomatosis with polyangiitis (Wegener), eosinophilic granulomatosis with polyangiitis (Cherja-Strauss syndrome). Endocardial lesions: infectious endocarditis, Lefler's eosinophilic endocarditis. Myocardial damage: idiopathic myocarditis Abramov-Fiedler.	2	-“-
5.	Chronic restrictive lung diseases (fibrosing, granulomatous; allergic and smoking-related). Respiratory distress syndrome of the adult type. Tumors of the upper respiratory tract, lung cancer.	4	-“-
6.	Diseases of the oropharynx, salivary glands, esophagus. Diverticula. Hirschsprung's disease. Malabsorption syndrome (celiac disease, sprue, Whipple's disease, lactase deficiency, abetalipoproteinemia). Tumors of the oropharynx, esophagus, stomach, small and large intestine.	2	-“-
7.	Gallstone disease, acute and chronic cholecystitis, tumors. Acute and chronic pancreatitis, tumors. Drug-induced hepatitis. Metabolic liver diseases (non-	2	-“-

	alcoholic fatty liver disease, hemochromatosis, Wilson's disease, A1-antitrypsin deficiency).		
8.	Secondary glomerulopathies. Tubulointerstitial nephritis. Hydronephrosis. Cystic kidney disease: Malformations of the urinary system. Tumors of the kidneys and bladder	2	--
9.	Breast disease. Sexually transmitted infections (syphilis, gonorrhea, papillomavirus infection, chlamydia, ureaplasmosis, trichomoniasis. Pathology of pregnancy and postpartum period. Spontaneous and medical abortions. Ectopic pregnancy. NPG gestosis. Trophoblastic disease. Pathology of manure.	2	--
10.	Genetic diseases: Mendelian diseases, cytogenetic, lesions with multifactorial and non-classical inheritance. Congenital malformations: morphological characteristics. Sudden infant death syndrome.	2	--
11.	Diseases of the endocrine system: Hypoatalamo-pituitary disorders. Pathology of the adrenal glands. Pathology of the endocrine system of the pancreas. MEN syndrome.	2	--
12.	Slow viral neuroinfections and prion diseases (chicken, Creutzfeldt-Jakob disease). Tumors of the central nervous system (astroglial, oligodendroglial, ependymal, neuronal, meningeal), cranial and paraspinal nerves. Postreanimation encephalopathy and brain death syndrome.	2	--
13.	Diseases of muscles, bones, joints; congenital and toxic myopathies; lesions of the neuromuscular junction - myasthenia gravis (myasthenia gravis).	4	--
14.	Skin diseases: terminology that reflects skin pathology. Inflammatory and vesicular skin diseases. Pigmentation disorders: albinism, vitiligo, nevi. Other diseases: keratoacanthoma, dermatofibroma, epidermal cysts, hemangiomas, fibroepithelial polyp. Keloid. Malignant tumors of the skin: skin cancer, basal cell carcinoma, melanoma.	4	--
15.	Pathomorphological changes in nutrition-related diseases. Occupational diseases associated with the influence of chemical production factors, dust; changes in atmospheric pressure; industrial noise; electromagnetic waves; temperature; electric current; ionizing radiation. Iatrogenic drug pathology, morphological characteristics.	4	--
16.	Infectious and parasitic diseases. Characteristics of the infectious process. Morphological variants of local and general reactions depending on the etiology of infection (bacterial, viral, parasitic, fungal, etc.): with the participation of neutrophils (purulent inflammation); with the participation of lymphocytes and macrophages (mononuclear infiltration and granulomatous inflammation); under the action of viruses (cytopathic); with a predominance of necrotic local reaction.	5	--
17.	Helminthiasis (trichinosis, echinococcosis, cysticercosis, opisthorchiasis, schistosomiasis)	5	--
18.	Anthropozoonotic infections: plague, tularemia, brucellosis, anthrax.	2	--
19.	Mycobacterial infections	2	--
20.	Diseases caused by rickettsiae, protozoa (malaria, balantidiasis, amebiasis), fungi.	2	--
	<b>Total amount of hours for Systemic Pathology</b>	<b>56</b>	
	<b>Total amount of hours in discipline</b>	<b>106</b>	

## 8. Educational Methods.

According to a curriculum the types of educational activity of students are pursuant to: a) lectures; b) practical classes, c) self-reliant work .

The themes of lecture course expose the problems questions of the proper sections of pathomorphology.

Practical training provide for:

1) research by the students of macroscopic changes of the affected isolated organs and systems in case of general or special pathological processes;

2) research by the students of microscopic changes of the affected cells and organs in case of general or special pathological processes;

3) to solve the situational tests (estimation of morphological changes at the varied pathological processes) which have clinical-anatomical direction.

Students are recommended to keep a minutes of practical trainings, where they describe the macroscopic and microscopic changes of organs, tissues and cells in case of those or other pathological processes and sketch separate microslides.

## 9. Control Methods.

Types of control:

- *Current control* (during each practical lessons)
- *Final control* according to the study plan (credit at the end of the Pathomorphology course and exam in the discipline) – at the end of VI semester.

## 10. Current Control.

**Current control** is carried out at each practical lesson depending on specific aims of each topic. It includes tests, structured written works, control of practical skills in conditions close to real professional activity.

For students knowledge assessment the following diagnostic tools are used: tests, answer of situation tasks; structured writing works; control of practical skills and abilities structured on procedure (estimation of knowledges and abilities to analyze and interpret macro- and microscopic changes of cells, tissues, organs and systems at those or other pathological processes).

**Assessment criteria** – ongoing learning activity of students is assessed according to traditional 4 scores scale. All types of work envisaged in the program are taken into account. The student has to be assessed for each topic. Forms of assessment include control of theoretical and practical aspects of professional skill training.

**Excellent ("5")** – The student answers correctly 90-100% of format A tests. Provides correct, explicit, logical answers to standardized questions of ongoing topic, including material of lecture and self-study work. Demonstrate pharmacology professional skills-building and competencies required for medical practice. Solves problems of increased complexity, is able to generalize information.

**Good ("4")** - The student answers correctly 70-89% of format A tests. Provides correct, explicit, logical answers to standardized questions of ongoing topic, including material of lecture and self-study work. Uses theoretical knowledge in practical problem solving. Is able to solve problems of low to medium complexity. Demonstrates professional skills-building and competencies grater than minimum necessary.

**Satisfactory ("3")** - The student answers correctly 50-69% of format A tests. Incompletely, by means of additional questions answers to standardized questions of ongoing topic, including material of lecture and self-study work. Is not able to formulate explicit, logical response on his own. While answering and demonstrating professional skills-building and competencies makes mistakes. The student solves the easiest problems, acquires the minimum necessary knowledge and skills.

**Unsatisfactory ("2")** - The student answers correctly less than 50% of format A tests. Does not know material of ongoing topic. Is not able to formulate explicit, logical response on his own, does not answer additional questions, does not understand the material content. While answering and demonstrating professional skills-building and competencies makes serious mistakes.

### **Control of the self-reliant work**

Control of the self-reliant work is undertaken during corresponding practical lessons. For the topics which are not included into classroom lessons control is carried out during exam.

## 11. Forms of the Final Control.

**Final control** includes *semesters' credit* and *exam*.



- **Semesters' credit** – is the form of final control based on the execution of certain work during practical and self-study. Is carried out after finishing the semester and before the exam session.
- **Semesters' exam** – is the form of final control of students mastering theoretical and practical material of the educational discipline.

**Semesters' exam** – is the form of final control of acquirement of knowledge, skills, attitude (theoretical and practical pathomorphology material for discipline). Student is enable to pass exam if he was present during all practical lessons, performed all forms of work envisaged in the pathomorphology program. Examination is hold in written form during exam session according to the time-table. Form of examination is standardized and includes control of practical and theoretical level.

**Methodology of semesters' exam:**

I stage – tests of format A.

Student answers 60 questions related to all parts of the pathomorphology.

II stage — 3 cases (1 gross-view sample and 2 slides)

Student has to answer 3 cases in written form.

III stage – testing of practical skills (discussion of cases).

## 12. Score Calculation.

### *Evaluation of current control*

At mastering of every theme of the discipline for estimation of student's ongoing educational control a 4-ball traditional scale is proposed, which then is converted in scores depending on the amount of themes in the semesters

Maximal number of scores which the student may get for ongoing learning activity accounts for 120 scores.

Minimal number of scores which the student has to get for ongoing learning activity accounts for 72 scores.

Number of scores is calculated in the following equation:

$$x = \frac{CA \times 120}{5}$$

CA – average for marks according to the traditional scale (rounding to the second figure after the point)

Table 1. Converting of traditional marks into points according to 200-point scale

4-points scale	200-points scale	4-points scale	200-points scale	4-points scale	200-points scale	4-points scale	200-points scale
5	120	4.45	107	3.91	94	3.33	80
4.95	119	4.41	106	3.87	93	3.29	79
4.91	118	4.37	105	3.83	92	3.25	78
4.87	117	4.33	104	3.79	91	3.2	77
4.83	116	4.29	103	3.74	90	3.16	76
4.79	115	4.25	102	3.7	89	3.12	75
4.75	114	4.2	101	3.62	87	3.08	74
4.7	113	4.16	100	3.58	86	3.04	73
4.66	112	4.12	99	3.54	85	3	72
4.62	111	4.08	98	3.49	84	Less than 3	
4.58	110	4.04	97	3.45	83		
4.54	109	3.99	96	3.41	82		
4.5	108	3.95	95	3.37	81		

Self-reliant work is assessed during ongoing control in corresponding practical lesson. For topics which are not included into classroom lessons control is carried out during exam..

### *Evaluation of the final control (exam)*

Test control	Practical skills			Maximal
	Tasks			
60 tests (A format)	Task 1 – sample	Task 2 – slide	Task 3 – slide	80 points
	6 points	7 points	7 points	

Maximal number of scores which the student may get for exam accounts for 80.

Minimal number of scores which the student has to get to pass exam accounts for 50.

### ***Calculation of scores for discipline***

Grade for the discipline is calculated as the sum of scores for ongoing learning activity (not less than 72) and exam scores (not less than 50).

Scores for the discipline are converted independently according to ECTS scale and traditional scale (4-scores). Scores in ECTS scale are not converted to traditional one and vice versa.

Grades of students of the same speciality are ranged according to ECTS scale in the following way:

ECTS grade	Statistical indicator
A	The best 10% students
B	The next 25% students
C	The next 30% students
D	The next 25% students
E	The last 10% students

Grade for the discipline for students who have successfully fulfilled the programme are converted according to 4-scores scale in the following way:

Discipline grade	Grade in 4-scores scale
From 170 to 200 scores	“5”
From 140 to 169 scores	“4”
From 139 to 120 scores	“3”
Less than 120 scores	“2”

### **13. Methodical Support.**

Workbook for practical lessons (general and systemic pathomorphology).

Students book for practical lessons (general and systemic pathomorphology).

Educational program in pathomorphology.

Work thematic plans for lectures, practicals and self-reliant work.

Lecture thesis

Instructive methodical material (tests base, tasks for skills control)

Slides

Samples

#### **13. 1. Questions for the Pathomorphology Exam.**

Pathomorphology as science, part of practical medicine and educational object.

Contents, aims, objects and methods of pathomorphologic researches.

Levels of diseases structural bases researches.

Basic stages of pathomorphology development.

Payment of works of G.Morgagni, C. Rokitansky, R.Virchow in development of world pathomorphology.

Concept about ultrastructural pathology of cell.

Morphogenesis and morphology of intra- and extracellular accumulation of proteins, carbohydrates and lipids.

Morphogenesis and morphology of pathological accumulation of endogenous and exogenous pigments

Morphogenesis and morphology of minerals metabolism disorders.

Injury and necrosis of cells and tissues. Necrosis and apoptosis are morphologic manifestation. Pathomorphology of organ insufficiency. Bases of thanatology. Death, definition, signs of death, postmortem changes.

Structural mechanisms and clinical-pathoanatomical characteristics of basic periods of tanatogenesis.

Death: definition, signs and term of development.

Postreanimation period: definition, pathoanatomical features of damage of vitally-important organs and renewal of their functions.

Desorganisation of connective tissue. Types, morphological manifestations, consequences.

Principles of amyloidosis classification.

Systemic amyloidosis (primary, secondary): morphological description.

System amyloidosis (primary, secondary): morphological description.

Local and endocrine amyloidosis: morphological description.

Amyloid of old age: morphological description.

Morphology of osmotic and water balance disturbances.

Morphology and consequences of different types of hyperemias types of hyperemias.

Morphogenesis and pathomorphology of ischemia.

Morphogenesis and pathomorphology of infarction.

Determination and morphogenesis of bleeding, hemorrhage different types.

Morphogenesis, pathomorphology and complications of stasis.

Pathomorphology and complications of plasmorrhagia.

Pathomorphology, types and complications of embolism.

Morphogenesis, pathomorphology and complications of shock.

Pathomorphology and complications of lymph circulation disturbance.

Morphogenesis, pathomorphology and complications of thrombosis, DIC-syndrome.

Defence mechanisms, their morphological equivalents. Definition of exudative inflammation. Types, morphological description clinical value of exudate inflammation.

Definition of proliferative inflammation. Morphological features and complications of proliferative inflammation.

Types, morphological description of granulomatous inflammation.

Types, morphological description of specific inflammation.

Morphological description of different types of hypersensitiveness.

Definition, classification and general morphological description of autoimmune diseases.

Definition, general morphological description of primary and secondary immune insufficiency.

Hyperplasia: definitions, types, morphological description.

Atrophy: definitions, types, morphological description.

Metaplasia: definitions, types, morphological description.

Phase character of motion of processes of compensation in pathological terms.

Hypertrophy: definitions, appearances, morphological description.

Morpho-functional features of hypertrophy of myocardium.

Pathology of disadaptation of organism.

Cellular and intracellular forms of regeneration.

Types of regeneration: physiology, reparative, pathological.

Morphogenesis of regenerate process.

Granulation tissue: morphological description.

Types of wounds healing.

Sclerosis.

Tumors: definition, the nomenclature, principles of the classification.

Modern theories of the neoplasia's development.

Dysplasia: definition, types, role of dysplasia in cancerogenesis.

Pre-tumorous processes and changes, morphology.

Tumor's cytomorphology (Differentiation and Anaplasia).

Morphogenesis and histogenesis of tumors.

The characteristic of tumorous growth: mechanisms, types.

Morphological features of benign tumors.

Morphological features of malignant tumors.

Metastases: definition, mechanisms, types of spreading, Peculiarities of cancer's dissemination.

Systemic nonmetastatic clinical – morphological manifestation of tumors.

General characteristic and modern histogenetic classification of mesenchymal tumors.

Morphological peculiarities of benign mesenchymal tumors.

Morphological peculiarities of malignant mesenchymal tumor.

Peculiarities of metastasizing of sarcomas.

Nomenclature of Tumors of nervous tissue.

Clinical-morphological peculiarities of tumors of the central nervous system (CNS).  
 Peculiarities of metastasizing of tumors of the central nervous system (CNS).  
 Clinical-morphological peculiarities of tumors of the vegetative nervous system.  
 Clinical-morphological peculiarities of tumors of the peripheral nervous system.  
 Nomenclature of tumors which derived from melanin-producing tissue. Nevus, its types.  
 Morphological features of melanoma, its morphological forms. Importance of pre-tumorous changes.  
 Modern histogenetic classification and nomenclature of the epithelial tumors.  
 Morphological peculiarities of epithelial tumors without specific localization: benign (adenoma, papilloma) and malignant (carcinoma).  
 Histological variants of carcinomas  
 Peculiarities of metastazing process.  
 Peculiarities of the growth and spreading of carcinomas.  
 Dysontogenetic tumors: gamartoma, and gamartoblastoma- morphological features.  
 Teratomas and teratoblastomas - morphological features.  
 Tumors are derived from cambial embryonic tissues.  
 Tumors of childhood, which develop on as the tumors of adults - morphological features.  
 Definition, classification, general morphological features of leukemias.  
 Acute leukemia: types, stages in course of diseases, morphologic description.  
 Chronic leukemia: types, stages in course of diseases, morphologic description.  
 Hodgkin's disease: histological types, morphological description, causes of death.  
 Non-Hodgkin's Lymphomas: common description, morphological features and prognosis.  
 Tumors of the organs and tissues of the oral cavity.  
 Peculiarities of course and metastatic spreading.  
 Definition, classification and morphological features of anemias.  
 Definition, classification, morphological features of thrombocytopenia and thrombocytopathy.  
 Classification, morphological description of coagulopathies.  
 Definition of atherosclerosis, risk factors, modern theories.  
 Morphogenesis of macroscopical changes in atherosclerosis.  
 Morphogenesis of microscopical changes in atherosclerosis.  
 Clinical-morphological types of atherosclerosis, morphological description of injured organs.  
 Ischemic heart disease: definition, risk-factors and connection with atherosclerosis and hypertensive disease.  
 Morphology of acute, relapsed and repeated heart attack of myocardium.  
 Outcomes, complications and causes of death in myocardial infarction.  
 Morphological description, complications, causes of death in chronic ischemic heart disease.  
 Hypertensive disease: definition, factors of risk.  
 Morphological changes in vessels, heart and other organs in hypertensive disease.  
 Secondary (symptomatic) hypertension: definition, classification.  
 Common description of systemic diseases of connective tissues: disturbance of immune homeostasis and systemic progressive disorganization of connective tissue.  
 Rheumatic Fever: etiology, criteria of rheumatic fever. Clinical-anatomical forms.  
 Morphology of heart damage in Rheumatic Fever (endocarditis, myocarditis, pericarditis): classifications, clinical-morphological description, complications.  
 Rheumatoid Arthritis: etiology, morphogenesis, clinical - morphological stages and their morphological appearance.  
 Outcomes and complications.  
 Morphology of Bechterew's disease  
 Systemic Lupus Erythematosus: etiology, morphological features, complications and causes of death.  
 Morphological appearance, complications and causes of death in scleroderma.  
 Dermatomyositis: morphological appearance, complications and causes of death.  
 Systemic vasculitis: nonspecific arteritis, polyarteritis nodosa, obliterated thrombangitis, Wegener's granulomatosis.  
 Description and pathomorphology.  
 Löffler's endocarditis: determination, pathogenesis, pathomorphology.  
 Pathomorphology of acquired heart defects.  
 Pathomorphology of acquired (secondary) cardiomyopathies.  
 Cerebral-vascular diseases: common description, risk factors and background states, classification.  
 Infarction (ischemic stroke) of brain: morphological appearance.  
 Morphogeny and morphological appearance of selective necrosis of neurons (ischemic encephalopathy).  
 Morphological appearance, consequences of hemorrhagic infarction.  
 Acute bronchitis: morphological characteristics.

Modern classification of pneumonias.

Lobar pneumonia: morphological appearance and complications.

Acute bronchopneumonias: morphological manifestations and complications.

Acute interstitial pneumonia: morphological manifestations and complications.

Morphological manifestations of acute destructive processes of lungs.

Determination of chronic nonspecific diseases of lungs.

Chronic bronchitis: morphological manifestations and complications.

Chronic obstructive emphysema: morphological manifestations.

Bronchiectasis: morphological manifestations and complications.

Bronchial asthma: morphological manifestations and complications.

Morphological manifestations of chronic diffuse interstitial diseases:

Idiopathic pulmonary fibrosis: morphological manifestations.

Carcinoma of lungs: morphological manifestations.

Diseases of esophages: morphological manifestations.

Morphological manifestations of chronic gastritis.

Pathomorphology of peptic ulcer.

Complications of peptic ulcer.

Gastric carcinoma: macroscopical and morphological types. Peculiarities of cancer's spread.

Pathomorphology of nonspecific ulcerative colitis.

Pathomorphology of Crohn's disease.

Appendicitis: clinical-morphological forms.

Complications of appendicitis.

Intestinal Neoplasms

Hepatoses: morphological manifestations and prognosis.

Toxic degeneration (massive necrosis) of liver: definition, morphological features and prognosis.

Acute hepatitis: morphogenesis, their classification and morphological features.

Chronic hepatitis: morphological description, degree of activity and chronicity.

Morphological characteristic of the most important types of cirrhosis.

Carcinoma of liver, morphological characteristic.

Pathomorphology of cholelithiasis.

Pathomorphology of acute and chronic cholecystitis.

Morphological characteristic, complications of acute and chronic cholecystitis.

Tumors of pancreas, morphological characteristic.

Morphological characteristic, outcomes of inflammatory diseases and precarcinomatous processes of cervix uteri.

Morphological manifestations of inflammatory diseases of endometrium and myometrium.

Morphological manifestations of precarcinomatous processes and tumors of endometrium and myometrium.

Morphological characteristic, complications, outcomes of inflammatory diseases of the breast.

Morphological characteristic of fibrocystic changes of the breast.

Benign prostatic hyperplasia (Nodular hyperplasia): Morphological characteristic, complications, outcomes.

Morphological characteristic of inflammatory diseases of testicles.

Modern clinico-morphological classification of kidney's diseases.

Acute poststreptococcal glomerulonephritis: morphological features, outcomes.

Rapidly progressive (crescent) glomerulonephritis: morphological characteristic, outcomes.

Chronic glomerulonephritis: morphological characteristic, outcomes.

Classification, morphological appearance of nephrotic syndrome.

Morphological manifestations of idiopathic membranous nephropathy .

Morphological features of focal sclerosis.

Acute tubular necrosis: Morphological characteristic, prognosis.

Interstitial nephritis: morphological characteristic, prognosis.

Acute and chronic pyelonephritis: morphological characteristic, prognosis.

Nephrolithiasis: morphogenesis and morphological characteristic, outcomes.

Chronic renal failure. Nephrosclerosis. Pathomorphology.

Hyperparathyroidism: morphological changes of bones.

Paget's disease: morphological description, complications.

Fibrous dysplasia: morphological characteristic, complications.

Ectopic pregnancy: classification, morphological diagnostics, complications and consequences.

Eclampsia of pregnancy: classification, morphological description.

Trophoblastic disease. Classification. Morphological description, prognosis.

Morphological appearances, influence on a fetus and organism of woman, consequences of infectious processes in a placenta.

Morphological manifestations of disturbance of blood circulation in a placenta.

Morphological characteristic, prognosis of Intrauterine growth retardation of newborn

Birth injury: classification, morphological description.

Morphological characteristic of hemolytic diseases of newborns.

Morphological characteristic of hemorrhagic diseases of newborns.

Diseases of lungs of perinatal period (pneumopathies): morphological manifestations, complications.

Morphological characteristic and outcomes of asphyxia.

Infectious fetopathies: morphological manifestations.

Non-infectious fetopathies (diabetic and alcoholic fetopathies): morphological characteristic and outcomes.

Classification and morphology of congenital defects of development.

Morphological characteristic disturbed and undernutrition.

Morphogenesis and morphological characteristic of pneumoconiosis.

Damages which are related to the changes of atmospheric pressure: pathomorphology, consequences, causes of death.

Diseases due to influencing of industrial noise (noise disease): pathomorphology, consequences and causes of death.

Diseases due to influencing of electromagnetic radiation: pathomorphology, outcomes, causes of death.

Damages from the temperature influencing: pathomorphology, consequences and causes of death.

Damages which are caused by an electric current: pathomorphology, consequences and causes of death.

Diseases as a result of influencing of ionizing radiations: pathomorphology, consequences and causes of death.

Cushing's disease: Morphological characteristic, complications and causes of death.

Morphological characteristic and complications of acromegaly.

Morphological characteristic of diabetes insipidus.

Morphological characteristic of diabetes mellitus.

Complications of diabetes mellitus. Morphological features of diabetic macro- and microangiopathy.

Multinodular Goiter: Morphological characteristic, complications, outcomes.

Graves' disease (or diffuse toxic goiter, Basedow's disease): morphologic features of thyroid gland, visceral appearance.

Hypothyroidism. Cretinism. Mixedema. Morphological description.

Hashimoto's thyroiditis: definition, pathomorphology.

Primary and secondary hyperparathyroidism: morphological peculiarities.

Primary chronic adrenocortical insufficiency (Addison's disease): morphological appearance.

Morphological appearance, complications of spontaneous intracerebral hemorrhage.

Morphological appearance, complications of spontaneous subarachnoid hemorrhage.

Alzheimer's disease: morphological appearance, complications.

Disseminated sclerosis:, morphological appearance, complications.

Lateral amyotrophic sclerosis: morphological appearance, complications.

Postreanimation's encephalopathy: morphological appearance, complications.

Morphological appearance, complications of diseases of peripheral nervous system.

General description of infectious process: portal of entry of infection, primary infectious complex, spreading and dissemination, ways of transmission of infectious diseases.

Morphological variants of local and general reactions in infections.

Shigella bacillary dysentery: morphological description, complications, consequences, causes of death.

Typhoid fever: morphological description, complications, consequences, causes of death.

Salmonellosis: morphological description, complications, consequences, causes of death.

Yersiniosis: morphological description, complications, consequences, causes of death.

Acute respiratory viral diseases: morphological description, complications, consequences, causes of death.

Typhoid fever: morphological description, complications, consequences, causes of death.

Infectious diseases of the brain (tick-borne viral encephalitis): morphological description, complications.

Morphological characteristic, complications in prion's diseases of CNS.

Morphological characteristic, complications, causes of death in AIDS.

Measles: morphological description, complications, consequences, causes of death.

Infectious mononucleosis: morphological description, complications, consequences, causes of death.

Mumps (epidemic parotitis): morphological description, complications, consequences, causes of death.

Diphtheria: morphological description, complications, consequences, causes of death.

Scarlet fever: morphological description, complications, consequences, causes of death.

"Whooping cough": morphological description, complications, consequences, causes of death.

Poliomyelitis: morphological description, complications, consequences, causes of death.

Morphology of tissues reactions in tuberculosis.  
 Pathomorphology of the primary tubercular complex.  
 Progress of primary tuberculosis with generalization: | morphological description.  
 Pathomorphology of chronic course of primary tuberculosis.  
 Hematogenous pulmonary tuberculosis: morphological description, complications, consequences, causes of death.  
 Hematogenous tuberculosis with unipulmonary lesions or organic tuberculosis: morphological description, complications, consequences, causes of death.  
 Secondary tuberculosis: morphological description, complications, consequences, causes of death.  
 Modern pathomorphology of tuberculosis.  
 Clinical-morphological forms of sepsis: septicemia, septicopyemia, septic endocarditis.  
 Plague: clinical-morphological forms, complications, causes of death.  
 Rabbit-fever: clinical-morphological forms, causes of death.  
 Anthrax: clinical-morphological forms, causes of death.  
 Cholera: clinical-morphological forms, complications, causes of death.  
 Morphological description of congenital syphilis.  
 Morphological description of aquired syphilis.  
 Malaria: morphological characteristic, complications, outcomes, causes of death.  
 Morphological description of balantidiasis.  
 Morphological description of amebiasis.  
 Morphological description of trichinellosis.  
 Morphological description of echinococcosis.  
 Morphological description of cysticercosis.  
 Morphological description of opisthorchiasis.  
 Morphological description of schistosomiasis.  
 Morphological description of dermatomycosis.  
 Morphological description of actinomycosis.  
 Morphological description of candidiasis.  
 Morphological description of aspergillosis.

#### 14. List of Educational Materials

1. Robbins&Cotran Pathologic Basis of Disease (Robbins Pathology) 10<sup>th</sup> Edition by V.Kumar, A.K.Abbas, J.C.Aster. – Canada: Elsevier Health Sciences, 2020 – 1392 p.
2. Robbins Basic Pathology (Robbins Pathology) 10<sup>th</sup> Edition by V.Kumar, A.K.Abbas, J.C.Aster. – Canada: Elsevier Health Sciences, 2017 – 952 p.
3. Diagnostic Pathology: Cytopathology 2<sup>nd</sup> Edition by D.M.Michael, J.Thrall, S.Krishnamuthy. – Elsevier Health Sciences, 2018 – 850 p.
4. Sternberg's Diagnostic Surgical pathology [2-Volume Set] 7<sup>th</sup> Edition by S.E.Mills, J.K.Greenon, J.L.Hornick, T.A.Longacre, V.E.Reuter. – Lippincott Williams and Wilkins, 2022.
5. Pathology: Implications for the Physical Therapist 5<sup>th</sup> Edition by C.C.Goodman, K.S.Fuller. – Elsevier Health Sciences, 2020 – 1800 p.
6. Comprehensive Radiographic Pathology 7<sup>th</sup> Edition by R.L.Eisenberg, N.M.Johnson. – Elsevier Health Sciences, 2020 – 480 p.
7. BRS Pathology 6<sup>th</sup> Edition by M.E.Peyton Gupta. – Wolters Kluwer Health, 2020. – 496 p.
8. Molecular Pathology 2<sup>nd</sup> Edition: The Molecular Basis of Human Diseases by W.Coleman, G.Tsongalis. – Academic Press, 2017. – 802 p.
9. General Pathology. Workbook for practical lessons for 3-rd year class students of medical faculty. Lviv, 2016, 90p.
10. General Pathology. Students book for practical lessons for 3-rd year class students of medical faculty. Lviv, 2016, 39p.
11. Special Pathology. Students book for practical lessons for 3-rd year class students of medical faculty. Lviv, 2016, 43p.
12. Special Pathology. Workbook for practical lessons for 3-rd year class students of medical faculty. Lviv, 2016, 89p.

#### 15. Informational Resources

<http://library.med.utah.edu/WebPath/webpath.html>  
<http://www.webpathology.com/>  
<https://www.geisingermedicallabs.com/lab/resources.shtml>  
<https://www.pathologyoutlines.com/>