

SYLLABUS

1. General information on the course

Full course name	Pathomorphology
Full official name of a higher education institution	Sumy State University
Full name of a structural unit	Medical Institute. Department of Pathology
Author(s)	Hyriavenko Nataliia Ivanivna
Cycle/higher education level	The Second Level Of Higher Education, National Qualifications Framework Of Ukraine – The 7th Level, QF-LLL – The 7th Level, FQ-EHEA – The Second Cycle
Semester	18 weeks during 5th semester, 20 weeks during 6th semester
Workload	Content of the discipline includes 5 ECTS credits/150 academic hours. 98 hours are recognized as work with lecturer (24 hours of lectures and 74 hours of practical trainings), 52 hours are recognized as independent work.
Language(s)	English

2. Place in the study programme

Relation to curriculum	Compulsory course available for study programme "Medicine"
Prerequisites	Medical Biology, Human Anatomy, Histology, Cytology and Embryology, Biochemistry, Krok-1, Normal Physiology, Propedeutics of Medicine
Additional requirements	There are no specific requirements
Restrictions	There are no specific restrictions

3. Aims of the course

The aim of the discipline is to achieve students' modern knowledge and professional skills to study macro-, microscopic and molecular-ultrastructural changes in the human body in the development of typical general pathological processes, the set of which determines the morphological manifestations of diseases, their clinical manifestations and structural basis of recovery, complications, and consequences.

4. Contents

Module 1. General pathological anatomy

<p>Topic 1 Morphology of reversible and irreversible injury of the cells and tissues. Intracellular and extracellular accumulations of proteins, carbohydrates and lipids. Disturbance of the metabolism.</p>
<p>Topic 2 Pathomorphological manifestations of metabolic products accumulation. Morphology of pathological accumulation of endogenous and exogenous pigments. Disturbance of the copper, potassium and calcium exchanges.</p>
<p>Topic 3 Fundamentals of thanatology. Birth and death of a man. Fundamentals of thanatogenesis. The main causes of biological death. Signs of biological death, cadaveric changes.</p>
<p>Topic 4 Injury and necrosis of cells and tissues. Necrosis and apoptosis. Clinical and morphological classification of necrosis. Morphological manifestations of necrosis. Outcomes</p>
<p>Topic 5 Processes of adaptation and compensation. Morphology of adaptation and compensation processes. Development phases. Violation of the body's adaptive processes.</p>
<p>Topic 6 Regeneration. Types of regeneration. Features of reparative regeneration of specialized cells. Variants of organs reparative regeneration.</p>
<p>Topic 7 Disorders of blood and lymph circulation. Acute systemic circulatory disorders. Systemic circulatory disorders in chronic heart failure and cardiac decompensation. Regional circulatory disorders (local venous and arterial hyperemia, ischemia, plasmorrhagia, bleeding, and hemorrhage). Disorders of lymph formation and circulation.</p>
<p>Topic 8 Disturbances of hemostasis, embolism. Hemorrhagic syndrome. Thrombosis, DIC syndrome (causes, stages of development). Embolism: classification, pathogenesis and thanatogenesis.</p>
<p>Topic 9 Inflammation. Pathogenesis of inflammation. Classification. Morphology of exudative inflammation.</p>
<p>Topic 10 Inflammation. Proliferative inflammation. Classification. Specific granulomatous inflammation. Types of granulomas. Pathological anatomy of granulomas.</p>
<p>Topic 11 Tumors. Initiating factors of tumor growth. Anatomical and microscopic features of the tumor. Morphological characteristics of the main stages of malignant tumor development. Pathomorphological classification of tumors.</p>

<p>Topic 12 Tumors of soft and other tissues</p> <p>Benign and malignant non-epithelial (mesenchymal) tumors. Tumors of fibroblastic, myofibroblastic and fibrohistiocytic genesis. Tumors of adipose, muscle, bone and cartilage tissues, vascular tumors.</p>
<p>Topic 13 Melanocytic tumors.</p> <p>Melanocytic tumors. Histological structure of naevus. Types of melanoma. Histological classification of melanoma by Clark and Breslow.</p>
<p>Topic 14 Tumors of the nervous system and meninges. Teratomas. Features of childhood tumors. Tumors of the central nervous system. Features of CNS tumors, classification. Tumors of the cranial and paraspinal nerves. Teratomas. Features of childhood tumors. Embryonic tumors. Germinogenic tumors. «Adult» tumors.</p>
<p>Topic 15 Epithelial tumors</p> <p>Benign and malignant tumors of the simple surface (transitional or stratified squamous) epithelium.</p>
<p>Topic 16 Epithelial tumors.</p> <p>Tumors of specialized (glandular or surface) epithelium.</p>
<p>Topic 17 Final module of the 1st semester.</p> <p>Solving test tasks "Krok 1". Assessment of practical skills acquisition (review of micropreparations)</p>
<p>Topic 18 Final module of the 1st semester.</p> <p>Assessment of student knowledge on theoretical issues of the final module. Assessment of practical skills acquisition (knowing of macropreparations)</p>
<p>Module 2. Special pathological anatomy</p>
<p>Topic 19 Diseases of the blood system.</p> <p>Anemia. Pathogenetic, morphological and depending on the ability of the bone marrow to regenerate the classification of anemia. Etiology, mechanisms of development, morphological manifestations, outcomes.</p>
<p>Topic 20 Tumors of hematopoietic and lymphoproliferative tissues.</p> <p>Groups of hemoblastosis. Etiology and pathogenesis of acute and chronic leukemias. Tumors of lymphoid origin, classification. Hodgkin's lymphoma. Tumors of the progenitor of T- and B-lymphocytes. Mature B-cell tumors. Diffuse B-cell large cell lymphoma. Burkitt's lymphoma. Follicular lymphoma. Plasma cell tumors. Myeloid origin tumors.</p>
<p>Topic 21 Diseases of the cardiovascular system</p> <p>Atherosclerosis and arteriosclerosis. Coronary heart disease. Hypertension and arteriosclerosis. Etiology, mechanisms of development, morphological manifestations, classification, outcomes.</p>

Topic 22 Systemic connective tissue diseases with autoimmunization.

Rheumatism. Rheumatoid arthritis. Systemic lupus erythematosus. Scleroderma. Dermatomyositis. Bekhterev's disease. Etiology, mechanisms of development, morphological manifestations, classification, outcomes.

Topic 23 Respiratory diseases.

Classification and pathomorphology of pneumonia. Complications and outcomes. Lung abscess and gangrene. Etiology, pathogenesis and complications.

Topic 24 Chronic diffuse lung lesions. Tumors of the bronchi and lungs.

Chronic diffuse lung lesions: classification, etiology, pathogenesis, pathomorphology and complications. Chronic bronchitis. Chronic obstructive emphysema. Bronchiectasis. Bronchial asthma. Acute and chronic interstitial lung diseases. Tumors of the bronchi and lungs.

Topic 25 Diseases of the esophagus, stomach and intestinal.

Esophageal diseases (developmental abnormalities, achalasia of the cardia, esophagospasm, diverticula, Mallory-Weiss syndrome, esophagitis, gastroesophageal reflux disease, Barrett's esophagus, tumors). Stomach diseases (gastritis, ulcerative colitis, tumors). Etiology, mechanisms of development, morphological manifestations, outcomes.

Topic 26 Intestinal diseases.

Intestinal diseases: enterocolitis, malabsorption syndrome, idiopathic inflammatory bowel disease. Tumors of the small and large intestine. Appendicitis. Etiology, mechanisms of development, morphological manifestations, outcomes.

Topic 27 Liver diseases.

Liver disease: massive / submassive liver necrosis, hepatosis, hepatitis, alcoholic liver disease, liver cirrhosis, liver tumors. Etiology, mechanisms of development, morphological manifestations, classification, outcomes.

Topic 28 Diseases of the gallbladder and pancreas.

Inflammatory processes, formation of stones and tumors in the gallbladder. Acute and chronic pancreatitis. Mechanisms of development, morphological manifestations, classification, outcomes. Pancreatic cancer.

Topic 29 Kidney diseases.

Glomerulopathies (glomerulonephritis, renal amyloidosis, diabetic nephropathy and hepatic glomerulosclerosis). Tubulopathy. Polycystic kidney disease. Pyelonephritis. Acute and chronic renal failure. Etiology, mechanisms of development, morphological manifestations, outcomes.

Topic 30 Diseases of the endocrine system.

Hypothalamic-pituitary disorders. Pathology of the adrenal glands. Thyroid diseases. Pathology of the endocrine system of the pancreas. Diabetes mellitus (definition, classification, complications, causes of death).

<p>Topic 31 Diseases of the female and male reproductive systems.</p> <p>Inflammatory diseases of the female and male reproductive systems. Precancerous processes and tumors of the genital system. Dyshormonal diseases. Etiology, mechanisms of development, morphological manifestations, classification, outcomes.</p>
<p>Topic 32 Pathology of pregnancy, postpartum and placenta. Prenatal and perinatal pathology.</p> <p>Complications of pregnancy: abortion, ectopic pregnancy, ORN-gestosis, trophoblastic disease. Placental pathology: inflammation, circulatory disorders, pathology of placental maturation, implantation disorders, placental insufficiency, tumors. Prenatal and perinatal pathology. Intrauterine growth retardation. Childbirth trauma. Mechanisms of development, morphological manifestations, classification, outcomes.</p>
<p>Topic 33 Primary and hematogenous tuberculosis.</p> <p>Epidemiology, etiology, pathogenesis, morphogenesis, classification. Morphological characteristics of primary tuberculosis. Hematogenous tuberculosis: forms, main pathomorphological manifestations, complications.</p>
<p>Topic 34 Secondary tuberculosis.</p> <p>Secondary tuberculosis: forms, morphological manifestations, outcomes, causes of death.</p>
<p>Topic 35 Infectious and parasitic diseases. Particularly dangerous (quarantine) infections.</p> <p>Classification of infectious diseases. Intestinal infectious diseases (typhoid fever, paratyphoid fever A and B, salmonellosis, shigellosis, yersiniosis, staphylococcal enteritis). Particularly dangerous infections: plague, tularemia, anthrax, cholera. The main morphological manifestations, outcomes, causes of death.</p>
<p>Topic 36 Viral airborne infections. Pediatric infections.</p> <p>Influenza, parainfluenza, respiratory syncytial infection, adenoviral infection. Pediatric infections (measles, mumps, infectious mononucleosis, polio, chickenpox, rubella, whooping cough, diphtheria, scarlet fever, meningococcal infection). The main morphological manifestations, outcomes, causes of death.</p>
<p>Topic 37 HIV infection and acquired immunodeficiency syndrome (AIDS).</p> <p>Etiology, pathogenesis, stages of the disease. Clinical characteristics of HIV and AIDS. Clinical and morphological characteristics of the most important opportunistic infections. AIDS-associated diseases.</p>

5. Intended learning outcomes of the course

After successful study of the course, the student will be able to:

LO1	Have the knowledge to define a clinical and pathological diagnosis in the conditions of a medical institutions, applying a standard procedure and using knowledge about a person, his organs and systems.
LO2	Be able to define a syndromic or clinical diagnosis of the disease. Have specialized knowledge of the structural disease progression and their clinical manifestations, foundations of recovery, complications, consequences, the main causes of death.

LO3	Be able to identify and record the main changes in the internal organs during various pathological processes, using knowledge about a person, his organs and the system, adhering to appropriate ethical and legal standards and rules.
LO4	To study the main methods of pathomorphological research: autopsy, surgical and biopsy material's research, experimental modeling of diseases to use them in the professional activities.
LO5	Be able to apply gained knowledge gained in pathomorphology in the professional activities conducting differential diagnosis of diseases, being able to think abstractly, analyze and synthesize information.

6. Role of the course in the achievement of programme learning outcomes

Programme learning outcomes achieved by the course.

For 222 Medicine:

PO2	To collect information about the patient's general condition; to assess the patient's psychomotor and physical development and the state of organs and systems of the body; to assess information on the diagnosis (according to the List 4) based on laboratory and instrumental findings.
PO3	To order and analyze additional (mandatory and optional) examinations (laboratory, radiological, functional and/or instrumental) (according to the List 4) in order to perform a differential diagnosis of diseases (according to the List 2).
PO4	To establish a final clinical diagnosis at a medical institution under control of a supervising doctor by means of informed decision and logical analysis of the obtained subjective and objective data of clinical and additional examinations, and differential diagnosis, following the relevant ethical and legal norms (according to the List 2).
PO18	To search for the necessary information in the professional literature and databases; to analyze, evaluate, and apply this information. To apply modern digital technologies, specialized software, statistical methods of data analysis to solve complex health problems.

7. Teaching and learning activities

7.1 Types of training

Topic 1. Morphology of reversible and irreversible injury of the cells and tissues.
lect.1 "Morphology of reversible and irreversible injury of the cells and tissues" (full-time course) Intracellular and extracellular accumulations of proteins, carbohydrates and lipids. Disturbance of the metabolism. Morphology of pathological accumulation of endogenous and exogenous pigments. Disturbance of the copper, potassium and calcium exchanges. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line)

pr.tr.1 "Morphology of reversible and irreversible injury of the cells and tissues." (full-time course)

Morphology of reversible and irreversible injury of the cells and tissues. Study of this topic involves review of macropreparations of the department museum with assessment of macroscopic changes and review of micropreparations (fatty liver disease, heart obesity, squamous cell carcinoma of the skin with keratinization).

Topic 2. Pathomorphological manifestations of metabolic products accumulation.

pr.tr.1 "Pathomorphological manifestations of metabolic products accumulation." (full-time course)

Morphology of pathological accumulation of endogenous and exogenous pigments. Disturbance of the copper, potassium and calcium exchanges. Study of this topic involves theoretical work in the classroom, review of macropreparations of the department museum with assessment of macroscopic changes. Review of micropreparations (liver with mechanical jaundice, melanoma of the skin).

Topic 3. Fundamentals of thanatology.

pr.tr.3 "Fundamentals of thanatology" (full-time course)

Birth and death of man. Fundamentals of thanatogenesis. The main causes of biological death. Signs of biological death, cadaveric changes. The study of this topic involves theoretical work in the classroom, work in the section hall if there is no quarantine restriction (according to the agreement on cooperation between the medical institution and university, study of signs of biological death, cadaveric changes). Use of virtual simulation (watching movies) with their further discussion.

Topic 4. Injury and necrosis of cells and tissues.

lect.2 "Injury and necrosis of cells and tissues" (full-time course)

Necrosis and apoptosis. Clinical and morphological classification of necrosis. Morphological manifestations of necrosis. Outcomes. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.4 "Injury and necrosis of cells and tissues." (full-time course)

Necrosis and apoptosis. Clinical and morphological classification of necrosis. Morphological manifestations of necrosis. Outcomes. Study of this topic involves theoretical work in the classroom, review of macropreparations of the department museum with assessment of macroscopic changes. Review of micropreparations (necrotic nephrosis, hemorrhagic pulmonary infarction, myocardial infarction), use of virtual simulation (watching movies with depiction of the main morphological forms of tissue necrosis) with their further discussion.

Topic 5. Processes of adaptation and compensation.

pr.tr.5 "Processes of adaptation and compensation." (full-time course)

Morphology of adaptation and compensation processes. Development phases. Violation of the body's adaptive processes. Study of this topic involves theoretical work in the classroom, review of macropreparations of the department museum with assessment of macroscopic changes. Review of micropreparations (adenomatous hyperplasia of the prostate, liver cyst), use of virtual simulation (watching movies with depiction of the main morphological compensatory and adaptive changes of the organs) with their further discussion.

Topic 6. Regeneration.

pr.tr.6 "Regeneration." (full-time course)

Types of regeneration. Features of reparative regeneration of specialized cells. Variants of organs reparative regeneration. Study of this topic involves theoretical work in the classroom, review of micropreparations (granulation tissue, postinfarction cardiosclerosis). Work in the section hall if there is no quarantine restriction (according to the agreement on cooperation between the medical institution and university).

Topic 7. Disorders of blood and lymph circulation.

lect.3 "Disorders of blood and lymph circulation." (full-time course)

Acute systemic circulatory disorders. Systemic circulatory disorders in chronic heart failure and cardiac decompensation. Regional circulatory disorders (local venous and arterial hyperemia, ischemia, plasmorrhagia, bleeding and hemorrhage). Disorders of lymph formation and circulation. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.7 "Disorders of blood and lymph circulation." (full-time course)

Acute systemic circulatory disorders. Systemic circulatory disorders in chronic heart failure and cardiac decompensation. Regional circulatory disorders (local venous and arterial hyperemia, ischemia, plasmorrhagia, bleeding and hemorrhage). Disorders of lymph formation and circulation. Study of this topic involves theoretical work in the classroom, review of macropreparations of the department museum with assessment of macroscopic changes. Review of micropreparations (pulmonary hyperemia, stasis in the capillaries of the brain, "nutmeg liver", brown induration of the lungs), use of virtual simulation (watching movies with depiction of the main disorders of blood and lymph circulation) with their further discussion.

Topic 8. Disturbances of hemostasis, embolism.

pr.tr.8 "Disturbances of hemostasis, embolism." (full-time course)

Hemorrhagic syndrome. Thrombosis, DIC-syndrome (causes, stages of development). Embolism: classification, pathogenesis and thanatogenesis. Study of this topic involves theoretical work in the classroom, review of micropreparations (pulmonary embolism, thrombus organization), work in the section hall if there is no quarantine restriction (according to the agreement on cooperation between the medical institution and university).

Topic 9. Inflammation.

lect.4 "Inflammation." (full-time course)

Pathogenesis of inflammation. Classification. Morphology of exudative inflammation. Classification. Specific granulomatous inflammation. Types of granulomas. Pathological anatomy of granulomas. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.9 "Inflammation." (full-time course)

Pathogenesis of inflammation. Classification. Morphology of exudative inflammation. Study of this topic involves theoretical work in the classroom, review of macropreparations of the department museum with assessment of macroscopic changes. Review of micropreparations (lobar pneumonia, phlegmonous appendicitis, acute lung abscess), use of virtual simulation (watching movies with depiction of the main forms of exudative inflammation) with their further discussion.

Topic 10. Inflammation.

pr.tr.10 "Inflammation." (full-time course)

Proliferative inflammation. Classification. Specific granulomatous inflammation. Types of granulomas. Pathological anatomy of granulomas. Study of this topic involves theoretical work in the classroom, review of macropreparations of the department museum with assessment of macroscopic changes. Review of micropreparations (syphilitic mesoarthrititis, tuberculoma), use of virtual simulation (watching movies with depiction of the main forms of proliferative inflammation and specific granulomatous inflammation) with their further discussion.

Topic 11. Tumors.

lect.5 "Tumors." (full-time course)

Initiating factors of tumor growth. Anatomical and microscopic features of the tumor. Morphological characteristics of the main stages of malignant tumor development. Pathomorphological classification of tumors. Benign and malignant non-epithelial (mesenchymal) tumors. Tumors of fibroblastic, myofibroblastic and fibrohistiocytic genesis. Tumors of adipose, muscle, bone and cartilage tissues, vascular tumors. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.11 "Tumors." (full-time course)

Initiating factors of tumor growth. Anatomical and microscopic features of the tumor. Morphological characteristics of the main stages of malignant tumor development. Pathomorphological classification of tumors. Study of this topic involves theoretical work in the classroom, review of macropreparations of the department museum with assessment of macroscopic changes, use of virtual simulation (watching movies with depiction of the main routes of metastasis of malignant tumors and morphological differences between benign and malignant tumors) with their further discussion.

Topic 12. Tumors of soft and other tissues

pr.tr.12 "Tumors of soft and other tissues." (full-time course)

Benign and malignant non-epithelial (mesenchymal) tumors. Tumors of fibroblastic, myofibroblastic and fibrohistiocytic genesis. Tumors of adipose, muscle, bone and cartilage tissues, vascular tumors. Study of this topic involves theoretical work in the classroom, visiting the clipping of postoperative material on the subject of the lesson if there is no quarantine restriction (according to the agreement on cooperation between the medical institution and the university).

Topic 13. Melanocytic tumors.

pr.tr.13 "Melanocytic tumors." (full-time course)

Melanocytic tumors. Histological structure of naevus. Types of melanoma. Histological classification of melanoma by Clark and Breslow. Study of this topic involves theoretical work in the classroom, review of macropreparations of the department museum with assessment of macroscopic changes. Review of micropreparations (complex nevus, melanoma). Interpretation of histological examination results, planning of immunohistochemical examination in case of suspected melanoma.

Topic 14. Tumors of the nervous system and meninges. Teratomas. Features of childhood tumors.

pr.tr.14 "Tumors of the nervous system and meninges. Teratomas. Features of childhood tumors" (full-time course)

Tumors of the central nervous system. Features of CNS tumors, classification. Tumors of the cranial and paraspinal nerves. Teratomas. Features of childhood tumors. Embryonic tumors. Germinogenic tumors. «Adult» tumors. Study of this topic involves theoretical work in the classroom, review of macropreparations of the department museum with assessment of macroscopic changes, review of micropreparations (anaplastic astrocytoma, schwannoma), use of virtual simulation (watching movies with depiction of the main representatives of tumors of the central and peripheral nervous system) with their further discussion.

Topic 15. Epithelial tumors

lect.6 "Epithelial tumors." (full-time course)

Benign and malignant tumors of the simple surface (transitional or stratified squamous) epithelium. Tumors of specialized (glandular or integumentary) epithelium. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.15 "Epithelial organ-nonspecific tumors." (full-time course)

Benign and malignant tumors of the simple integumentary (transitional or stratified squamous) epithelium. The study of this topic involves theoretical work in the classroom, visiting the clipping of postoperative material for the subject of the lesson if there is no quarantine restriction (according to the agreement on cooperation between the medical institution and university).

Topic 16. Epithelial tumors.

pr.tr.16 "Epithelial organ-specific tumors." (full-time course)

Tumors of the specialized (glandular or integumentary) epithelium. Study of this topic involves theoretical work in the classroom, review of micropreparations (hepatocellular carcinoma, follicular adenoma of the thyroid gland, vesical drift), visiting the clipping of postoperative material on the subject of the lesson if there is no quarantine restriction (according to the agreement on cooperation between the medical institution and the university).

Topic 17. Final module of the 1st semester.

pr.tr.17 "Final module of the 1st semester." (full-time course)

Solving test tasks "Krok 1". Assessment of practical skills acquisition (review of micropreparations).

Topic 18. Final module of the 1st semester.

pr.tr.18 "Final module of the 1st semester." (full-time course)

Assessment of students' knowledge on theoretical issues of the final module. Assessment of practical skills acquisition (knowledge of macro preparations).

Topic 19. Diseases of the blood system.

lect.7 "Anemia.Tumors of hematopoietic and lymphoproliferative tissue." (full-time course)

Pathogenetic, morphological and depending on the ability of the bone marrow to regenerate classification of anemia. Etiology, mechanisms of development, morphological manifestations, outcomes. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.19 "Anemia." (full-time course)

Pathogenetic, morphological and depending on the ability of the bone marrow to regenerate classification of anemia. Etiology, mechanisms of development, morphological manifestations, outcomes. Study of this topic involves theoretical work in the classroom, review of macropreparations of the museum of the department with assessment of macroscopic changes in this pathology, review of micropreparations (hemosiderosis of the liver, kidneys), use of virtual simulation (watching movies with depiction of the main mechanisms of anemia with characteristic changes in the internal bodies) with their further discussion.

Topic 20. Tumors of hematopoietic and lymphoproliferative tissues.

pr.tr.20 "Tumors of hematopoietic and lymphoproliferative tissue" (full-time course)

Groups of hemoblastosis. Etiology and pathogenesis of acute and chronic leukemias.Tumors of lymphoid origin, classification. Hodgkin's lymphoma. Tumors of the progenitor of T- and B-lymphocytes. Mature B-cell tumors. Diffuse B-cell large cell lymphoma. Burkitt's lymphoma. Follicular lymphoma. Plasma cell tumors.Myeloid origin tumors. Study of this topic involves theoretical work in the classroom, usage of virtual simulation (watching movies depicting the main tumors of lymphoid origin, acquaintance with immunohistochemical markers of their diagnosis) and further discussion of their morphological diagnostics. Visiting the laboratory of the Center of pathomorphological research and review of micropreparations on the subject of the lesson if no quarantine restrictions are implemented.

Topic 21. Diseases of the cardiovascular system

lect.8 "Diseases of the cardiovascular system.Systemic connective tissue diseases with autoimmunization." (full-time course)

Atherosclerosis and arteriosclerosis. Coronary heart disease. Hypertension and arteriosclerosis. Rheumatism. Rheumatoid arthritis. Systemic lupus erythematosus. Scleroderma. Dermatomyositis. Bekhterev's disease. Etiology, mechanisms of development, morphological manifestations, classification, outcomes. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.21 "Diseases of the cardiovascular system." (full-time course)

Atherosclerosis and arteriosclerosis. Coronary heart disease. Hypertension and arteriosclerosis. Etiology, mechanisms of development, morphological manifestations, classification, outcomes. Study of this topic involves theoretical work in the classroom, review of micropreparations (stenotic atherosclerosis of the coronary artery, acute myocardial infarction, atherosclerotic cardiosclerosis), if there are no quarantine restrictions work in the section hall (according to the cooperation agreement between the medical institution and the university).

Topic 22. Systemic connective tissue diseases with autoimmunization.

pr.tr.22 "Systemic connective tissue diseases with autoimmunization." (full-time course)

Rheumatism. Rheumatoidarthritis. Systemic lupus erythematosus. Scleroderma. Dermatomyositis.Bekhterev's disease. Etiology, mechanisms of development, morphological manifestations, classification, outcomes. The study of this topic involves theoretical work in the classroom, review of macropreparations of the museum of the department on the subject of the lessons with their valuation, review of micropreparations (acute warty endocarditis, glomerulonephritis in systemic lupus erythematosus),application of virtual simulation watching movies depicting the main representatives of collagenosis and their clinical and morphological features) with further discussion.

Topic 23. Respiratory diseases.

lect.9 "Respiratory diseases." (full-time course)

Classification and pathological anatomy of pneumonia. Complications and outcomes. Lung abscess and gangrene. Chronic diffuse lung lesions.Etiology, pathogenesis and complications. Tumors of the bronchi and lungs. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.23 "Acute inflammatory lung diseases." (full-time course)

Classification and pathological anatomy of pneumonia. Complications and outcomes. Lung abscess and gangrene. Etiology, pathogenesis and complications. The study of this topic involves theoretical work in the classroom, review of macrodrug of the museum of the department, review of micropreparations (lobar pneumonia, lung gangrene), work in the section hall if there are no quarantine restrictions (according to the cooperation agreement between the hospital and the university).

Topic 24. Chronic diffuse lung lesions. Tumors of the bronchi and lungs.

pr.tr.24 "Chronic diffuse lung lesions. Tumors of the bronchi and lungs." (full-time course)

Chronic diffuse lung lesions: classification, etiology, pathogenesis, pathomorphology and complications. Chronic bronchitis. Chronic obstructive emphysema. Bronchiectasis. Bronchial asthma. Acute and chronic interstitial lung diseases. Tumors of the bronchi and lungs. The study of this topic involves theoretical work in classroom, viewing macropreparations of the museum of the department with the assessment of macroscopic changes in this pathology, viewing micropreparations (pneumosclerosis, emphysema, pulmonary adenocarcinoma), the use of virtual simulation (watching movies depicting the main chronic diffuse lung lesions, morphological features of bronchial and lung tumors) with further discussion of immunohistochemical markers for the diagnosis of malignant tumors of this localization.

Topic 25. Diseases of the esophagus, stomach and intestinal.

lect.10 "Diseases of the esophagus, stomach and intestine." (full-time course)

Esophageal diseases (developmental abnormalities, achalasia of the cardia, esophagospasm, diverticula, Mallory-Weiss syndrome, esophagitis, gastroesophageal reflux disease, Barrett's esophagus, tumors). Stomach diseases (gastritis, ulcerative colitis, tumors). Intestinal diseases: enterocolitis, malabsorption syndrome, idiopathic inflammatory bowel disease. Tumors of the small and large intestine. Appendicitis. Etiology, mechanisms of development, morphological manifestations, outcomes. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.25 "Diseases of the esophagus and stomach." (full-time course)

Esophageal diseases (developmental abnormalities, achalasia of the cardia, esophagospasm, diverticula, Mallory-Weiss syndrome, esophagitis, gastroesophageal reflux disease, Barrett's esophagus, tumors). Stomach diseases (gastritis, ulcerative colitis, tumors). Etiology, mechanisms of development, morphological manifestations, outcomes. The study of this topic involves theoretical work in the classroom, if there are no quarantine restrictions visiting clippings of postoperative material on the subject of the lesson (according to the agreement on cooperation between the institution and the university), review of macro- and micropreparations of the museum of the department (gastric ulcer, chronic gastric ulcer, Menetrie's disease).

Topic 26. Intestinal diseases.

pr.tr.26 "Intestinal diseases." (full-time course)

Intestinal diseases: enterocolitis, malabsorption syndrome, idiopathic inflammatory bowel disease. Tumors of the small and large intestine. Appendicitis. Etiology, mechanisms of development, morphological manifestations, outcomes. The study of this topic involves theoretical work in the classroom, review of macropreparations of the museum of the department with the assessment of macroscopic changes in this pathology, review of micropreparations (Crohn's disease, gangrenous appendicitis), application of virtual simulation (watching movies depicting the main diseases of the intestine, differential morphological diagnosis of Crohn's disease and nonspecific ulcerative colitis) with further discussion.

Topic 27. Liver diseases.

pr.tr.27 "Liver diseases." (full-time course)

Liver diseases: massive / submassive liver necrosis, hepatitis, alcoholic liver disease, liver cirrhosis, liver tumors. Etiology, mechanisms of development, morphological manifestations, classification, outcomes. The study of this topic involves theoretical work in the classroom, in case of absence of quarantine restrictions work in the section hall (according to the agreement on cooperation between the medical institution and the university), review of macro- and micro-preparations of the museum of the department (toxic liver dystrophy, portal liver cirrhosis).

Topic 28. Diseases of the gallbladder and pancreas.

pr.tr.28 "Diseases of the gallbladder and pancreas." (full-time course)

Inflammatory processes, formation of stones and tumors in the gallbladder. Acute and chronic pancreatitis. Mechanisms of development, morphological manifestations, classification, outcomes. Pancreatic cancer. The study of this topic involves theoretical work in the classroom, in case of the absence of quarantine restrictions visiting clippings of postoperative material on the subject of the lesson (according to the agreement on cooperation between the hospital and the university), review of macro- and micropreparations of the museum of the department (phlegmonouscholecystitis, pancreatic adenocarcinoma).

Topic 29. Kidney diseases.

lect.11 "Kidney disease." (full-time course)

Glomerulopathies (glomerulonephritis, renal amyloidosis, diabetic nephropathy and hepatic glomerulosclerosis). Tubulopathy. Polycystic kidney disease. Pyelonephritis. Acute and chronic renal insufficiency. Etiology, mechanisms of development, morphological manifestations, outcomes. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.29 "Kidney disease." (full-time course)

Glomerulopathies (glomerulonephritis, renal amyloidosis, diabetic nephropathy and hepatic glomerulosclerosis). Tubulopathy. Polycystic kidney disease. Pyelonephritis. Acute and chronic renal insufficiency. Etiology, mechanisms of development, morphological manifestations, outcomes. The study of this topic involves theoretical work in the classroom, viewing macropreparations of the museum of the department with the assessment of macroscopic changes in this pathology, viewing micropreparations (necrotic nephrosis, chronic pyelonephritis), the use of virtual simulation (viewing films depicting major kidney disease and subsequent differential diagnosis) with further discussions.

Topic 30. Diseases of the endocrine system.

pr.tr.30 "Diseases of the endocrine system." (full-time course)

Hypothalamic-pituitary disorders. Pathology of the adrenal glands. Thyroid disease. Pathology of the endocrine system of the pancreas. Diabetes mellitus (definition, classification, complications, causes of death). The study of this topic involves theoretical work in classroom, if there is no quarantine restrictions visiting the section of postoperative material on the subject of the lesson (according to the agreement on cooperation between the medical institution and the university), review of macro- and micropreparations of the museum of the department.

Topic 31. Diseases of the female and male reproductive systems.

pr.tr.31 "Diseases of the female and male reproductive systems." (full-time course)

Diseases of the female and male reproductive systems of inflammatory nature. Precancerous processes and tumors of the genital system. Dyshormonal diseases. Etiology, mechanisms of development, morphological manifestations, classification, outcomes. The study of this topic involves theoretical work in the classroom, review of macro-and micro-preparations of the museum of the department on the subject of the lesson.

Topic 32. Pathology of pregnancy, postpartum and placenta. Prenatal and perinatal pathology.

pr.tr.32 "Pathology of pregnancy, postpartum and placenta. Prenatal and perinatal pathology." (full-time course)

Complications of pregnancy: abortion, ectopic pregnancy, ORN-gestosis, trophoblastic disease. Placental pathology: inflammation, circulatory disorders, pathology of placental maturation, implantation disorders, placental insufficiency, tumors. Prenatal and perinatal pathology. Intrauterine growth retardation. Childbirth trauma. Mechanisms of development, morphological manifestations, classification, outcomes. The study of this topic involves theoretical work in the classroom, review of macro-and micro-preparations of the museum of the department on the subject of the lesson.

Topic 33. Primary and hematogenous tuberculosis.

lect.11 "Tuberculosis." (full-time course)

Epidemiology, etiology, pathogenesis, morphogenesis, classification. Morphological characteristics of primary tuberculosis. Hematogenous tuberculosis: forms, main pathomorphological manifestations, complications. Secondary tuberculosis: forms, morphological manifestations, outcomes, causes of death. Teaching is conducted in the form of multimedia lectures (in case of quarantine restrictions – on-line).

pr.tr.33 "Primary and hematogenous tuberculosis." (full-time course)

Epidemiology, etiology, pathogenesis, morphogenesis, classification. Morphological characteristics of primary tuberculosis. Hematogenous tuberculosis: forms, main pathomorphological manifestations, complications. The study of this topic involves theoretical work in classroom, viewing macropreparations of the museum of the department with the assessment of macroscopic changes in this pathology, viewing micropreparations, the use of virtual simulation (watching films depicting the main manifestations of tuberculosis and their differential morphological diagnosis) with further discussion.

Topic 34. Secondary tuberculosis.

pr.tr.34 "Secondary tuberculosis." (full-time course)

Secondary tuberculosis: forms, morphological manifestations, outcomes, causes of death. The study of this topic involves theoretical work in the classroom, viewing macropreparations of the museum of the department with the assessment of macroscopic changes in this pathology, viewing micropreparations (cirrhotic tuberculosis, tuberculoma), the use of virtual simulation (viewing films depicting the main manifestations of secondary tuberculosis morphology and their diagnosis) with further discussion.

Topic 35. Infectious and parasitic diseases. Particularly dangerous (quarantine) infections.

pr.tr.35 "Infectious and parasitic diseases. Particularly dangerous (quarantine) infections." (full-time course)

Classification of infectious diseases. Intestinal infectious diseases (typhoid fever, paratyphoid fever A and B, salmonellosis, shigellosis, yersiniosis, staphylococcal enteritis). Particularly dangerous infections: plague, tularemia, anthrax, cholera. The study of this topic involves theoretical work in the classroom, viewing macropreparations of the museum of the department with the assessment of macroscopic changes in this pathology, viewing micropreparations, application of virtual simulation (watching films depicting the main manifestations of infectious and parasitic diseases and their differential diagnosis) with further discussion.

Topic 36. Viral airborne infections. Pediatric infections.

pr.tr.36 "Viral airborne infections. Pediatric infections." (full-time course)

Influenza, parainfluenza, respiratory syncytial infection, adenoviral infection. Pediatric infections (measles, mumps, infectious mononucleosis, polio, chickenpox, rubella, whooping cough, diphtheria, scarlet fever, meningococcal infection). Basic morphological manifestations, outcomes, causes of death. The study of this topic involves theoretical work in classroom, review of macropreparations of the museum of the department with the assessment of macroscopic changes in this pathology, viewing micropreparations, the use of virtual simulation (watching movies depicting the main morphological manifestations of viral airborne infections and their differential diagnosis) with further discussion.

Topic 37. HIV infection and acquired immunodeficiency syndrome (AIDS).

pr.tr.37 "HIV infection and acquired immunodeficiency syndrome (AIDS)." (full-time course)

Etiology, pathogenesis, stages of the disease. Clinical characteristics of HIV and AIDS. Clinical and morphological characteristics of the most important opportunistic infections. AIDS-associated diseases. The study of this topic involves theoretical work in the classroom, review of macropreparations of the museum of the department with the assessment of macroscopic changes in this pathology, viewing micropreparations, the use of virtual simulation (watching movies depicting the main morphological manifestations of HIV infection) with further discussion.

7.2 Learning activities

LA1	E-learning in systems (Zoom, MIX.sumdu.edu.ua)
LA2	Self-training
LA3	Preparation for "Krok-1"
LA4	Preparation for certification
LA5	Preparation for practical classes
LA6	Discussion of cases
LA7	Solving situational tasks
LA8	Participation in the discussion (in groups and pairs)
LA9	Interpretation of histological preparations
LA10	Work with textbooks and relevant information sources.

LA11	Individual research project (student research work, article, thesis, etc.)
LA12	Practice of practical skills in the section hall.

8. Teaching methods

Course involves learning through:

TM1	Interactive lectures
TM2	Case-based learning (CBL)
TM3	Team-based learning (TBL)
TM4	Research-based learning (RBL)
TM5	Case-study
TM6	Brain storm
TM7	Practice-oriented learning
TM8	Scientific discussions / debates

Teaching of discipline is conducted using modern teaching methods (CBL, TBL, RBL) that promote the development of professional abilities, creative and scientific activities and aimed at training practice-oriented professionals.

The discipline provides students such kind of soft skills as:GC1. Ability to abstract thinking, analysis and synthesis. GC2. Ability to learn, master modern knowledge and apply the knowledge in practice.GC3. Knowledge and understanding of the subject area and professional activity comprehension.

9. Methods and criteria for assessment

9.1. Assessment criteria

ECTS	Definition	National scale	Rating scale
	Outstanding performance without errors	5 (Excellent)	$170 \leq RD \leq 200$
	Above the average standard but with minor errors	4 (Good)	$140 \leq RD < 169$
	Fair but with significant shortcomings	3 (Satisfactory)	$120 \leq RD < 139$
	Fail – some more work required before the credit can be awarded	2 (Fail)	$0 \leq RD < 119$

9.2 Formative assessment

FA1	Peer assessment
FA2	Interview and verbal comments of the lecturer according to its results
FA3	Solving situational tasks of “Krok-1”
FA4	Solving situational tasks (analysis and interpretation of macro- and microscopic changes of cells, tissues, organs and systems in certain pathological processes)

FA5	Defence of an individual research project (speech at the conference, competition of scientific works)
FA6	Teacher's admonishments during performing practical tasks

9.3 Summative assessment

SA1	Survey on the topic of practical class, solving clinical cases and situational tasks
SA2	Testing
SA3	Description macropreparations
SA4	Description micropreparations
SA5	Final control: credit
SA6	Defence of an individual research project (incentive activities, extra points)
SA7	Final control: practice-oriented exam (in accordance with the regulations)

Form of assessment:

5 semester		200 scores
SA1. Survey on the topic of practical class, solving clinical cases and situational tasks		60
		60
SA2. Testing		20
		20
SA3. Description macropreparations		20
		20
SA4. Description micropreparations		20
		20
SA5. Final control: credit		80
	Testing of theoretical knowledges for the semester -40 points, testing of practical skills for the semester – 20 points, situational tasks of “Krok-1” for the semester– 20 points.	80
6 semester		200 scores
SA1. Survey on the topic of practical class, solving clinical cases and situational tasks		60
		60
SA2. Testing		20
		20
SA3. Description macropreparations		20
		20
SA4. Description micropreparations		20

		20
SA7. Final control: practice-oriented exam (in accordance with the regulations)		80
	Testing of theoretical knowledges - 40 points, testing of practical skills – 20 points, situational tasks of “Krok-1” – 20 points.	80

Form of assessment (special cases):

5 semester		200 scores
SA1. Survey on the topic of practical class, solving clinical cases and situational tasks		80
	In case of quarantine restrictions, practical classes are held at remote mode using Mix.sumdu.edu.ua platform, Zoom, Google meet.	80
SA2. Testing		40
	In case of quarantine restrictions, practical classes are held at remote mode using Mix.sumdu.edu.ua platform, Zoom, Google meet.	40
SA5. Final control: credit		80
	In case of quarantine restrictions, testing of theoretical knowledge, practical skills (assessment of macro- and microscopic changes of the organs) and solving situational tasks of “Krok-1” are conducted in remote mode using Mix.sumdu.edu.ua platform, Zoom, Google meet. Testing of theoretical knowledge for the semester – 40 points, testing of practical skills – 20 points, situational tasks of “Krok-1” for the semester – 20 points.	80
6 semester		200 scores
SA1. Survey on the topic of practical class, solving clinical cases and situational tasks		80
	In case of quarantine restrictions, practical classes are held at remote mode using Mix.sumdu.edu.ua platform, Zoom, Google meet.	80
SA2. Testing		40
	In case of quarantine restrictions, practical classes are held at remote mode using Mix.sumdu.edu.ua platform, Zoom, Google meet.	40
SA7. Final control: practice-oriented exam (in accordance with the regulations)		80
	In case of quarantine restrictions, testing of theoretical knowledge, practical skills (assessment of macro- and microscopic changes of the organs) and solving situational tasks of “Krok-1” are conducted in remote mode using Mix.sumdu.edu.ua platform, Zoom, Google meet. Testing of theoretical knowledge – 40 points, testing of practical skills – 20 points, situational tasks of “Krok-1” – 20 points.	80

During the course a student is awarded maximum 5 points for each practical class (the grade is set in the traditional 4-point grading system). The maximum number of points for the current educational activities of the student – 120 points (survey on the topic of practical class, test – 20 points, description of macropreparations – 20 points, description of micropreparations – 20 points).

A student is admitted to the exam if he has fulfilled the conditions of the curriculum and if for the current educational activity he scored at least 72 points. The final module control is carried out according to the schedule at the end of 5 semester. The final module control includes testing of theoretical knowledge for the semester-40 points, testing of theoretical skills – 20 points, situational tasks of “Krok-1” – 20 points. Practice-oriented exams are carried out according to the schedule at the end of 6 semester. Exam tickets contain 2 theoretical questions on various topics and cover all sections of the discipline (20 points each), a test of practical skills (20 points) and basic test questions “Krok 1” (20 points). The exam is credited to the student if he scored at least 48 points out of 80. Additional points are added to the grade for the discipline for the implementation of an individual research project (defence of an individual research project – 12 points, speech at the conference – 5 points, poster report at the conference – 4 points, thesis work – 3 points). The total score in the discipline may not exceed 200 points.

10. Learning resources

10.1 Material and technical support

MTS1	Information and communication systems
MTS2	Library funds
MTS3	Medical facilities / premises and equipment (section halls of Sumy Regional Hospital, premises for in vivo examination of postoperative material, macropreparations of samples of internal organs, histological preparations, etc. pathohistological laboratory)
MTS4	Computers, computer systems and networks
MTS5	Laboratory equipment (microscopes, the device for the automated painting of samples, microtomes, medical equipment, etc.)
MTS6	Multimedia, video and audio reproduction, projection equipment (video cameras, projectors, screens, smart boards, etc.)
MTS7	Software (to support distance learning: training materials "Lectur.ED", training platform "MIX")
MTS8	Sumy Regional Hospital

10.2 Information and methodical support

Essential Reading	
1	Fundamentals of Robinson's pathology: in 2 vols. Vol.1/ Viney Kumar, Abul K. Abbas, John K. Aster.; Scientific Translation by prof. I. Sorokina, S. Hychka, I. Davydenko. – K.: VSV "Medicine", 2019. - XII, 420 p.
2	Fundamentals of Robinson's pathology: in 2 vols. Vol.2/ Viney Kumar, Abul K. Abbas, John K. Aster.; Scientific Translation by prof. I. Sorokina, S. Hychka, I. Davydenko. – K.: VSV "Medicine", 2020. - XII, 532 p.
3	Bodnar Ya., Romaniuk A., Voloshyn V., Gargin V. Essentials of pathology. / Ya. Bodnar, A. Romaniuk, V. Voloshyn, V. Gargin. – Kharkiv: Planeta-Print, 2020. – 216 p.

4	Device for histological and histochemical staining of samples. Patent 144872 U Ukraine, IPC G01N 1/30 (2006.01) G01N 1/31 (2006.01). [Text] / YV Kuzenko, AM Romaniuk, MS Skidanenko and others; applicant and patent owner of SSU. - № u202003
5	Hyriavenko N, Lyndin M, Sikora K, Piddubnyi A, Karpenko L, Kravtsova O, Hyriavenko D, Diachenko O, Sikora V, Romaniuk A. Serous Adenocarcinoma of Fallopian Tubes: Histological and Immunohistochemical Aspects. J Pathol Transl Med. 2019;53: 236–43.
Supplemental Reading	
1	Pathomorphology and histology: atlas / ed.: DD Zerbino, MM Bagria, Ya.Ya. Bodnara, V.A.Dibrova. - Vinnytsia: Nova Kniga, 2016. - 800 p.: ill.
2	Tuffaha SA Muin, Gichka Sergey, Guski Hans, Christiansen Glen. Immunohistochemistry in the diagnosis of tumors. - K.: Kniga-plus, 2018.-336p.
3	A modified method of preparation of histological preparations of the pineal gland of rats. Patent 142276 U Ukraine, IPC (2020.01) G01N 1/00. [Text] / NB Grintsova, AM Romaniuk, MS Lyndin, YM Lyndina; applicant and patent owner of SSU. - №u201912202.
4	Lyndin M, Gluschenko N, Sikora V, Lyndina Yu, Hyryavenko N, Tkach G, Kurochkina V, Romaniuk A. Morphofunctional features of articular cartilage structure. Folia Medica Cracoviensia. 2019;59(3):81–93.