THEMATIC PLAN OF PRACTICAL CLASSES IN PATHOLOGICAL PHYSIOLOGY

for 3rd year students of **FIS**
Educational Institution «Gomel State Medical University»
for **V semester 2025/2026 academic year**

№ п/п	Name of topics, content of practical classes	Number of hours, date
1.	**Introduction to the discipline "Pathological physiology". General etiology and pathogenesis** 1. Pathophysiology: subject, content, tasks and methods. The concept of clinical pathological physiology. 2. Basic concepts of general nosology. Dual nature of disease. 3. Typical pathological processes: their characteristic features and clinical significance. 4. The role and place of the etiological factor in the pathogenesis of diseases. Critical analysis of the concepts of general nosology. 5. General pathogenesis: definition of the concept, the role of damage in pathogenesis, types of damage, manifestation of damage at different levels of the body. 6. Cause-and-effect relationships in pathogenesis; concepts of the leading link in pathogenesis and "vicious circles". 7. Types and mechanisms of sanogenesis, their role in the development of the disease. Decompensation phenomena. 8. Etiotropic and pathogenetic principles of disease therapy.	**2,5** **08.09.25-** **13.09.25**
2.	**Pathogenic effects of environmental factors on the human body. Stress** 1. Actions of mechanical factors: general characteristics, pathogenesis and manifestations. 2. Actions of barometric pressure: general characteristics, pathogenesis and manifestations. 3. Actions of electric current: general characteristics, pathogenesis and manifestations. 4. Action of high and low temperatures: general characteristics, pathogenesis and manifestations. 5. Mechanisms of action of ionizing radiation. Radiosensitivity of cells. 6. Pathogenic effects of chemical factors; exo- and endogenous intoxications. 7. Biological factors as causes of infectious diseases. 8. Psychogenic pathogenic factors. Iatrogenic diseases. 9. The concept of stress, stages, mechanisms of stress development, the role of neurohormonal factors. The main manifestations of stress "diseases of adaptation".	**2,5** **15.09.25-** **20.09.25**
3.	**The role of heredity and age in the development of pathology** 1. The concept of hereditary, congenital diseases and phenocopies. Mutagenic factors. 2. Mechanisms of hereditary pathology. Antimutagenesis. 3. Mono- and polygenic hereditary diseases. Penetrance and expressivity. 4. Chromosomal diseases. Hereditary predisposition to diseases. 5. Hereditary diseases of connective tissue. 6. Methods of studying hereditary diseases, principles of their prevention. 7. Concept of gene therapy and "genetic engineering". 8. Pathology of intrauterine development. The concept of antenatal	**2,5** **22.09.25-** **27.09.25**

	pathology. 9. Theories and mechanisms of aging.	
4.	**Reactivity. Immunogenic reactivity. Immunodeficiency states** 1. Reactivity of the organism, its types and indicators. The relationship between the concepts of reactivity and resistance. 2. The role of reactivity in the development of the infectious process. Specific and non-specific protective factors. 3. Pathological reactivity, its types and forms of manifestation. 4. Directed change in individual and group reactivity as the most important means of disease prevention and therapy. 5. Factors that ensure a decrease in non-specific resistance. Ways and means of increasing it. 6. The doctrine of the constitution. Classification of constitutional types. Significance in pathology. 7. Hereditary and acquired immunodeficiencies (ID): causes, mechanisms of formation and manifestation of ID. 8. Principles of diagnostics and immunotherapy of ID.	**2,5** **29.09.25-** **04.10.25**
5.	**Allergy. Autoimmune diseases** 1. Allergy: definition, etiology, classification, stages of allergic reactions. 2. Allergic reactions of type I: pathogenesis and main clinical manifestations 3. Allergic reactions of type II: pathogenesis and clinical manifestations. 4. Allergic reactions of type III: pathogenesis and clinical manifestations. 5. Allergic reactions of type IV: pathogenesis and clinical manifestations. 6. Autoimmune diseases: definition, classification, mechanisms of violation of immune tolerance and occurrence of immune autoaggression.	**2,5** **06.10.25-** **11.10.25**
6.	**Microcirculation and peripheral blood circulation disorders** 1. Typical microcirculation disorders: classification, causes and mechanisms of development. 2. "Sludge" phenomenon: definition of the concept, types, causes, mechanisms of development and manifestations. 3. Stasis: definition of the concept, types, causes, mechanisms of development and manifestations. Capillary-trophic insufficiency. 4. Typical lymphodynamic disorders: types, causes, mechanisms of development and manifestations. 5. Arterial and venous hyperemia: types, causes, mechanisms of development and manifestations 6. Ischemia: types, causes, mechanisms of development and manifestations. 7. Thrombosis: types of thrombi, causes, stages, mechanisms of the thrombus formation process. Embolism: types of embolism, causes and mechanisms of formation. 8. General changes in the body and compensatory processes in case of peripheral blood flow disorders. 1. 9. Principles of therapy of regional blood circulation and microcirculation disorders.	**2,5** **13.10.25-** **18.10.25**
7.	**Control Lesson №1**	**2,5** **20.10.25-** **25.10.25**
8.	**Pathophysiology of the cell** 1. Cell damage: definition, causes, types. 2. General mechanisms and manifestations of cell damage. 3. Disorders of the structure and functions of individual cellular organelles. 4. Manifestations of cell damage: cellular dystrophies and dysplasias.	**2,5** **27.10.25-** **01.11.25**

	5. Types of cell death: necrosis and apoptosis. 6. Cellular mechanisms of compensation during damage. 7. General reactions of the body to damage. Acute phase response.	
9.	**General reactions of the body to injury. Shock, collapse, coma** 1. General characteristics of extreme conditions, their difference from terminal conditions. Conditions that contribute to the development of extreme conditions. 2. Shock: definition of the concept, types of shock, pathogenesis, similarities and differences between individual types of shock. 3. Stages of shock, functional and structural disorders at different stages of shock. Pathophysiological foundations of shock prevention and therapy. 4. The concept of crush syndrome. Etiology and main pathogenetic mechanisms of development. 5. Collapse: types, causes, main links of pathogenesis, manifestations and consequences. Principles of therapy. Fainting, etiology and pathogenesis. 1. 6. Coma: types, etiology, pathogenesis, stages of coma, dysfunctions of the body. Principles of therapy.	**2,5** **03.11.25-** **08.11.25**
10.	**Inflammation** 1. Inflammation: definition, etiology, types, signs and main components. 2. Primary and secondary alteration in inflammation. Inflammatory mediators. 3. Changes in blood flow in the inflammation focus: stages and mechanisms of development. 4. Mechanisms and significance of exudation in the inflammation focus. Types of exudates. 5. Marginal standing and emigration of leukocytes in the inflammation focus, their mechanisms. Phagocytosis: its types, stages, mechanisms and biological significance. Impaired phagocytosis: causes and significance in inflammation. 6. Proliferation, its main manifestations and mechanisms of development. 7. Chronic inflammation, patterns of development. 8. Outcomes of inflammation. Principles of anti-inflammatory therapy.	**2,5** **10.11.25-** **15.11.25**
11.	**Infectious process. Fever** 1. Infectious process: types, stages, general etiology and pathogenesis, its outcomes and complications, prevention methods and principles of therapy. 2. Sepsis: etiology and pathogenesis. 3. Fever: definition of the concept, etiology, types, stages and pathogenesis. 4. Biological significance of febrile reaction for the body. 5. Temperature curves, their diagnostic value. 6. Changes in metabolism and physiological functions during fever. 7. Pathophysiological principles of antipyretic therapy. The concept of pyrotherapy. 1. 8. Difference between fever and exogenous overheating and other types of hyperthermia.	**2,5** **17.11.25-** **22.11.25**
12.	**Typical metabolic disorders. Disorders of protein, vitamin, and nucleic acid metabolism. Food starvation** 1. Typical forms of protein metabolism disorders. Positive and negative nitrogen balance. 2. Disorders of the final stages of protein metabolism: types, causes, mechanisms of development. 3. Disorders of the protein composition of blood plasma. 4. Disorders of the metabolism of purine and pyrimidine bases.	**2,5** **24.11.25-** **29.11.25**

	5. Fasting: causes, types, periods of complete fasting. The concept of therapeutic fasting. 6. Protein-calorie deficiency, its types. 1. 7. Primary and secondary hypovitaminosis: causes, mechanisms of development, main manifestations. The concept of antivitamins.	
13.	**Disorders of carbohydrate and lipid metabolism** 1. Typical forms of carbohydrate metabolism disorders. Hypo- and hyperglycemic states. 2. Diabetes mellitus (DM): definition of the concept, principles of classification, mechanisms of disorders of all types of metabolism in DM. 3. Type 1 DM: etiology, pathogenesis. 4. Type 2 DM: etiology, pathogenesis. Characteristics of the main risk factors. 5. The concept of acute and chronic complications of DM. 6. Typical forms of lipid metabolism pathology: classification, etiology, pathogenesis, principles of prevention and correction. 7. Cholesterol metabolism disorders: mechanisms of hypo- and hypercholesterolemia. 8. Atherosclerosis: definition, pathogenetic mechanisms and adverse effects.	**2,5** **01.12.25-** **06.12.25**
14.	**Acid-base balance, water-electrolyte and mineral metabolism disorders** 1. Acid-base balance disorders (ABM): classification principles. 2. Gas acidosis and alkalosis: causes, mechanisms, manifestations. 3. Non-gas forms of acidosis and alkalosis: causes, mechanisms, manifestations. Mixed forms. 4. Compensatory reactions in acute and chronic ABM disorders. 5. Principles of correction of changes in ABM parameters in the body with various types of acidosis and alkalosis. 6. Water metabolism disorders: types, causes, development mechanisms. 7. Electrolyte metabolism disorders: causes, mechanisms, metabolic and physiological function disorders. 8. Principles of diagnostics of typical water-electrolyte metabolism disorders.	**2,5** **08.12.25-** **13.12.25**
15.	**Hypoxia** 1. Hypoxia: definition of the concept. Resistance of individual organs and tissues to oxygen starvation. 2. Principles of classification of hypoxic conditions. Types of hypoxia. 3. Etiology and pathogenesis of the main types of hypoxia. The effect of hyper- and hypocapnia on the development of hypoxia. 4. Laboratory parameters of the gas composition of arterial and venous blood in certain types of hypoxia. 5. Mechanisms of emergency and long-term adaptive-compensatory reactions in hypoxia. 6. Disorders of metabolism, cell structure and function, physiological functions of the body in acute and chronic hypoxia. Reversibility of hypoxic conditions. 7. Pathophysiological bases for the prevention and therapy of hypoxic conditions.	**2,5** **15.12.25-** **20.12.25**
16.	**Tumor growth** 1. Definition of the term "tumor", types of tumors, etiology. 2. Biological features of tumor growth. 3. Metastasis: definition, stages, mechanisms. Tumor recurrence.	**2,5** **22.12.25-** **27.12.25**

	4. Malignant and benign tumors, features of their growth. 5. Theories of tumor pathogenesis. 6. Anti-neoplastic resistance of the body. 7. Systemic manifestations of tumor disease. 8. Principles of tumor prevention and therapy.	
17.	**Control Lesson №2**	**2,5 29.12.24- 03.01.26**
18.	**Pathophysiology of the blood system. Changes in total blood volume. Blood loss** 1. Changes in total blood volume: their types, causes and mechanisms of development, significance for the body. 2. Acute blood loss: etiology, pathogenesis, changes in bone marrow and peripheral blood at different times after blood loss. 3. Anemia: definition of concepts, principles of classification, general characteristics. 4. Acute and chronic posthemorrhagic anemia: causes, mechanisms of development. 5. Emergency and long-term protective and adaptive reactions of the body during blood loss. 6. Disorders of physiological functions during blood loss and in posthemorrhagic conditions, reversible and irreversible changes. 7. Principles of blood loss therapy.	**2,5 05.01.26- 10.01.26**

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