Federal State Budget Educational Institution
of Higher Education
Pacific State Medical University
of the Ministry of Health of the Russian Federation

APPROVED BY

Head of the Department of
Human Physiology and Pathophysiology
_____ / Markelova E.V./
"14th" of April 2025

SUBJECT GUIDE FOR TEACHERS AND STUDENTS FOR

Б1.О.14 Pathological physiology. Pathophysiology of head and neck

(name of discipline)

Specialty	**31.05.03 Dentistry for international students (in English)** (code, name)
Degree	Specialist's degree
Profile	02 "Healthcare" (in the field of providing health care in patients with dental pathology)
Mode of study	Full-time
Period of mastering the BEP	**5 years** (nominal length of study)
Institute/Department	of Human Physiology and Pathophysiology

Vladivostok, 2025

The methodological guidelines for discipline (module) **Б1.О.14 Pathological physiology. Pathophysiology of head and neck** is based on:

1) Federal State Educational Standard of Higher Education for the specialty approved by the Order No. 988 of Ministry of Science and Higher Education of the Russian Federation dated August 12, 2020.

2) Curriculum for the 31.05.03 Dentistry for international students (in English), profile 02 "Healthcare" (in the field of providing health care in patients with dental pathology), approved by the Academic Council of FSBEI HE PSMU of the Ministry of Health of Russia Report No. 8/24-25 dated March 31, 2025.

Subject guide for teachers and students for the discipline was developed by the writing team of the Department of Human Physiology and Pathophysiology of the FSBEI HE PSMU of the Ministry of Health of Russia, under the guidance of the Head of the Department of Human Physiology and Pathophysiology, Doctor of Medical Sciences, Professor Markelova E.V.

Developers:

Assistant professor	Candidate of Medical Sciences, Associate Professor	Knysh S.V.
(position held)	(academic degree, academic title)	(full name)

1. GENERAL PROVISIONS

Subject guide for **Б1.О.14 Pathological physiology. Pathophysiology of head and neck** is a set of recommendations and explanations that facilitate to optimal organization of mastering this discipline.

Regular analysis of lecture materials and work with end-of-the-text questions are necessary for better understanding of the material and systematization of knowledge of **Б1.О.14 Pathological physiology. Pathophysiology of head and neck**. Particular attention should be paid to emerging questions, confusing terms, and conflicts of points of view during the independent review of the lecture material. If necessary, a student should contact the teacher for advice. Lecture material streamlines students' thinking, while practical classes provide deeper insight into the material of the discipline.

Special attention should be paid to the content of the main provisions and conclusions, explanation of phenomena and facts, and clarification of the practical application of theoretic aspects of topic when preparing for a practical class. During this process students should aim to understand and remember the main provisions of the material under consideration, examples provided, as well as understand the illustrative material.

Collections of assessment tools are used to organize independent study of topics (questions) of the discipline.

Independent work of students is facilitated by the following:

1. availability and accessibility of the necessary educational and reference material;
2. a system of regular quality control of completed independent work;
3. availability of teacher's advice.

Subject guides for self-study are presented as literary sources and visual aids (portfolios for different sections of the discipline, microscope slides, subject guides for the students). Subject guides for independent work of students include a list of library resources of the educational institution and other materials accessible to students.

Independent work is a type of in-person extracurricular work of teachers and students of **Б1.О.14 Pathological physiology. Pathophysiology of head and neck**. Control of independent work is conducted by the leading teacher. Evaluation of independent work results is taken into account when conducting interim examination of students throughout the Б1.О.07 Biology course.

Continuous assessment during the **Б1.О.14 Pathological physiology. Pathophysiology of head and neck** course is implemented in order to check indicators of achieving competencies, to stimulate students' academic work, and improve methods of mastering new knowledge. Continuous assessment during the **Б1.О.14 Pathological physiology. Pathophysiology of head and neck** course is conducted during the semester to assess all types and sections of the academic discipline that encompass the competencies developed by the discipline: classroom questioning, conducting discussions, working with tests, and preparing reports. Continuous assessment of students' knowledge and results of their preparation for practical classes is conducted during every class session.

Interim assessment aims to determine the level of mastery of competency indicators. It is conducted in the graded test format after the student has mastered all sections of **Б1.О.14 Pathological physiology. Pathophysiology of head and neck** and takes into account learning outcomes for all types of student work over the entire period of mastering the **Б1.О.14 Pathological physiology. Pathophysiology of head and neck** course.

Time allotted for interim assessment is indicated in the schedule.

Assignments given during practical classes, as well as assignments aimed to prepare students for continuous and interim assessment, are included in the collection of assessment tools for **Б1.О.14 Pathological physiology. Pathophysiology of head and neck**. If necessary, students should contact the teacher for advice. It is necessary to thoroughly think over questions that need clarification before seeking teacher's advice.

2. SUBJECT GUIDES FOR LECTURE CLASSES

Table 1. Subject Guides for **Б1.О.14 Pathological physiology. Pathophysiology of head and neck** Lectures

Topic No.1 Subject, objectives, and methods of pathophysiology (pathophysiology of head and neck). Main concepts of general nosology. General etiology and pathogenesis	
Duration of the lecture (in academic hours):	2
Purpose of the lecture: 1. tell students about the subject and structure of pathophysiology as a science and academic discipline, showcase its role as a theoretical foundation of medicine, as well as familiarize students with the basic concepts of general nosology and their significance for medical practice; 2. define key terms: pathophysiology, nosology, health, disease, pathological process, etiology, pathogenesis; and focus on the main categories of pathology and their essence 3. analyze the examination methods in pathophysiology, including modelling of pathological processes in animals, clinical, laboratory and instrumental, and mathematical research methods; as well as discuss their significance for gaining new knowledge about mechanisms behind diseases and improving means of prevention and therapy	
Lecture plan, order of presentation of its sections: 1. Introduction to the topic 2. Terminology and key definitions 3. Main section. Etiology and pathogenesis 4. Main section. Morphological and functional manifestations 5. Main section. Outcomes and principles of detection, treatment, and prevention 6. Conclusion. Summary of the lecture	
Recommended reading: 1. Pathophysiology: concise lectures, tests, cases : tutorial guideP. F. Litvitsky, S. V. Pirozhkov, I. A. Budnik. 4th ed. - Moscow : GEOTAR-Media, 2025. - 376 c. - ISBN 978-5-9704-8600-9, DOI: 10.33029/9704-8600-9-PAT-2025-1-376. - Electronic version available on the site of EBS "Student's Consultant":[website].URL: https://www.studentlibrary.ru/book/ISBN9785970486009.html (date of reference: 03.06.2025). - Access mode: by subscription. - Text: electronic 2. Pathophysiology : Course of Lectures G. V. Poryadin, J.M. Salmasi M. : MIA, 2020. - 572 + IV p. - ELS "Medlib"	
Topic No.2 Impairment of peripheral circulation and microcirculation	
Duration of the lecture (in academic hours):	2
Purpose of the lecture: 1. tell students about the types of and mechanisms behind disorders of peripheral circulation, as well as the importance of microcirculation for the normal functioning of tissues and organs; 2. define key terms: microcirculation, sludge phenomenon, capillary-trophic insufficiency, arteriovenous anastomoses; 3. analyze the methods of examining disorders of peripheral circulation, including experimental, instrumental, and laboratory approaches; 4. form an understanding of the etiology and pathogenesis of typical disorders of peripheral circulation, including the role of neural, humoral, and local factors, as well as mechanisms of vessel wall damage, changes in blood viscosity, and aggregation of formed elements.	
Lecture plan, order of presentation of its sections:	

1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

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Topic No.3 Pathophysiology of hypo- and hyperoxia

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about the types, mechanisms, and clinical significance of hypoxia and hyperoxia;
2. define key terms: hypoxia, hyperoxia, tissue hypoxia, and circulatory hypoxia;
3. analyze the methods of examining hypoxic and hyperoxic states, including laboratory, instrumental, and experimental approaches;
4. form an understanding of the etiology and pathogenesis of hypoxia and hyperoxia, their main causes and mechanisms.

Lecture plan, order of presentation of its sections:
1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

Recommended reading:
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Topic No.4 Physiology of inflammation. Acute phase response. Fever

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about the main stages and mechanisms of inflammation, as well as the role of mediators in the development of the inflammatory process; about mechanisms behind acute phase response, including fever as a systemic organism response;
2. define key terms: alteration, exudation, inflammatory mediators, and proliferation; acute phase response, fever, acute phase response proteins;
3. analyze the examination methods including experimental, laboratory, and instrumental approaches, such as acute phase response proteins detection and clinical manifestation analysis;
4. form an understanding the etiology and pathogenesis of inflammation, including mechanisms and manifestations of local and generalized reactions of the organism; of the etiology and pathogenesis of acute phase response and fever, including the role of cytokines (IL-1, IL-6, TNF-α) and the influence of infections, injuries, and other damaging factors.

Lecture plan, order of presentation of its sections:
1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

Recommended reading:
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Topic No.5 Reactivity (responsiveness) and resistance of the organism. Role in pathologic processes. Somatotype (body type). Heredity

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about the role of reactivity(responsiveness) and resistance of the organism in progression and course of a disease;
2. define key terms: reactivity (responsiveness), resistance, body type, hereditary disease;
3. analyze the methods of assessing reactivity (responsiveness), resistance, and hereditary factors, including clinical and genetic approaches;
4. form an understanding of etiology and pathogenesis of pathologic processes that takes into account individual characteristics, hereditary background, and body type of an organism

Lecture plan, order of presentation of its sections:
1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

Recommended reading:
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Topic No.6 Pathophysiology of immune reactivity disorders

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about the main forms of immune reactivity disorders, including immunodeficiencies (primary and secondary), allergic reactions, autoimmune diseases and pathological tolerance, as well as their clinical significance in the development of pathologic conditions;
2. define key terms: immune reactivity, immunodeficiencies (T- or B-cell deficiency, phagocytosis deficiency), pathological tolerance, autoimmune reactions, and graft-versus-host disease;
3. analyze the methods of assessing of immune reactivity, including laboratory tests (assessment of immunoglobulin levels, cytokine profile), instrumental approaches (microscopy, flow cytometry), and genetic testing for the identification of primary immunodeficiencies;
4. form an understanding of the etiology and pathogenesis of immune reactivity disorders, including the role of genetic defects, infections (HIV, cytomegalovirus), toxicity exposure (drugs, radiation), endocrine disorders (diabetes mellitus), and mechanisms (lymphocyte dysfunction, cytokine imbalance, apoptosis of immunocompetent cells).

Lecture plan, order of presentation of its sections:
1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

Recommended reading:
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Topic No.7 Pathophysiology of hypersensitivity reactions

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about the main types of hypersensitivity reactions (I–IV), their clinical manifestations and significance in pathology;
2. define key terms: hypersensitivity, anaphylaxis; cytotoxic, immune complex, and delayed-type reactions;
3. analyze the examination methods including laboratory tests, skin tests, and histological

methods;
4. form an understanding of the etiology and pathogenesis of hypersensitivity reactions, including the role of genetic predisposition and environmental factors.

Lecture plan, order of presentation of its sections:

1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

Recommended reading:

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Topic No.8 Pathophysiology of water-mineral metabolism and acid-base balance

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about the main disorders of water- mineral metabolism, their manifestations and significance for pathology, as well as disorders of acid-base balance (acidosis, alkalosis), their types (metabolic, respiratory), clinical manifestations (hypoxia, cardiovascular disorders), and significance for the development of pathological processes (shock, renal failure, diabetic ketoacidosis);
2. define key terms: dehydration, hyperhydration, dyshydria, hypo- and hyperosmolar states; acidosis (decrease in blood pH due to excess acids or loss of bases), alkalosis (increase in pH due to accumulation of bases or loss of acids), metabolic and respiratory disorders, as well as the role of buffer systems (bicarbonate, protein) in maintaining homeostasis;
3. analyze the examination methods: laboratory tests (pH, bicarbonate level, anion gap), blood gas test, assessment of electrolyte balance (potassium, sodium), and instrumental approaches (ultrasound to identify causes of hypoxia);
4. form an understanding of the etiology and pathogenesis of water- mineral metabolism and acid-base disorders, including the main causes and mechanisms.

Lecture plan, order of presentation of its sections:

1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

Recommended reading:

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Topic No.9 Pathophysiology of tumor growth. Systemic influence of a tumor on the organism

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about the mechanisms of tumor growth, including multistep carcinogenesis, atypia of tumor cells, and features of their autonomous division;
2. define key terms: tumor, carcinogenesis, proto-oncogenes, oncogenes, tumor transformation and metastasis;
3. analyze the methods of examining tumor growth, including morphological, molecular-genetic, and biochemical approaches;
4. form an understanding of the etiology and pathogenesis of tumor growth, the systemic effects of tumors on the body, including the role of carcinogens, genetic changes, and metabolic disturbances.

Lecture plan, order of presentation of its sections:
1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

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Topic No.10 Pathophysiology of blood system disorders

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about the main red blood cell disorders, such as anemias and erythrocytoses, their manifestations, and significance for the body;
2. define key terms: anemia, hypochromia, hemolysis, erythrocytosis;
3. analyze the examination methods, including laboratory blood tests, morphological, and genetic tests;
4. form an understanding of the etiology and pathogenesis of red blood cell disorders, including main causes and mechanisms.
5. tell students about the main white blood cell disorders, such as leukocytosis, leukopenia, and agranulocytosis, their manifestations and significance for the body;
6. define key terms: leukocytosis, leukopenia, agranulocytosis, leukemoid reactions ;
7. analyze the examination methods, including complete blood count, bone marrow biopsy, and genetic tests;

8. form an understanding of the etiology and pathogenesis of white blood cell disorders, including main causes and mechanisms.
9. tell students about the main hemostasis disorders, such as hemorrhagic diatheses and thrombophilias, their manifestations and significance for the body;
10. define key terms: hemorrhagic diathesis, thrombophilia, coagulopathy, disseminated intravascular coagulation (DIC) syndrome;
11. analyze the examination methods, including coagulation profile analysis, platelet aggregation analysis, and genetic tests;
12. form an understanding of the etiology and pathogenesis of hemostasis disorders, including hereditary and acquired causes, as well as mechanisms behind bleeding and thrombosis.

Lecture plan, order of presentation of its sections:

1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

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Topic No.11 Pathophysiology of cardiovascular diseases

Duration of the lecture (in academic hours):	2

Purpose of the lecture:

1. tell students about the main cardiovascular diseases, such as heart failure, arrhythmias, ischemic heart disease, and atherosclerosis, their manifestations and significance for the body;
2. define key term: heart failure, coronary insufficiency, arrhythmia, atherosclerosis, myocardial infarction;
3. analyze the examination methods, including clinical, laboratory, and instrumental approaches to diagnosing cardiovascular diseases;
4. form an understanding of the etiology and pathogenesis of cardiovascular diseases, including the role of risk factors, impairments of blood supply, energy metabolism, and regulation of cardiac activity.
5. tell students about pathogenesis of atherosclerosis, its stages, clinical manifestations, and consequences for the cardiovascular system;
6. define key terms: atherosclerosis, dyslipidemia, endothelial dysfunction;
7. analyze the examination methods, including lipid profile test (lipid panel), instrumental and genetic examination methods;
8. form an understanding of the etiology and pathogenesis of atherosclerosis, including the main risk factors and mechanisms of disease progression.

Lecture plan, order of presentation of its sections:

1. Introduction to the topic
2. Terminology and key definitions

3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

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Topic No.12 Pathophysiology of respiratory system disorders

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about the main disorders of external respiration, such as obstructive and restrictive disorders, their manifestations and significance for the body;
2. define key terms: obstructive disorders, restrictive disorders, hypoventilation, respiratory failure;
3. analyze the examination methods, including spirometry, blood gas test, and other instrumental approaches;
4. form an understanding of etiology and pathogenesis of disorders of external respiration that includes main causes and mechanisms.

Lecture plan, order of presentation of its sections:
1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

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Topic No.13 Pathophysiology of digestive system and excretory system disorders

Duration of the lecture (in academic hours):	2

Purpose of the lecture:

1. tell students about the main digestive system disorders, including disorders of secretion, motility, and absorption, their manifestations and significance for the body;
2. define key terms: malabsorption, dyspepsia, hyper- and hyposecretion, motility disorders;
3. analyze the examination methods, including laboratory, instrumental, and function tests;
4. form an understanding of etiology and pathogenesis of digestive system disorders that takes into account role of nutrition, infections, toxins, hereditary, and neurohumoral factors.
5. students about the main disorders of the hepatobiliary system, such as liver failure, cholestasis, gallstone disease, and their clinical manifestations;
6. define key terms: biliary insufficiency, cholestasis, hyperbilirubinemia, liver failure;
7. analyze the examination methods, including laboratory tests (bilirubin, liver enzymes), ultrasound and instrumental examination methods;
8. form an understanding of etiology and pathogenesis of hepatobiliary system disorders that takes into account role of infections, toxins, metabolic and immune factors in liver and biliary tract lesions.
9. tell students about the main disorders of the excretory system, such as renal failure, tubulopathies, and urolithiasis;
10. define key terms: renal failure, tubulopathy, proteinuria, oliguria;
11. analyze the examination methods, including urinalysis, blood biochemical parameters, and instrumental methods;
12. form an understanding of etiology and pathogenesis of excretory system disorders that includes main causes and mechanisms.

Lecture plan, order of presentation of its sections:

1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

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Topic No.14 Pathophysiology of endocrine diseases

Duration of the lecture (in academic hours):	2

Purpose of lecture:

1. tell students about the main endocrine diseases, such as hyper- and hypofunction of glands, their manifestations and significance for the body; about specific disorders of the endocrine system, including pathologies of the hypothalamic-pituitary, thyroid, parathyroid, and adrenal systems;
2. define key terms: hyperfunction, hypofunction, hormonal insufficiency, hormonal resistance, hypo- and hyperfunction of glands, endemic and multinodular goiter, diabetes insipidus, Cushing's syndrome;

3. analyze the examination methods, including hormonal assays, instrumental, and functional tests;
4. form an understanding of etiology and pathogenesis of endocrine diseases that takes into account role of hereditary background, inflammation, tumors, and external factors.

Lecture plan, order of presentation of its sections:
1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

Recommended reading:
1. Pathophysiology: concise lectures, tests, cases : tutorial guideP. F. Litvitsky, S. V. Pirozhkov, I. A. Budnik. 4th ed. - Moscow : GEOTAR-Media, 2025. - 376 c. - ISBN 978-5-9704-8600-9, DOI: 10.33029/9704-8600-9-PAT-2025-1-376. - Electronic version available on the site of EBS "Student's Consultant":[website].URL: https://www.studentlibrary.ru/book/ISBN9785970486009.html (date of reference: 03.06.2025). - Access mode: by subscription. - Text: electronic
2. Pathophysiology : Course of Lectures G. V. Poryadin, J.M. SalmasiM. : MIA, 2020. - 572 + IV

Topic No.15 Pathophysiology of nervous system disorders

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about the main disorders of the nervous system and higher nervous function, such as neuroses, pareses, paralyses, and convulsions;
2. define key terms: neurosis, paresis, paralysis, convulsions, generator of pathologically enhanced excitation;
3. analyze the examination methods, including clinical, laboratory, and instrumental approaches
4. form an understanding of etiology and pathogenesis of disorders of the nervous system that takes into account role of external and internal factors, energy metabolism disturbances, and neuronal damage.

Lecture plan, order of presentation of its sections:
1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

Recommended reading:
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Topic No.16 Pathophysiology of immune diseases

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about main types of immune diseases, such as immune deficiencies, autoimmune and allergic diseases;
2. define key terms: immune deficiency, autoimmunity, allergy, pathologic tolerance;
3. analyze the examination methods, including autoantibody and immunoglobulin assays/tests, as well as immunity function tests.
4. form an understanding of etiology and pathogenesis of immune diseases that takes into account hereditary and acquired causes, as well as mechanisms behind disruption of the immune response.

Lecture plan, order of presentation of its sections:
1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

Recommended reading:
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Topic No.17 Pathophysiology of extreme conditions

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about such extreme conditions, as shock, collapse, and coma; their clinical manifestations and threat to life;
2. define key terms: extreme condition, shock, collapse, terminal (end-of-life) condition;
3. analyze the examination methods, including clinical, laboratory, and instrumental approaches
4. form an understanding of etiology and pathogenesis of extreme conditions that takes into account role of extreme factors, microcirculation disorders, hypoxia, and adaptive exhaustion.

Lecture plan, order of presentation of its sections:
1. Introduction to the topic
2. Terminology and key definitions
3. Main section. Etiology and pathogenesis
4. Main section. Morphological and functional manifestations
5. Main section. Outcomes and principles of detection, treatment, and prevention
6. Conclusion. Summary of the lecture

Recommended reading:
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3. SUBJECT GUIDES FOR PRACTICAL CLASSES

Table 2. Subject Guides for Practical **Б1.О.14 Pathological physiology. Pathophysiology of head and neck** Classes

Topic No.1 Subject, objectives, and methods of pathophysiology. Main concepts of general nosology. General etiology and pathogenesis	
Duration of the practical class (in academic hours):	4
Purpose of the practical class: 1. consolidate acquired knowledge of the subject, objectives, and methods of pathophysiology, clinical pathophysiology, general nosology; concept of general etiology and pathogenesis; 2. during the discussion, outline the main aspects of classification, etiology, and pathogenesis of diseases; 3. thoroughly go over definitions and concepts of pathophysiology, nosology, etiology, and pathogenesis; 4. study patterns of occurrence, progression, and outcomes of diseases; 5. develop the ability to use acquired knowledge during analysis of pathologic processes.	
Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.	
Independent work of the student: writing a research paper. Preparation of a report on the lecture. Working with study materials.	
Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.	
Recommended reading: 1. Pathophysiology: concise lectures, tests, cases : tutorial guideP. F. Litvitsky, S. V. Pirozhkov, I. A. Budnik. 4th ed. - Moscow : GEOTAR-Media, 2025. - 376 c. - ISBN 978-5-9704-8600-9, DOI: 10.33029/9704-8600-9-PAT-2025-1-376. - Electronic version available on the site of EBS "Student's Consultant":[website].URL: https://www.studentlibrary.ru/book/ISBN9785970486009.html (date of reference: 03.06.2025). - Access mode: by subscription. - Text: electronic 2. Pathophysiology : Course of Lectures G. V. Poryadin, J.M. SalmasiM. : MIA, 2020. - 572 + IV	
Topic No.2 Impairment of peripheral circulation and microcirculation	
Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of pathophysiology of peripheral circulation and microcirculation;
2. during the discussion, outline the main forms of and mechanisms behind disorders of peripheral circulation and microcirculation (arterial and venous hyperemia, ischemia, thrombosis, embolism, disturbances of rheological properties of the blood)
3. thoroughly go over definitions and concepts related to arterial hyperemia, ischemia, venous stasis, thrombosis, embolism, and microcirculatory disorders;
4. study patterns of progression and outcomes of disorders of peripheral circulation and microcirculation;
5. develop the ability to analyze the pathogenesis and clinical manifestations of the main types of disorders of peripheral circulation and microcirculation.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
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Topic No.3 Pathophysiology of hypoxia and hyperoxia

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of classification, etiology, and pathogenesis of hypoxia (exogenous, respiratory, circulatory, hemic, tissue), as well as the pathological effects of hyperoxia;
2. during the discussion, outline the main mechanisms behind oxygen deprivation, compensatory-adaptive responses, metabolic disturbances, and the consequences of hyperoxygenation;
3. thoroughly go over definitions and concepts of "hypoxia," "hyperoxia," "hypoxemia," "oxygen deprivation," "tissue respiration," "free-radical damage";
4. study patterns of progression of hypoxic states (acute vs. chronic hypoxia), the interrelationship of gas exchange, hemodynamic, and metabolic disturbances, and the pathogenesis of hyperoxic hypoxia;
5. develop skills of analyzing blood gas composition, interpreting acid-base balance parameters, and selecting principles of pathogenetic therapy.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.
Recommended reading: 1. Pathophysiology: concise lectures, tests, cases : tutorial guideP. F. Litvitsky, S. V. Pirozhkov, I. A. Budnik. 4th ed. - Moscow : GEOTAR-Media, 2025. - 376 c. - ISBN 978-5-9704-8600-9, DOI: 10.33029/9704-8600-9-PAT-2025-1-376. - Electronic version available on the site of EBS "Student's Consultant":[website].URL: https://www.studentlibrary.ru/book/ISBN9785970486009.html (date of reference: 03.06.2025). - Access mode: by subscription. - Text: electronic 2. Pathophysiology : Course of Lectures G. V. Poryadin, J.M. SalmasiM. : MIA, 2020. - 572 + IV
Topic No.4 Pathophysiology of inflammation

Duration of the practical class (in academic hours):	4

Purpose of the practical class: 1. consolidate acquired knowledge of the pathophysiology of inflammation, its etiology, stages, and mechanisms; 2. during the discussion, outline the main components of the pathogenesis of the inflammatory process, the role of mediators, and the features of acute and chronic inflammation; 3. thoroughly go over definitions and concepts of "inflammation," "alteration," "exudation," "phagocytosis," "inflammatory mediators," "proliferation"; 4. study patterns of local and systemic manifestations of inflammation, the outcomes of the inflammatory process, and the biological significance of inflammation; 5. develop the ability to analyze clinical and model situations related to inflammation and to apply pathogenetic approaches to diagnosis and therapy.
Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.
Independent work of the student: writing a research paper. Preparation of a report on the lecture. Working with study materials.
Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.
Recommended reading: 1. Pathophysiology: concise lectures, tests, cases : tutorial guideP. F. Litvitsky, S. V. Pirozhkov, I. A. Budnik. 4th ed. - Moscow : GEOTAR-Media, 2025. - 376 c. - ISBN 978-5-9704-8600-9, DOI: 10.33029/9704-8600-9-PAT-2025-1-376. - Electronic version available on the site of EBS "Student's Consultant":[website].URL: https://www.studentlibrary.ru/book/ISBN9785970486009.html (date of reference: 03.06.2025). - Access mode: by subscription. - Text: electronic 2. Pathophysiology : Course of Lectures G. V. Poryadin, J.M. SalmasiM. : MIA, 2020. - 572 + IV
Topic No.5 Physiology of acute phase response. Fever. Hyperthermia and hypothermia

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of the pathophysiology of the acute phase response (APR), fever, hyperthermia, and hypothermia;
2. during the discussion, outline the main mechanisms behind the systemic inflammatory response, the role of cytokines, and the features of the development and manifestations of fever, hyperthermia, and hypothermia;
3. thoroughly go over definitions and concepts of "acute phase response," "acute phase proteins," "cytokines," "fever," "hyperthermia," "hypothermia";
4. study patterns of occurrence and manifestation of the APR, the stages of fever development, and the mechanisms of thermoregulation and its disorders;
5. develop the ability to analyze clinical manifestations and laboratory indicators of the systemic inflammatory response and to interpret the pathogenesis of body temperature disorders.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
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Topic No.6 Reactivity (responsiveness) and resistance of the organism. Role in pathologic processes. Somatotype (body type). Heredity.
Interim knowledge control.

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of reactivity (responsiveness) and resistance of the organism, their significance in pathologic processes, as well as the concepts of body type and heredity;
2. during the discussion, outline the main mechanisms of formation of reactivity and resistance, and the influence of constitutional and hereditary factors on disease progression;
3. thoroughly go over definitions and concepts of "reactivity (responsiveness)," "resistance," "body type," "heredity," "diathesis";
4. study patterns of changes in reactivity and resistance in various physiological and pathological states, the role of individual characteristics in the pathogenesis of diseases;
5. develop the ability to analyze clinical situations taking into account reactivity, resistance, body type, and heredity; preparing for interim assessment.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.
Recommended reading: 1. Pathophysiology: concise lectures, tests, cases : tutorial guideP. F. Litvitsky, S. V. Pirozhkov, I. A. Budnik. 4th ed. - Moscow : GEOTAR-Media, 2025. - 376 c. - ISBN 978-5-9704-8600-9, DOI: 10.33029/9704-8600-9-PAT-2025-1-376. - Electronic version available on the site of EBS "Student's Consultant":[website].URL: https://www.studentlibrary.ru/book/ISBN9785970486009.html (date of reference: 03.06.2025). - Access mode: by subscription. - Text: electronic 2. Pathophysiology : Course of Lectures G. V. Poryadin, J.M. SalmasiM. : MIA, 2020. - 572 + IV
Topic No.7 Pathophysiology of immune reactivity disorders

Duration of the practical class (in academic hours):	4

Purpose of the practical class: 1. consolidate acquired knowledge of the classification, etiology, and pathogenesis of immune reactivity disorders (immunodeficiencies, allergies, autoimmune processes); 2. during the discussion, outline the main mechanisms of development of immunopathological conditions, the role of mediators, genetic, and external factors in their formation; 3. thoroughly go over definitions and concepts of"immune reactivity," "immunodeficiency," "allergy," "autoimmunity," "hypersensitivity," "dysergia"; 4. study patterns of interaction among components of the immune system in pathology, and the consequences of immune response disorders (infections, tumors, chronic inflammation); 5. develop skills of analyzing clinical cases related to immunopathologies and the principles of their pathogenetic correction.
Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.
Independent work of the student: writing a research paper. Preparation of a report on the lecture. Working with study materials.
Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.
Recommended reading: 1. Pathophysiology: concise lectures, tests, cases : tutorial guideP. F. Litvitsky, S. V. Pirozhkov, I. A. Budnik. 4th ed. - Moscow : GEOTAR-Media, 2025. - 376 c. - ISBN 978-5-9704-8600-9, DOI: 10.33029/9704-8600-9-PAT-2025-1-376. - Electronic version available on the site of EBS "Student's Consultant":[website].URL: https://www.studentlibrary.ru/book/ISBN9785970486009.html (date of reference: 03.06.2025). - Access mode: by subscription. - Text: electronic 2. Pathophysiology : Course of Lectures G. V. Poryadin, J.M. SalmasiM. : MIA, 2020. - 572 + IV
Topic No.8 Pathophysiology of hypersensitivity reactions

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of the pathophysiology of hypersensitivity reactions, including the mechanisms, classification, and clinical manifestations of immediate (ITH or Type I) and delayed-type (DTH or Type IV) hypersensitivity;
2. during the discussion, outline the main mechanisms of development of allergic reactions, the role of antigens, antibodies, cellular and humoral factors in the pathogenesis of immediate and delayed-type hypersensitivity;
3. thoroughly go over definitions and concepts of "hypersensitivity," "immediate-type hypersensitivity (ITH)," "delayed-type hypersensitivity (DTH)," "allergen," "immune complex," "effector cells";
4. study patterns of development and manifestation of hypersensitivity reactions, their consequences for the body, and the pathogenetic basis of therapy;
5. develop the ability to analyze clinical cases related to various types of hypersensitivity and to apply pathophysiological knowledge to interpret laboratory test results and clinical data.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

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Topic No.9 Pathophysiology of water- mineral metabolism and acid-base balance

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of the pathophysiology of water-mineral and acid-base metabolism, their regulation, and disorders;
2. during the discussion, outline the main mechanisms behind water-electrolyte and acid-base balance disturbances, as well as the causes and consequences of typical pathological conditions (edema, dehydration, acidosis, alkalosis);
3. thoroughly go over definitions and concepts of "water-mineral metabolism," "osmolarity (osmotic concentration)," "edema," "dehydration," "acid-base status," "acidosis," "alkalosis";
4. study patterns of changes in water- mineral and acid-base metabolism in various pathological processes, and their impact on the functions of organs and systems;
5. develop the ability to analyze clinical situations related to disorders of water- mineral and acid-base metabolism and to apply pathophysiological knowledge for the diagnosis and correction of these conditions.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper. Preparation of a report on the lecture. Working with study materials.
Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.
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Topic No.10 Pathophysiology of metabolism

Duration of the practical class (in academic hours):	4

Purpose of the practical class: 1. consolidate acquired knowledge of the pathophysiology of metabolism and typical disorders of protein, lipid, carbohydrate, and energy metabolism; 2. during the discussion, outline the main causes, mechanisms, and consequences of metabolic disorders, the role of hereditary and acquired factors, and the significance of enzymopathies and endocrine disorders; 3. thoroughly go over definitions and concepts of "metabolism," "energy metabolism," "catabolism," "anabolism," "enzymopathies," "dyslipidemia," "ketosis," "hyperazotemia"; 4. study patterns of progression of typical metabolic disorders, their impact on the functions of organs and systems, and the interrelationship between different metabolic disturbances; 5. develop the ability to analyze clinical situations related to metabolic disorders and to apply pathophysiological knowledge for the diagnosis and correction of metabolic disturbances.
Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.
Independent work of the student: writing a research paper. Preparation of a report on the lecture. Working with study materials.
Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.
Recommended reading: 1. Pathophysiology: concise lectures, tests, cases : tutorial guideP. F. Litvitsky, S. V. Pirozhkov, I. A. Budnik. 4th ed. - Moscow : GEOTAR-Media, 2025. - 376 c. - ISBN 978-5-9704-8600-9, DOI: 10.33029/9704-8600-9-PAT-2025-1-376. - Electronic version available on the site of EBS "Student's Consultant":[website].URL: https://www.studentlibrary.ru/book/ISBN9785970486009.html (date of reference: 03.06.2025). - Access mode: by subscription. - Text: electronic 2. Pathophysiology : Course of Lectures G. V. Poryadin, J.M. SalmasiM. : MIA, 2020. - 572 + IV
Topic No.11 Pathophysiology of tissue growth. Biological characteristics of malignant cells. Etiology and pathogenesis of malignant growth. Antitumoral resistance

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of the pathophysiology of tissue growth, the biological characteristics of malignant cells, the etiology and pathogenesis of malignant growth, as well as the mechanisms of the body's antitumoral resistance (intrinsic antineoplastic agents);
2. during the discussion, outline the main mechanisms regulating tissue growth, the differences between benign and malignant growth, and the roles of genetic, humoral, immune, and environmental factors in carcinogenesis;
3. thoroughly go over definitions and concepts of "tissue growth," "hypertrophy," "hyperplasia," "tumor," "atypia," "carcinogenesis," "antitumoral resistance";
4. study patterns of progression and manifestations of malignant growth, features of tumor atypia, stages of carcinogenesis, and mechanisms of the body's antitumor defense;
5. develop the ability to analyze clinical and model situations related to tissue growth disorders and tumor processes, as well as to apply pathophysiological knowledge to assess risk factors and principles of malignant neoplasm prevention.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

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Topic No.12 Pathophysiology of the infectious process. Interim knowledge control

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of the pathophysiology of the infectious process, its etiology, pathogenesis, and main stages of progression;
2. during the discussion, outline the main mechanisms of interaction between the pathogen and the host organism, the role of pathogenicity factors, tropism, immune response, as well as manifestations of typical pathological reactions (fever, inflammation, hypoxia, metabolic disturbances);
3. thoroughly go over definitions and concepts of "infectious process," "pathogenicity," "virulence," "pathogenicity factors," "portal of entry," "immune resistance," "tropism," "exotoxins," "infectious dose";
4. study patterns of progression of the infectious process, features of pathogen dissemination, formation of the immune response, and systemic manifestations of the disease;
5. develop the ability to analyze clinical situations related to the infectious process.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
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Topic No.13 Pathophysiology of blood system disorders

Duration of the practical class (in academic hours):	4

1. consolidate acquired knowledge of the pathophysiology of the red blood cell system, mechanisms of development of anemias and erythrocytoses, their classification and clinical manifestations;
2. during the discussion, outline the main causes, pathogenetic mechanisms, and consequences of anemias (blood loss, hemolysis, impaired erythropoiesis) and erythrocytoses, as well as the role of erythropoiesis regulation and external and internal factors;
3. thoroughly go over definitions and concepts of "anemia," "erythrocytosis," "erythropoiesis," "hypochromia," "hemolysis," "reticulocytosis," "hemic hypoxia";
4. study patterns of changes in peripheral blood and hematopoiesis linked to various forms of anemia and erythrocytosis, their impact on the oxygen-carrying capacity of blood and body functions;
5. develop the ability to analyze clinical data and laboratory test results in relation red blood cell disorders and apply pathophysiological knowledge for diagnosis and correction of these conditions.
6. consolidate acquired knowledge of the pathophysiology of the white blood cell system, mechanisms behind leukocytoses, leukopenias, and leukemias, their classification and clinical manifestations;
7. during the discussion, outline the main causes, pathogenetic mechanisms, and consequences of leukocytoses (reactive, neoplastic), leukopenias (primary, secondary), and the features of neoplastic proliferation in leukemias;
8. thoroughly go over definitions and concepts of "leukocytosis," "leukopenia," "leukemia," "leukemoid reaction," "neutrophilia," "agranulocytosis," "blast cells";
9. study patterns of changes in the white blood cell differential and hematopoiesis in various forms of white blood cell pathology, their impact on immune reactivity and the body's defense functions;
10. develop the ability to analyze clinical data and laboratory test results in relation to leukocytoses, leukopenias, and leukemias, and apply pathophysiological knowledge for diagnosis and correction of these conditions.
11. consolidate acquired knowledge of the pathophysiology of the hemostasis system, mechanisms of vascular-platelet (primary) hemostasis and coagulation cascade (secondary hemostasis), as well as fibrinolysis;
12. during the discussion, outline the main causes, mechanisms, and consequences of hemostasis disorders: hypercoagulation (thrombosis), hypocoagulation (hemorrhage), thrombocytopenia, thrombocytopathy, and disseminated intravascular coagulation syndrome

13. thoroughly go over definitions and concepts of "hemostasis," "coagulation," "platelet," "thrombosis," "hemorrhagic diathesis," "fibrinolysis," "coagulopathy," "hemophilia";
14. study patterns of interaction between the vessel wall, platelets, and plasma coagulation factors, as well as regulation and disturbances of these processes in various pathological conditions;
15. develop the ability to analyze clinical data and laboratory test results in relation to hemostasis disorders and apply pathophysiological knowledge for the diagnosis and correction of hemorrhagic and thrombotic conditions.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
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Topic No.14 Pathophysiology of cardiovascular diseases

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of the pathophysiology of the cardiovascular system, the main mechanisms behind and types of disorders of cardiac function and vascular tone;
2. during the discussion, outline the main causes and pathogenetic mechanisms of heart failure, arterial hypertension, atherosclerosis, ischemic heart disease, as well as rhythm and conduction disturbances;
3. thoroughly go over definitions and concepts of "heart failure," "ischemia," "arterial hypertension," "atherosclerosis," "arrhythmias," "dyslipoproteinemias," "endothelial dysfunction";
4. study patterns of progression and manifestations of typical pathological processes in the cardiovascular system, their impact on hemodynamics, metabolism, and organ functions;
5. develop the ability to analyze clinical situations related to heart and vascular pathologies and apply pathophysiological knowledge for the diagnosis and correction of these disorders
6. consolidate acquired knowledge of the pathophysiology of the cardiovascular system using specific examples, including ischemic heart disease, arterial hypertension, and rhythm and conduction disturbances;
7. during the discussion, outline the main mechanisms of development and progression of myocardial ischemia, coronary artery atherosclerosis, the pathogenesis of arterial hypertension and cardiomyopathies;
8. thoroughly go over definitions and concepts of "ischemic heart disease," "coronary atherosclerosis," "myocardial infarction," "arterial hypertension," "arrhythmias," "heart failure";
9. study patterns of morphofunctional changes in the myocardium and vessels in patients with various cardiovascular diseases, the influence of risk factors, and pathogenetic mechanisms;

10. develop the ability to analyze clinical cases and laboratory test results and apply pathophysiological knowledge for the diagnosis, prevention, and treatment of cardiovascular diseases.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
1. Pathophysiology: concise lectures, tests, cases : tutorial guideP. F. Litvitsky, S. V. Pirozhkov, I. A. Budnik. 4th ed. - Moscow : GEOTAR-Media, 2025. - 376 c. - ISBN 978-5-9704-8600-9, DOI: 10.33029/9704-8600-9-PAT-2025-1-376. - Electronic version available on the site of EBS "Student's Consultant":[website].URL: https://www.studentlibrary.ru/book/ISBN9785970486009.html (date of reference: 03.06.2025). - Access mode: by subscription. - Text: electronic
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Topic No.15 Pathophysiology of respiratory system disorders

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of pathophysiology of the external respiratory system, mechanisms of ventilation, gas diffusion, and pulmonary perfusion;
2. during the discussion, outline the main causes and pathogenetic mechanisms of disorders of external respiration (obstructive, restrictive, mixed forms, regulation and gas exchange disturbances), their clinical manifestations and outcomes;
3. thoroughly go over definitions and concepts of "external respiration," "respiratory failure," "obstruction," "restriction," "alveolar ventilation," "hypoxemia," "hypercapnia," "Cheyne-Stokes respiration," "Biot's respiration.";
4. study patterns of progression of typical disorders of external respiration, their impact on blood gas composition, acid-base balance, and body functions;
5. develop the ability to analyze clinical situations related to disorders of external respiration and to apply pathophysiological knowledge for the diagnosis, prevention, and correction of respiratory disorders.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
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Topic No.16 Pathophysiology of digestive system and excretory system disorders.
Interim knowledge control.

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of the pathophysiology of the digestive system, regulation mechanisms and typical disorders of secretory, motor, evacuatory, and absorptive functions ;
2. during the discussion, outline the main causes, pathogenetic mechanisms, and outcomes of digestive system disorders, the role of neurohumoral, immune, metabolic, and exogenous factors, as well as the features of multiorgan involvement in gastrointestinal pathology;
3. thoroughly go over definitions and concepts of "secretory function," "motility," "evacuation," "absorption," "ulcer formation," "dystrophy," "ascites," "portal hypertension," "hypo- and hyperacidic conditions," "GI tract hormones.";
4. study patterns of development and manifestations of typical pathological processes in the digestive system, their impact on metabolism, tissue trophism, immune status, and systemic reactions of the body;
5. develop the ability to analyze clinical situations related to digestive system disorders and to apply pathophysiological knowledge for the diagnosis, prevention, and correction of digestive system disorders.
6. consolidate acquired knowledge of the pathophysiology of the hepatobiliary system and the main mechanisms of liver and biliary tract lesions;
7. during the discussion, outline the main causes, pathogenetic mechanisms, and outcomes of diseases of the liver and biliary system: viral, toxic, immune, vascular, and metabolic factors; as well as aspects of syndrome development (jaundice, portal hypertension, liver failure, ascites, hypersplenism, fatty degeneration);
8. thoroughly go over definitions and concepts of "hepatobiliary system," "hepatocyte," "portal hypertension," "jaundice," "fatty hepatosis," "cirrhosis," "liver failure," "ascites," "hypersplenism," "enzymopathies," "biliary dyskinesia";
9. study patterns of progression and manifestations of typical pathological processes in the hepatobiliary system, their impact on metabolism, hemostasis, hormonal status, and the functions of other organs;
10. develop the ability to analyze clinical situations related to liver and biliary tract pathology and to apply pathophysiological knowledge for the diagnosis, prevention, and correction of these conditions.
11. consolidate acquired knowledge of the pathophysiology of the excretory system, including the mechanisms of glomerular filtration, tubular reabsorption, secretion, and regulation of water-electrolyte balance;
12. during the discussion, outline the main causes and pathogenetic mechanisms of renal disorder: acute and chronic injuries (prerenal, renal, postrenal), the role of immune complexes in glomerulopathies, tubulointerstitial lesions, and obstructive nephropathies;
13. thoroughly go over definitions and concepts of "acute tubular necrosis," "glomerulonephritis," "nephrotic syndrome," "prerenal acute kidney injury," "postrenal obstruction," "in situ immune complexes," "tubular obstruction," "azotemia";
14. study patterns of progression and manifestations of typical excretory system disorders: impaired filtration (reduced GFR), reabsorption (proteinuria, glucosuria), secretion (acidosis), as well as systemic consequences of renal failure;
15. develop the ability to analyze clinical situations (oliguria, hyperkalemia, uremia) and interpret laboratory test results (creatinine, urea, electrolytes) for differential diagnosis and pathogenetic therapy.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
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Topic No.17 Pathophysiology of endocrine diseases

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of the pathophysiology of the endocrine system, regulatory mechanisms, and typical disorders of hormonal balance;
2. during the discussion, outline the main causes, pathogenetic mechanisms, and consequences of endocrine disorders: disturbances of central regulation (hypothalamic-pituitary system), pathology of the endocrine glands themselves, peripheral and post-glandular mechanisms, as well as aspects of feedback and interhormonal interactions;
3. thoroughly go over definitions and concepts of "endocrine system," "hypofunction," "hyperfunction," "endocrinopathy," "hormone," "tropic hormones," "receptor sensitivity," "counterregulatory effect";
4. study patterns of development and manifestations of typical endocrine disorders (central, glandular, peripheral, receptor, metabolic), their impact on metabolism, homeostasis, and the functions of target organs;
5. develop the ability to analyze clinical situations related to endocrine pathology and to apply pathophysiological knowledge for the diagnosis, prevention, and correction of hormonal disorders.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
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Topic No.18 Pathophysiology of nervous system disorders

Duration of the practical class (in academic hours):	4

Purpose of the practical class:;
1. consolidate acquired knowledge of the pathophysiology of the nervous system and higher nervous function, the main causes, mechanisms, and manifestations of typical forms of nervous system pathology;
2. during the discussion, outline the main mechanisms of regulatory disorders, typical pathological processes (neuroses, pareses, paralyses, convulsions, sensory disorders, pathological systems), as well as features of dysregulatory pathology and the formation of pathological dominants;
3. thoroughly go over definitions and concepts of "pathophysiology of the nervous system," "dysregulatory pathology," "neurosis," "paresis," "paralysis," "convulsions," "pathological dominant," "pathological system," "sensory and motor disorders," "higher nervous function";
4. study patterns of development of disorders of nervous regulation, formation of pathological systems, manifestations of higher nervous function disorders, and their impact on adaptation and organism behavior;
5. develop the ability to analyze clinical situations related to pathology of the nervous system and higher nervous function, and to apply pathophysiological knowledge for the diagnosis, prevention, and correction of these disorders

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
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Topic No.19 Pathophysiology of immune diseases

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of pathophysiology of immune diseases, including the etiology, pathogenesis, and classification of immunodeficiency states;
2. during the discussion, outline the main mechanisms behind immune disorders, the role of genetic, infectious, toxic, and other factors in the formation of immunopathologies, as well as the clinical manifestations and outcomes of these disorders;

3. thoroughly go over definitions and concepts of "immunodeficiency", "humoral and cell-mediated immunity," "complement," "phagocytosis," "AIDS";
4. study patterns of progression and manifestations of typical pathological processes of the immune system, their impact on the body's resistance, and progression of infectious, inflammatory, and neoplastic diseases;
5. develop the ability to analyze clinical cases related to immune diseases and to apply pathophysiological knowledge for the diagnosis, prevention, and correction of immunopathologies.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
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Topic No.20 Pathophysiology of extreme conditions. Interim knowledge control

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate acquired knowledge of the pathophysiology of extreme conditions, their definition, classification, general pathogenetic mechanisms, and differences from terminal (end-of-life) conditions;
2. during the discussion, outline the main mechanisms behind extreme conditions (shock, collapse, coma), the role of microcirculation disorders, hypoxia, metabolic and neuroendocrine changes, as well as the features of activation of adaptive processes and adaptive exhaustion;
3. thoroughly go over definitions and concepts of "extreme conditions," "shock," "collapse," "coma," "microcirculation," "hypoxia," "adaptation," "terminal condition";
4. study patterns of progression and manifestations of extreme conditions, their impact on metabolism, organ and system functions, as well as the criteria for reversibility and emergency care;
5. develop the ability to analyze clinical situations related to extreme conditions and prepare for the interim knowledge assessment on this topic.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: writing a research paper.
Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, quizzes, tests.

Recommended reading:
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4. GUIDELINES FOR CONTINUOUS AND INTERIM ASSESSMENT

Table 3. Guidelines for Conducting Continuous and Interim Assessment **B1.O.14 Pathological physiology. Pathophysiology of head and neck** Course

Type of assessment	Assessment format
Continuous assessment	- conducting and evaluating oral or written quizzes during lectures and practical classes; - assessment and evaluation of completion and results of assignments given during practical classes; - assess and evaluate completion and results of individual assignments and exam tasks given during practical classes; - assessment and evaluation of lecture notes quality.
Interim assessment	is conducted in oral (verbal) format; it allows to assess the development of students' competencies correlating with types of professional activity.

5 ASPECTS OF THE IMPLEMENTATION OF THE COURSE FOR STUDENTS WITH DISABILITIES AND SPECIAL NEEDS

5.1. Availability of accessible environment

For students with disabilities and special needs, if a written application is submitted, lectures and practical classes are carried out taking into account health limitations, individual capabilities and medical status (hereinafter referred to as individual characteristics) of the student. Compliance with the following general requirements is ensured: teaching aids for collective and individual use are provided, required technical assistance is provided by an assistant; buildings and premises where lectures and practical classes are taking place meet accessibility requirements, other arrangements lack of which makes it impossible or difficult to master the discipline are made.

5.2. Compliance with general requirements

When lectures and practical classes are carried out at the written application of the student, the following general requirements are met: lectures and practical classes for students with disabilities and special needs take place at the same location as for students who do not have disabilities, if this does not cause difficulties for students; an assistant (assistants), who provide(s) students with the necessary technical assistance taking into account individual characteristics of the student, is (are) provided; necessary teaching aids are provided, taking into account individual characteristics of the student.

5.3. Availability of the internal policies and procedures of FSBEI HE PSMU of the Ministry of Health of Russia to students with disabilities in a form accessible to them.

All internal policies and procedures of FSBEI HE PSMU of the Ministry of Health of Russia concerning the discipline (module) are made available to students with disabilities in a form accessible to them.

5.4. Increase in the duration of interim assessment of students with disabilities and special needs in relation to the established duration

Format of the interim assessment of academic performance within the scope of the discipline for students with disabilities and special needs is selected taking into account individual characteristics (orally, by writing on paper, by typing on a computer, as a test, etc.). The duration of the interim assessment in relation to the established duration is increased at the written application of the student with disabilities. Time limit for the student's preparation for the test is increased by at least 0.5 hours.

6. STAFFING REQUIREMENTS OF THE DISCIPLINE

Academic teaching personnel that ensure the implementation of the discipline education process meet the requirements of the Federal State Educational Standard of Higher Education for the 31.05.03 Dentistry specialty; list of the aforementioned personnel is available on the website of the educational organization.