INTERNATIONAL HIGHER SCHOOL OF MEDICINE

Department of Introduction to therapy and Family Medicine

SYLLABUS

Module «Blood and Hematopoietic system»

2026-2027 academic year

for students of medical faculty

2 course 4 semester

2 credits (60 h, including auditorial 40 h, independent work – 20 h)

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The Syllabus is considered at the meeting of the department of of Introduction to therapy and Family Medicine

Protocol № 1 dated 27.08.2026

Head of the department _____ Kamchybekova A.A.

Course Objective: mastering the complex fundamentals of theoretical knowledge, practical skills for physical and laboratory-instrumental methods of examination in patients with damages of the blood and hematopoietic system with the study of the characteristics of the course of diseases in children, as well as the principles of treatment and prevention of syndromes affecting the hematological system in adults and children.

After study of the discipline the student must:

Knowledge:

- a scheme of medical history that determines the sequence of examining a patient with hematological diseases using physical, clinical, laboratory, functional and instrumental methods;
- main symptoms and syndromes of pathological lesions of the hematological system, mechanisms of their development and methods for their detection;
- patterns of functioning of the hematopoietic organs, mechanisms of development of the main symptoms and syndromes, as well as methods for their identification;
- the essence of methods for clinical, laboratory and functional examination of adults and children;
- the essence of normal biochemical processes at the level of organs, systems and the body as a whole, as well as standards for the results of biochemical and clinical studies in diseases of the hematological system;
- etiology, pathogenesis, clinical and laboratory criteria, principles of treatment of emergency and life-threatening conditions of hematological system.

Skill:

- collect the necessary information, carefully and competently describe all sections of the "student's" medical history, recording all the necessary data reflecting the course of clinical thinking in the process of diagnosing and choosing treatment tactics for hematological diseases;
- analyze and synthesize information about identified pathological symptoms and syndromes of hematological system lesions and prescribe an adequate examination for the purpose of reliable diagnosis of diseases;
- identify the main symptoms using physical examination methods and group them into syndromes based on knowledge of the anatomical and physiological characteristics and patterns of functioning of the hemopoietic organs;
- analyze the results of clinical, laboratory and functional examination of an adult person and child, taking into account their specifics in order to diagnose the main diseases of hematological system;
- recognize and interpret the results of biochemical and clinical studies, identifies logical relationships between changes in biochemical parameters and the clinical state of the body;
- diagnose urgent and life-threatening conditions and determine the basic principles of first medical aid for hematological pathology.

Attitude:

- demonstrate practical skills in collecting patient complaints, his medical history, conducting a physical examination in accordance with the medical history chart at the bedside of a patient with hematological pathology;
- skills in the practical use of methods aimed at identifying the main pathological symptoms and syndromes of hematological system in order to reliably diagnose diseases of the blood and hematopoietic organs;
- skills in physical examination of patients aimed at identifying the main pathological symptoms and syndromes of hematological system for the purpose of reliable diagnosis of diseases;
- skills in conducting basic clinical, laboratory and functional examinations of adults and children;
- skills in making a primary diagnosis based on the results of biochemical and clinical studies for hematological pathology;
- skills in determining the scope of first medical aid in emergency and life-threatening conditions in hematological pathology.

Pre-requisites:

- Macroanatomy of hematopoietic organs
- Physiology of the blood and hematopoiesis
- Biochemistry of the blood
- Microanatomy
- Propedtherapy (physical examination of hematological system of healthy person)

Post-requisites:

- All clinical subjects;
- Clinical training «Feldsher's assistant»
- Clinical training «Doctor's assistant»

Table №1.

THEMATIC PLAN OF LECTURES

№	Theme of lecture	Hours	Date

1	Topographic anatomy of the hematopoietic organs. Topographic anatomy of the lymphatic system.	2	According to the timetable
2	Pathophysiology of diseases of the hematopoietic system. Disorders of hematopoiesis, erythropoiesis. Pathophysiology of anemia syndrome. Principles of classification of anemia	2	According to the timetable
3	Anatomical and physiological features of the hematopoetic system in children.	2	According to the timetable
4	Examination of pediatric hematology patients.	2	According to the timetable
5	Common hematological tests: Hemoglobin; RBC; WBC; DLC. Anemia: definition; classification; investigations. Iron metabolism overview. Microcytic hypochromic anemia: etiology; investigations; differential diagnosis.	2	According to the timetable
6	Vitamin B12 metabolism; etiology and pathogenesis of B12 deficiency; laboratory investigations of macrocytic anemia; peripheral blood picture of macrocytic anemia; pathogenesis, clinical features, hematologic indices and peripheral blood picture of sickle cell anemia and thalassemia; normal hemostasis; classification, etiology, pathogenesis and pathology of vascular and platelet disorders including ITP and hemophilia.	2	According to the timetable
	Total	12	

THEMATIC PLAN OF PRACTICAL CLASSES

№	Theme of practical class	Hours	Date
1	Topographic anatomy of the hematopoietic organs. Topographic anatomy of the lymphatic system.	4	According to the timetable
2	Pathophysiology of iron deficiency, B12- and folate deficiency anemia.	2	According to the timetable
3	Pathophysiology of hemolytic anemia: sickle cell anemia, thalassemia.	2	According to the timetable
4	Anatomy and physiology of the red blood cells in children.	2	According to the timetable
5	The types and roles of white blood cells in Children.	2	According to the timetable
6	Bleeding disorders in children.	2	According to the timetable
7	Unit №1	2	According to the timetable
8	Common hematological tests: Hemoglobin; RBC count; WBC count; Differential Leukocyte Count (DLC).	2	According to the timetable
9	Anemia: Definition and Classification. Investigations. Iron Metabolism: Etiology and Diagnosis. Vitamin B12: Metabolism, Deficiency and Pathogenesis. Macrocytic Anemia: Labs and Peripheral Blood. Megaloblastic vs Non-Megaloblastic Anemia. Sickle Cell Anemia and Thalassemia.	2	According to the timetable
10	Normal hemostasis: classification, etiology, pathogenesis and pathology of vascular and platelet disorders including ITP and hemophilias.	2	According to the timetable
11	Causes of leukocytosis, leucopenia, lymphocytosis and leukemoid reactions; etiology, genetics, pathogenesis, classification and hematologic features of acute and chronic leukemia; differences, etiology. Laboratory features of megaloblastic anemia and distinguishing features of megaloblastic and non-megaloblastic macrocytic anemia. Causes and differentiating features of lymphadenopathy. Causes and differentiation of splenomegaly.	4	According to the timetable
12	Unit №2	2	According to the timetable
	Total	28	

Table №2.

THEMATIC PLAN OF INDEPENDENT WORK OF STUDENTS

Unit №	Theme of independent work	Hours	Date
1 Top anatomy and pathophysiology of hematological system. Hematological syndromes in children.	**Make an abstract for topics:** 1. Topographical anatomy of organs of hematopoiesis system. 2. Topographical anatomy of the thymus, age features. 3. Topographical anatomy of the spleen. 4. Draw schemes and arrangement of lymph nodes on the trunk. 5. Draw schemes and arrangement of lymph nodes on the upper and lower extremities. 6. Classification of the lymph nodes and lymphatic vessels. **Choose topic for presentation:** 1. Features of red blood in children 2. Peculiarities of white blood in children 3. Changes in the CBC in iron deficiency anemia and additional laboratory tests to make a diagnosis 4. Changes in the CBC in hemolytic anemia and additional laboratory tests to make a diagnosis 5. Metabolism of hemoglobin and bilirubin 6. Types of bleeding and their causes 7. Etiology and pathogenesis of different types of acquired hemolytic anemias	10	According to the timetable
2 Investigation of blood and hematological syndromes in adults.	**Make an abstract for topics:** 1. Write an algorithm for diagnosing anemia. 2. Pathology of the hemostatic system. Differential diagnosis of coagulopathies. 3. Clinical picture and laboratory blood parameters of iron deficiency anemia. 4. Clinical picture and laboratory parameters of folate deficiency anemia. 5. Clinical picture and laboratory parameters of hemolytic anemia. 6. Clinical picture and laboratory parameters for thalassemia. 7. Describe methods for diagnosing various types of anemia. 8. Method of direct and indirect Coombs test.	10	According to the timetable
	Total	**20**	

Recommended reading for the discipline:

Basic:

Topanatomy:

1. B.D.Chaurasia «Human Anatomy» Volume 1-4, 8th edition 2020

Patophysiology:

2. Robins and Katran «Pathologic basis of disease», 8th edition 2012
3. Harsh Mohan «Textbook of pathology», 8th edition 2019

Propedtherapy:

2. Barbara Bates «A guide to physical examinaton and history taking», 6th edition 2009
3. Davidson «Principles and Practice of medicine», 23rd edition 2018
4. Harrison «Principles of Internal Medicine» Volume 1-2, 16th edition 2005

Propedpediatrics:

5. Ghai «Essential Pediatrics», 8th edition 2014
6. Nelson «Textbook of Pediatrics», 21th edition 2020

Additional:

Topanatomy:

7. Frank H. Netter «Atlas of Human Anatomy», 6th edition 2011

Grading policy and procedures for all types of work

For the period of studying the discipline, the student gains points for the relevant parameters (per unit):

- current score - 20 points
- independent work - 20 points
- unit/ module – 20 points
- the overall score - 60 (20+20+20)

For violations of t**he conduct policy**, the overall discipline score will be reduced by a maximum of 10 points.
For violations of **the academic ethics policy**, the overall score in the discipline is reduced by a maximum of 10 points.

Grading system for student's achievements

Grading criteria per discipline				
Maximum score	Intervals			
	«unsatisfactory»	«satisfactory»	«good»	«excellent»
Current control - 20	0-11	12-15	16-17	18-20
Interval description	The student refuses to answer or when trying to answer demonstrates a complete lack of knowledge of the material. No clinical task has been solved, no practical task has been completed.	The student knows the educational material partially. Incorrectly performs or disrupts the sequence of clinical examination of the patient. Can apply his knowledge only in a typical familiar situation, and experiences difficulty when changing the question. There are also difficulties in using special skills. Can only solve typical clinical problems and has poor	The student knows program material fluently in a familiar situation and makes two or three mistakes when answering. The student confidently answers additional questions. Able to apply knowledge and relevant clinical skills to a range of routine tasks. There are minor errors in the preparation of the medical history or situational task.	The student is fluent in educational material of varying complexity and uses information from other disciplines. The student demonstrates the ability to think and perform practical work independently. All tasks of the practical part were completed at a high level, clinical thinking and a non-standard approach to problem solving were demonstrated. He is fluent in communication skills.

		communication skills.	Good confidence in communication skills and ability to conduct effective dialogue.	
Independent work - 20	0-11	12-15	16-17	18-20
Interval description	As above	As above	As above	As above
	The following are additionally taken into account - logic of reasoning; - original approach to the solution.			
Control work (module) - 20	0-11	12-15	16-17	18-20
Interval description	Number of correct answers to MCQs –49% or less	Number of correct answers to MCQs –50-75 %	Number of correct answers to MCQs – 76-89%	Number of correct answers to MCQs – 90% and above

Exam 40 points.
The exam is carried out in 2 stages:
Stage 1 - clinical skills exam – 20
Stage 2 - theoretical knowledge exam – 20

Grand total score for the discipline (average score for units 60 + exam score 40) = 100 points
Grand total score for the discipline put into the record book.

Conduct Policy: (lateness, absence, behavior in the auditorium, late submission of work).
- Punctuality and completion of tasks.
- Mandatory attendance of classes.
- Attending class in a clean medical uniform.
- Eliminating conversations on a cell phone in the classroom.
- Active participation in the learning process.
- Doing homework on time.
- Academic detention at the time specified by the teacher.

For violations of the Conduct Policy, the total points for discipline might be reduced to 1-10 points.

Academic Ethics Policy.
- Be tolerant, respect the opinions of others.
- Formulate objections in the correct form.
- Constructively support feedback in all classes.
- Plagiarism and other forms of dishonest work are unacceptable. Plagiarism includes the following: the absence of references when using printed and electronic materials, quotes, thoughts and works of other authors or students.
- Prompting and cheating during tests, exams, classes is unacceptable as well as passing an exam for another student, unauthorized copying of materials.

For violations of the Academic Ethics Policy, the total points for the discipline may be reduced to 1-10 points.

Guidelines for the lessons of the discipline

Key questions covered in lesson 1. Topographic anatomy of the hematopoietic organs. Topographic anatomy of the lymphatic system.
Topographic anatomy of the hematopoietic organs.
1. Topographical anatomy of thymus glands, interposition with other bodies.
2. Age features thymus glands.
3. Topographical anatomy of a red marrow and their age features.
4. Topographical anatomy of vessels and nerves thymus.
5. Topographical anatomy of a spleen and their age features.
6. Topographical anatomy of vessels and nerves of spleen.

Topographic anatomy of the lymphatic system.
1. Topographical anatomy of lymph nodes of a head and neck.

2. Topographical anatomy of lymph nodes of a thorax and chest cavity.
3. Topographical anatomy of lymph nodes of an abdominal cavity.
4. Topographical anatomy of lymph nodes of the upper and lower extremity.

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[1,9]

Key questions covered in lesson 2. Pathophysiology of iron deficiency, B12- and folate deficiency anemia.
1. Definition and characteristics of anemia. Pathophysiologic characteristics of anemic syndrome signs and symptoms.
2. The basics of classifications of anemias. Pathogenetic classification of anemias.
3. Etiology and pathogenesis of erythropoiesis disorders: disorders of division and maturation of erythroid precursors.
4. Characteristics of regenerative and hyporegenerative anemia.
5. Iron balance in normal and pathology. Disorders of iron absorption and distribution in organism.
6. Etiology of iron deficiency anemia. Characteristic of different etiologic factors, which may cause iron deficiency.
7. Pathogenesis or iron deficiency anemia and characteristics of blood picture.
8. B12 and folate metabolism. Role of intrinsic factor (IF) in B12 absorption.
9. Etiology of B12 deficiency anemia: causes for development of pernicious (Addison-Biermer) anemia and for other types of B12 anemias.
10. Etiology of folate deficiency anemia.
11. Pathogenesis of B12 and folate deficiency anemias and characteristics of blood picture.
12. Triad of symptoms in B12 deficiency and their characteristics.

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[2,3]

Key questions covered in lesson 3. Pathophysiology of hemolytic anemia: sickle cell anemia, thalassemia.
1. Etiology and pathogenesis of increased hemolysis of RBCs.
2. The basics of classifications of hemolytic anemias.
3. Common characteristics of different types of hemolytic anemias.
4. Typical etiology and pathogenesis of sickle cell anemia.
5. Characteristics of changes in peripheral blood in BM and other system in sickle cell anemia.
6. Typical etiology and pathogenesis of thalassemias
7. Characteristics of changes in peripheral blood in BM and other system in thalassemias.
8. Pathogenic concepts of anemias treatment.

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[2,3]

Key questions covered in lesson 4. Anatomical and physiological features of blood and the hematopoietic system in children. Semiotics of damage to the blood system and hematopoietic organs in children.
1.
2.
N.

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[7,8]
Key questions covered in lesson 5. Features of examination of hematological patients and the blood system in childhood.
1.
2.
N.

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[7,8]

Key questions covered in lesson 6. Special methods for diagnosing blood diseases in children. Hematological syndromes.
1.
2.
N.

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[7,8]

Key questions covered in lesson 7. Unit №1
Module questions

1. The Central organs of hematopoiesis systems.
2. Peripheral organs of hematopoiesis systems.
3. The General morphological characteristics.
4. Topography of a red marrow.
5. Topography of thymus.
6. Topography of lymph nodes.
7. Topography of spleen.
8. Age features.
9. Definition and characteristics of anemia.
10. Pathophysiologic characteristics of anemic syndrome signs and symptomes.
11. The basics of classifications of anemias. Pathogenetic classification of anemias.
12. Characteristics of Bone Marrow response to anemia: erythropoiesis state variants in different types of anemia.
13. Etiology and pathogenesis of erythropoiesis disorders: disorders of division and maturation of erythroid precursors.
14. Etiology of B12 deficiency anemia: causes for development of pernicious (Addison-Biermer) anemia and for other types of B12 anemias.
15. Etiology of folate deficiency anemia.
16. Pathogenesis of B12 and folate deficiency anemias and characteristics of blood picture.
17. Triad of symptoms in B12 deficiency and their characteristics.
18. Etiology and pathogenesis of increased hemolysis of RBCs.
19. The basics of classifications of hemolytic anemias.
20. Common characteristics of different types of hemolytic anemias.
21. Typical etiology and pathogenesis of sickle cell anemia.
22. Blood and hematopoiesis in children. Morphology of blood cells in children of different ages.
23. The erythrocyte system in children, its development in the postnatal period. Anemia syndrome.
24. Lymphoid system in children. Morphological and functional immaturity, factors of their compensation, research methods. Syndrome of enlarged lymph nodes.
25. Blood of a newborn child, features of the morphological composition of blood in children in the neonatal period.
26. Granulocyte system in children. Syndrome of leukocytosis and leukopenia.
27. Features of the blood coagulation system, thrombocytopoiesis in children in the age aspect.
28. Hemorrhagic syndrome in children. Semiotics of coagulopathies, thrombocytopathies and vasopathies. Types of bleeding.
29. Write the CBC (variant of the norm) for children aged 5 days, 1 month, 1 year, 5 years.

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[1,2,3,7,8,9]

Key questions covered in lesson 8. Common Hematological Tests: Hemoglobin; RBC count; WBC count; Differential Leukocyte Count (DLC).

1 Normal values and clinical significance of hemoglobin, RBC, WBC, and DLC
2 Methods used to perform hematological tests
3 Interpretation of abnormal results in common hematological conditions

Key questions covered in lesson 9. Anemia: Definition and Classification. Investigations. Iron Metabolism: Etiology and Diagnosis. Vitamin B12: Metabolism, Deficiency and Pathogenesis. Macrocytic Anemia: Labs and Peripheral Blood. Megaloblastic vs Non-Megaloblastic Anemia. Sickle Cell Anemia and Thalassemia

1. Definition and classification of anemia (morphological and etiological)
2. Diagnostic investigations for anemia (CBC, iron studies, etc.)
3. Iron metabolism: key processes, causes of deficiency, diagnostic approach
4. Vitamin B12 metabolism and pathogenesis of deficiency
5. Laboratory features and peripheral smear findings in macrocytic anemia
6. Differences between megaloblastic and non-megaloblastic anemia

7. Sickle cell anemia and thalassemia: pathogenesis, features, indices, and peripheral smear

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[4,5,6]

Key questions covered in lesson 10. Normal Hemostasis; Classification, Etiology, Pathogenesis and Pathology of Vascular and Platelet Disorders Including ITP and Hemophilias

1 Components and phases of normal hemostasis
2 Classification and causes of vascular and platelet disorders
3 Immune thrombocytopenic purpura (ITP): etiology, pathogenesis, clinical features
4 Hemophilias: types, genetic basis, and bleeding patterns

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[4,5,6]

Key questions covered in lesson 11. Causes of Leukocytosis, Leucopenia, Lymphocytosis and Leukemoid Reactions; Etiology, Genetics, Pathogenesis, Classification and Hematologic Features of Acute and Chronic Leukemia; Laboratory Features of Megaloblastic Anemia and Distinguishing Features of Megaloblastic and Non-Megaloblastic Macrocytic Anemia; Causes and Differentiating Features of Lymphadenopathy; Causes and Differentiation of Splenomegaly

1 Causes of leukocytosis, leucopenia, lymphocytosis, and leukemoid reactions
2 Etiology, genetics, pathogenesis and classification of acute and chronic leukemia
3 Hematologic and clinical features of leukemias
4 Laboratory features of megaloblastic anemia and differences from non-megaloblastic forms
5 Causes and differentiating features of lymphadenopathy
6 Causes and clinical-laboratory differentiation of splenomegaly

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[4,5,6]

Key questions covered in lesson 12. Unit №2
Module questions

1.Interpret the results and clinical relevance of hemoglobin, RBC count, WBC count, and differential leukocyte count.
2.Classification of anemia based on morphology and etiology; key diagnostic investigations.
3.Iron metabolism, causes of deficiency, and diagnostic approach in iron deficiency anemia.
4.Vitamin B12 metabolism, pathogenesis of deficiency, and hematologic consequences.
5. Laboratory features and peripheral smear findings in macrocytic anemia; comparison of megaloblastic and non-megaloblastic types.
6. Pathogenesis, clinical features, hematologic indices, and peripheral blood picture in sickle cell anemia and thalassemia.
7.Phases and components of normal hemostasis; classification and key features of ITP and hemophilias.
8. Causes and mechanisms of leukocytosis, leucopenia, lymphocytosis, and leukemoid reactions.
9.Etiology, classification, genetic basis, and hematologic findings in acute and chronic leukemia.
10. Major causes and distinguishing features of lymphadenopathy and splenomegaly.

Recommended reading for the lesson/unit (if necessary); serial number is indicated in square brackets.
[4,5,6]

Methodological instructions for the implementation of independent work on the discipline

Methodological instructions for making an abstract:

1. To study the curriculum and the working curriculum.
2. Determine the place of the topic of this lecture in the structure of the discipline according to the thematic plan.
3. Find out all the issues that need to be studied.
4. To study material, which is in the syllabus, to clarify the amount of missing material on the basis of control

questions, tasks for control work and questions submitted for the module (see the program discipline and the working curriculum).

5. Determine the literature in which there is the necessary educational material, and the sequence of its assimilation.
6. To process each educational material in the following way.
7. Read it in dynamics to understand the general essence..
8. Read the study material a second time, understanding each word and sentence
9. For the third time to identify the basic concepts, the essence of phenomena and processes, their structure and content, as well as the links between them.
10. Write it all down in a synopsis.
11. To establish a connection with the previous educational material.
12. Independently answer all control questions on this topic.

Methodological instructions for independent work:

1. Study the theoretical material well; master the method of applying knowledge in practice.
2. Be able to use the necessary equipment, materials, equipment for measurements.
3. To study the recommendations for specific laboratory or practical work, which are set out in textbooks and methodological developments.
4. Make a plan for laboratory or practical work.
5. Prepare the necessary material.
6. Perform tasks of laboratory or practical work.
7. Interpret the results and describe the identified phenomena.
8. Draw conclusions.
9. Draw up everything accordingly.