MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS
Educational Institution
BELARUSIAN STATE MEDICAL UNIVERSITY

APPROVED
by Rector of the Educational Institution «Belarusian State Medical University»

S.P.Rubnikovich
26.06.2024

Reg. # UD-0991-01-24/2425Edu.

CLINICAL ASSESSMENT OF LABORATORY TESTS

Curriculum of the educational institution in the academic discipline for the specialty

1-79 01 01 «General Medicine»

2024

Curriculum is based on the educational program «Clinical Assessment of Laboratory Tests», approved 26.06.2024, registration # УД-0911-01-24/2425/уч; on the educational plan in the specialty 1-79 01 01 «General Medicine», approved 15.05.2024, registration # 7-07-0911-01/2425/mf.

COMPILERS:

I.V.Nagornov, Head of the Department of Military Field Therapy at the Military Medical Institute of the educational institution «Belarusian State Medical University», PhD, Associate Professor;

A.A.Bova, Professor of the Department of Military Field Therapy at the Military Medical Institute of the educational institution «Belarusian State Medical University», Doctor of Medical Sciences, Professor;

A.N.Yanul, Associate Professor of the Department of Military Field Therapy at the Military Medical Institute of the educational institution «Belarusian State Medical University»;

N.F.Soroka, Professor of the 2nd Department of Internal Diseases of the educational institution «Belarusian State Medical University», Doctor of Medical Sciences, Professor;

O.P.Sirosh, Associate Professor of the 2nd Department of Internal Diseases of the educational institution «Belarusian State Medical University», PhD, Associate Professor

RECOMMENDED FOR APPROVAL:

by the Department of Military Field Therapy of the Military Medical Institute at the educational institution «Belarusian State Medical University»
(protocol # 10 of January 24, 2024);

by the 2nd Department of Internal Diseases of the educational institution «Belarusian State Medical University»
(protocol # 6 of May 17, 2024);

by the Scientific and Methodological Council of the educational institution «Belarusian State Medical University»
(protocol # 18 of June 26, 2024)

EXPLANATORY NOTE

«Clinical Assessment of Laboratory Tests» is an academic discipline within the module «Clinical Pathology and Clinical Diagnosis» which contains systematized scientific knowledge about the methods of objective examination of the cellular and chemical composition of the biological material of the human body and the application of this information to identify deviations from the norm, establish diagnoses, and monitor treatment.

The aim of the discipline «Clinical Assessment of Laboratory Tests» is the formation of specialized competence for the rational and effective use of laboratory methods and results of the examination of biological material of the human body in diagnosing diseases and monitoring the chosen treatment strategy.

The objectives of the discipline «Clinical Assessment of Laboratory Tests» are to form students' scientific knowledge about the etiology and characteristics of the pathogenesis of diseases, and the development of skills and abilities necessary for:

diagnosing diseases using laboratory tests;

determining the diagnostic value of laboratory tests;

planning and interpreting the results of laboratory tests.

The knowledge, skills, and abilities acquired through studying the discipline «Clinical Assessment of Laboratory Tests» are necessary for successful mastering of the following modules: «Internal Diseases», «Therapy Module 2», «Therapy Module 3», «Surgical Module 2», «Surgical Module 3».

Studying the educational discipline «Clinical Assessment of Laboratory Tests» should ensure the formation of possess the following specialized competence: develop a laboratory examination plan and interpret laboratory indicators.

As a result of studying the discipline «Clinical Assessment of Laboratory Tests» the student should:

know:

modern theoretical principles and analytical principles of clinical laboratory diagnostics;

criteria for normal and reference values for various disease forms;

basic principles and methodology for interpreting laboratory test results;

be able to:

create an optimal plan for laboratory tests based on clinical and instrumental data;

interpret and clinically evaluate the results of laboratory tests;

use laboratory test results to confirm or exclude disease diagnoses, predict the disease course, and monitor and assess the effectiveness of treatment measures;

master:

skills in planning laboratory tests;

skills in interpreting the results of laboratory tests based on clinical and instrumental data.

Total number of hours for the study of the discipline is 46 academic hours, of which 27 classroom hours and 19 hours of student independent work. Classroom hours according to the types of studies: lectures – 3 hours, practical classes – 24 hours.

Intermediate assessment is carried out according to the syllabus of the specialty in the form of a credit (7th semester).

Form of higher education – full-time.

ALLOCATION OF ACADEMIC TIME ACCORDING TO SEMESTERS OF STUDY

Code, name of the specialty	semester	Number of academic hours						Form of intermediate assessment
		total	in-class	including			out-of-class self-studies	
				lectures	supervised student independent work	practical classes		
1-79 01 01 «General Medicine»	7	46	27	3	-	24	19	credit

THEMATIC PLAN

Section name (topic)	Number of class hours	
	lectures	practical
1. **Clinical evaluation of general clinical tests**	**3**	**6**
1.1.Clinical evaluation of complete blood count (CBC)	1,5	2
1.2.Clinical evaluation of urine analysis	1,5	2
1.3.Clinical evaluation of sputum, serous fluid and stool tests	–	2
2. **Clinical evaluation of blood biochemistry tests**	**–**	**12**
3. **Clinical evaluation of hemostasis system tests**	**–**	**6**
Total hours	**3**	**24**

CONTENT OF THE EDUCATIONAL MATERIAL

1. Clinical Evaluation of General Clinical Tests

1.1. Clinical Evaluation of Complete Blood Count (CBC)

Main indicators of CBC (erythrocytes, leukocytes, platelets) and their indices obtained using automated hematology analyzers, factors influencing their values.

Diagnostic significance of leukocytosis, leukopenia, and changes in the leukocyte formula. Reactive changes in the hematopoietic system in various pathological conditions: infections, intoxications, malignant neoplasms.

Clinical significance of changes in the morphological characteristics of erythrocytes, hemoglobin levels. Diagnostic significance of determining reticulocytes. Laboratory criteria for the effectiveness of anemia treatment.

Clinical significance of changes in platelet count.

Methods for measuring erythrocyte sedimentation rate (ESR). Clinical significance of changes in ESR.

Interpretation of CBC results. Monitoring treatment effectiveness.

1.2. Clinical Evaluation of Urine Analysis

General urine analysis: clinical evaluation of physical properties, chemical indicators (protein, glucose, ketone bodies, bilirubin), and sediment microscopy. Diagnostic significance of proteinuria, albuminuria, glucosuria. Clinical evaluation of the three-glass urine test, Nechiporenko urine test, and Zimnitsky urine test.

Rules for urine collection for various analyses. Interpretation of urine laboratory test results. Preparation of clinical laboratory reports. Monitoring treatment effectiveness.

1.3. Clinical Evaluation of Sputum, Serous Fluid and Stool Tests

Clinical evaluation of general sputum analysis (macroscopic and microscopic examination).

Clinical significance of examining serous cavity fluids (transudate, exudate). Distinction between transudate and exudate.

Clinical evaluation of stool analysis (coprogram). Stool test for occult blood.

Interpretation of laboratory test results of stool, sputum, and serous fluids. Monitoring treatment effectiveness.

2. Clinical Evaluation of Blood Biochemistry Tests

Clinical evaluation of protein metabolism indicators: total protein, protein fractions, specific proteins. Clinical significance of C-reactive protein, high-sensitivity C-reactive protein, procalcitonin, troponins I and T, cystatin C, lipocalin, haptoglobin.

Determination of non-protein nitrogen components (urea, creatinine, uric acid, homocysteine).

Clinical diagnostic significance of enzyme studies: alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase, creatine kinase, gamma-glutamyl transpeptidase (GGT), lactate dehydrogenase (LDH), lipase, α-amylase, elastase, cholinesterase.

Clinical diagnostic significance of ferritin, transferrin, and transferrin saturation with iron levels.

Clinical evaluation of lipid metabolism indicators. Laboratory monitoring of lipid metabolism disorders correction.

Clinical evaluation of carbohydrate metabolism. Methods for monitoring diabetes mellitus. Methods for determining insulin resistance.

Interpretation of blood biochemistry test results. Monitoring treatment effectiveness.

3. Clinical Evaluation of Hemostasis System Tests

Clinical evaluation of vascular-platelet hemostasis. Assessment of the effectiveness of antiplatelet therapy.

Clinical evaluation of coagulation hemostasis and the fibrinolytic system. Features of hemostasis system indicator changes in various pathological conditions. Laboratory monitoring of the effectiveness of anticoagulant and fibrinolytic therapy.

Interpretation of laboratory test results of the hemostasis system.

ACADEMIC DISCIPLINE CURRICULAR CHART FOR THE DISCIPLINE «CLINICAL ASSESSMENT OF LABORATORY TESTS»

№	Section (topic) name	Number of classroom hours		Supervised student independent work	Practical Skills	Form of control	
		lectures	practical classes			of practical skills	of current / intermediate assessment
7 semester							
	Lectures	**3**	-	-			
1.1	Clinical Evaluation of Complete Blood Count	1,5	-	-			
1.2	Clinical Evaluation of Urine Tests	1,5	-	-			
	Practical Classes		**24**				
1.	Clinical Evaluation of General Clinical Studies	-	6	-	1.Interpretation of complete blood count. 2. Interpretation of urinalysis. 3. Interpretation of general clinical examination of sputum 4. Interpretation of analysis of effusions into serous cavities	Solving situational tasks	Interview
2	Clinical Evaluation of Biochemical Blood Tests. *Clinical Evaluation of Protein Metabolism Indicators. Clinical Diagnostic Value of Enzyme Studies*	-	6	-	Interpretation of biochemical blood analysis	Solving situational tasks	Interview

3	Clinical Evaluation of Biochemical Blood Tests *Clinical Evaluation of Iron Metabolism, Lipid and Carbohydrate Metabolism Indicators*	-	6	-	Interpretation of Biochemical Blood Analysis	Solving situational tasks	Interview*
4	Clinical Evaluation of Hemostasis System Studies	-	6	-	Interpretation of Coagulation Hemostasis Studies	Solving situational tasks	Credit
		3	**24**	**-**			

* is a mandatory form of current assessment

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INFORMATION AND INSTRUCTIONAL UNIT

LITERATURE

Basic (relevant):

1. Гутько, А. Г. Основы клинической лабораторной диагностики = Basic clinical laboratory diagnostics : пособие для студентов / А. Г. Гутько, С. В. Лелевич; под ред. С. В. Лелевича; Гродненский государственный медицинский университет. - Гродно : ГрГМУ, 2020. - 134 с.

Additional:

2. McPherson, Richard A. Henry's clinical diagnosis and management by laboratory methods / McPherson, Richard A., Pincus, Matthew. - 23-rd ed. - Missouri: Elsevier, 2017. - 1534 p.

3. Основы лабораторной диагностики = Basics of laboratory diagnostics : практикум / Э. А. Доценко [и др.]. – Минск : БГМУ, 2020. – 55 с.

4. Кузнецов, О. Е. Исследование цереброспинальной жидкости = The study of cerebrospinal fluid / О. Е. Кузнецов, А. Г. Гутько. – Гродно : ГрГМУ, 2018. Rysuly, M. R. Laboratory medicine: training manual / M. R. Rysuly, B. G. Tashmukhambetov. - Алматы : New book., 2018. - 236 p.

5. Oxford Handbook of Clinical Laboratory Investigation: handbook / ed. D. Provan. - 3rd ed. - Oxford : Oxford University press, 2016. - 870 p.

METHODOLOGICAL RECOMMENDATIONS FOR THE ORGANIZATION AND PERFORMANCE OF STUDENT INDEPENDENT WORK IN THE ACADEMIC DISCIPLINE

The allocated time for independent work can be utilized by students for:
preparation for lectures and practical classes;
preparing for credit in the academic discipline;
studying topics (questions) assigned for independent study;
preparing thematic reports, essays, presentations;
completing practical assignments;
taking notes from educational literature.

LIST OF AVAILABLE DIAGNOSTIC TOOLS

The following forms of current assessment are used to diagnose competencies:

1. Interview.
2. Solving situational tasks.

LIST OF AVAILABLE TEACHING METHODS

Linear (traditional) method;
active (interactive) methods:
Problem-Based Learning (PBL).
Case-Based Learning (CBL).

LIST OF PRACTICAL SKILLS

Name of practical skills	Form of practical skill control
1. Interpretation of complete blood count	Solving situational tasks
2. Interpretation of urinalysis	Solving situational tasks
3. Interpretation of general clinical examination of sputum	Solving situational tasks
4. Interpretation of analysis of effusions into serous cavities	Solving situational tasks
5. Interpretation of biochemical blood analysis	Solving situational tasks
6. Interpretation of coagulation hemostasis studies	Solving situational tasks

PROTOCOL OF THE CURRICULUM APPROVAL BY OTHER DEPARTMENTS

Title of the discipline requiring approval	Name of the Department	Amendments to the curriculum in the academic discipline	Decision of the department, which designed the curriculum (date, protocol #)
Internal Medicine	1st Department of Internal Diseases	No comments	protocol # 10 of January 24, 2024
	2nd Department of Internal Diseases	No comments	protocol # 6 of May 17, 2024
	Department of Cardiology and Internal Diseases	No comments	protocol # 10 of January 24, 2024
	Military Field Therapy	No comments	protocol # 6 of May 17, 2024

COMPILERS:

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Associate Professor of the 2nd Department of Internal Diseases of the educational institution «Belarusian State Medical University», PhD, Associate Professor — O.P.Sirosh

Associate Professor of the 2nd Department of Internal Medicine of the educational institution «Belarusian State Medical University», PhD, Associate Professor — N.N.Moroz-Vadalazhskaya

Curriculum content, composition and the accompanying documents comply with the established requirements.

Dean of the Medical Faculty for International Students of the educational institution «Belarusian State Medical University» — O.S.Ishutin

24.06.2024

Methodologist of the Educational and Methodological Department of the Office of Educational Activities of the educational institution «Belarusian State Medical University» — S.V.Zaturanova