

**Academic programme  
component**

**31.05.01 General Medicine  
(in a foreign language)  
programme**

**Б1.В.01  
discipline code**

## **SYLLABUS**

**Discipline Clinical Aspects of Laboratory Diagnostics**

Author(s):

Mishanina L.A.

Director of Medicine and  
Life Sciences Institute

PhD in Medical Sciences,  
Docent

Approved at the meeting of the  
Clinical Medicine Department

Record no.7 dated March 12, 2024

Head of the department Krivenko O.G.

\_\_\_\_\_  
signature

**Murmansk**

**2024**

## Clarification

Discipline volume: 3 credit points

**1. Discipline (module) training results** correlated with the indicators of competencies achievement determined by the educational programme

Competency	Indicators of competency achievement	Discipline (module) training results
<b>УК-1</b> Can design action plans and apply systematic approach to critical analysis of problem situations	ИД-2УК-1 Collects, systematizes and critically analyzes information necessary to develop a strategy for resolving a problematic situation	<b>To know:</b> - standards for the diagnosis and treatment of the most common diseases of the cardiovascular, respiratory, digestive, genitourinary, hematopoietic, musculoskeletal, nervous, immune, and endocrine systems; - the main modern preanalytical and analytical technologies of clinical laboratory research; - principles of operation and rules of operation of the main types of measuring instruments, analyzers and other equipment used in clinical laboratory research; - the technology of organizing and conducting in-laboratory and external quality control of clinical laboratory studies. <b>To be able to:</b> - interpret the results of laboratory studies in order to conduct a scientific search, formulate a working hypothesis, compare and analyze the results obtained; - to develop algorithms for laboratory diagnostics of patients' condition. <b>To have:</b> - a system of theoretical knowledge in the field of clinical laboratory diagnostics; - skills for independent laboratory research.
<b>ПК-2</b> Able to assess morphofunctional, physiological conditions and pathological processes in the human body to solve professional problems	ПК-2.1. Collects complaints, the patient's medical history, and his complete physical examination. ПК-2.2. Formulates a preliminary diagnosis and draws up a plan for laboratory and instrumental examinations of the patient, directs him to laboratory and instrumental examinations in accordance with current clinical recommendations (treatment protocols) and standards of medical care ПК-2.3. Taking into account the examination data, performs a differential diagnosis of the disease, establishes a diagnosis in accordance with the ICD, if necessary, directs the patient to provide specialized medical care in a hospital. ПК-2.4. Conducts the necessary types of examinations, analyzes their results, formulates a diagnosis for children patients.	

## 2. Discipline contents

**Topic 1. Preparation of biomaterial for laboratory diagnostics. Methods of laboratory diagnostics.** Conditions and procedures for taking samples of biological material: blood, urine, feces, cerebrospinal fluid, transudates, sputum, saliva. Primary processing of biological samples of materials. Requirements for the conditions of storage and transportation of biomaterial samples. Morphological, photometric and turbidimetric methods. Enzyme immunoassay. PCR. Chromatography, electrophoresis, mass spectrometry.

**Topic 2. Laboratory diagnostics quality control.** In-laboratory quality control. Means and methods of quality control. Making of research control checklist. Analytical reliability of the method. Reference values of laboratory parameters. External quality assessment.

**Topic 3. Clinical hematological studies.** Counting the number of blood cells (leukocytes, erythrocytes, platelets, reticulocytes). Assessment of changes in hematological parameters in norm and pathology. Examination of bone marrow punctate. Neoplasms of the hematopoietic system.

Paraproteinemic hemoblastoses. Anemia. Agranulocytosis. Reactive changes in blood and bone marrow in various diseases and conditions.

**Topic 4. General clinical studies.** Studies in diseases of the lungs, digestive system, urinary system, genitals, central nervous system and lesions of the serous membranes.

**Topic 5. Clinical biochemical studies.** The study of indicators of protein, carbohydrate and lipid metabolism. Determination of enzyme activity. The study of indicators of pigment metabolism, nitrogen metabolism. Acid-base state. Laboratory diagnostics of disorders of water-electrolyte metabolism. Laboratory diagnostics of diseases of the endocrine system.

**Topic 6. Clinical coagulological studies.** The mechanism of hemostasis. Plasma and platelet hemostasis. Disorders of platelet hemostasis. The main syndromes associated with a violation in the hemostasis system.

**Topic 7. Clinical parasitological studies.** The study of the life cycles of parasites-pathogens of human diseases and the clinical picture of these diseases. Methods of laboratory diagnostics of the main helminthiasis and protozoa

**Topic 8. Clinical immunological and molecular genetic studies.** Cellular and humoral immunity. IgM and IgG immunoglobulins in the diagnosis of infectious diseases. The diagnostic value of determining the avidity of antibodies. Isoserological studies: determination of group and rhesus affiliation, detection of antierythrocyte antibodies. The study of nonspecific resistance. Laboratory indicators of the activity of the rheumatic process. Allergy and methods of laboratory diagnosis of allergic conditions. Diagnostics of nucleic acids: the possibilities of various PCR methods for the detection of infectious diseases.

### **3. Training support materials**

- multimedia presentations on the discipline are available on MAU LMS Moodle;
- practical training manuals are available on MAU LMS Moodle;
- learning materials are available on MAU official website at [«Информация по образовательным программам, в том числе адаптированным»](#).

### **4. Discipline assessment materials**

It is a separate component of the educational programme developed in the form of a separate document, includes:

- a list of competencies indicating the stages of their formation in the process of mastering the discipline;
- current assessment tasks;
- interim assessment tasks;
- tasks for internal assessment of education quality.

**5. The list of main and supplementary literature** (printed, electronic and (or) electronic library resources)

#### ***Main literature:***

1. Кишкун А. А. Клиническая лабораторная диагностика : учебное пособие для студентов учреждений высшего профессионального образования по дисциплине "Клиническая лабораторная диагностика". – 2-е изд., перераб. и доп. – Москва : ГЭОТАР-Медиа, 2023. – 996 с. : ил., табл. – (Учебное пособие). – Библиогр.: с. 985-990. - Предм. указ.: с. 991-996. – ISBN 978-5-9704-7424-2 [Гриф].

#### ***Supplementary literature:***

2. Тэмл Х.-Атлас по гематологии : практическое пособие по морфологической и клинической диагностике : перевод с английского / под общей редакцией В. С. Камышникова. – 4-е изд. – Москва : МЕДпресс-информ, 2021. – 207 с. : ил., табл. – Тит. л. парал. рус., англ. – Библиогр.: с. 200. - Алф. указ.: с. 201-207. – ISBN 978-5-00030-895-0.

#### 6. Professional databases and information reference systems

- 1) University Library Online <https://biblioclub.ru/>
- 2) Electronic library “Student Consultant” <https://www.studentlibrary.ru/>

#### 7. The list of licensed and openly distributed software, including domestic software

- 1) Microsoft Office 2007 Package
- 2) ABBYY FineReader Optical text recognition system

#### 8. Ensuring mastering the discipline for people with special needs

Students with special needs are provided with printed and (or) electronic educational resources adapted to their needs.

9. The material and technical support of the discipline (module) is presented in the appendix to the academic programme "Material and technical conditions for the implementation of the educational programme" and includes:

- classrooms for conducting training sessions provided for by the specialty programme, fitted with technical equipment;
- spaces for self-study work fitted with computer equipment with the Internet connection and access to MAU LMS Moodle;
- biochemical laboratory;
- PCR laboratory.

It is allowed to replace the equipment with its virtual counterparts.

#### 10. Study load distribution by type of educational activity

Table 1 - Study load distribution

Educational activity	The discipline (module) study load distribution by the forms of training	
	Semester	Total hours
	5	108
Lectures	22	22
Seminars	50	50
Individual work	36	36
<b>Total hours for the discipline</b>	<b>108</b>	<b>108</b>
/ in the form of seminars	50	50
Interim and formative assessment		
Credit	+	+

#### The list of seminars by the forms of education

№	Seminar topics
1	2
	Full-time

1	Familiarization with the basic principles of clinical laboratory diagnostics. Safety precautions in the clinical diagnostic laboratory when working with biological materials
2	Laboratory study quality control
3	Leukocyte formula
4	Leukocyte count in pathology
5	Counting cells in the Goryaev's chamber
6	General urine analysis
7	Quantitative determination of urine protein by the Lowry method
8	Analysis of the results of a general blood and urine test
9	Analysis of the results of a biochemical blood test
10	PCR-test performance
11	Blood type determination
12	Case task solving