

**FEDERAL STATE BUDGET EDUCATIONAL  
INSTITUTION OF HIGHER EDUCATION  
«DAGESTAN STATE MEDICAL UNIVERSITY»  
MINISTRIES OF HEALTH OF THE RUSSIAN FEDERATION  
(FGBOU VO DSMU of the Ministry of Health of Russia)**

**ANNOTATION  
WORKING PROGRAM OF THE DISCIPLINE  
"CHEMISTRY"**

Index of discipline according to the curriculum: Б 1. 0. 11  
Specialty: 31.05.01 General Medicine  
Level of higher education: specialist  
Graduate Qualification: Medical Doctor  
Faculty: medical  
Department of General and Biological Chemistry  
Full-time form of education  
Course: 1  
Semester: II  
Total labor intensity: 2 c.u. / 72 hours  
Lectures: 18 hours  
Practical training: 24 hours  
Labs: 12 hours  
Independent work of the student: 18 hours  
Form of control: credit in the II semester

### **1. PURPOSE AND OBJECTIVES OF MASTERING THE DISCIPLINE**

The discipline "Chemistry" refers to the mandatory part of the curriculum of the educational program in the specialty 31.05.01 General Medicine

The purpose of mastering the discipline "Chemistry" is the formation of the ability to assess the morpho-functional, physiological states and pathological processes in the human body to solve professional problems.

Objectives of the discipline: to form basic knowledge about the physical and chemical nature, mechanisms and patterns of processes occurring in a living organism, about the basics of modern chemical and physical and chemical methods used in medical science and practice.

### **II. PLANNED TRAINING OUTCOMES IN THE DISCIPLINE**

<b>Code and name of competence (or parts of it)</b>	<b>Code and name of the indicator of achievement of competence</b>
<b>ОПК-5</b> Able to assess morphofunctional, physiological conditions and pathological processes in the human body to solve professional problems.	<b>ИД-1ОПК-5</b> Able to evaluate morpho-functional processes under physiological conditions. <b>ИД-2ОПК-5</b> Able to evaluate functional processes in pathological conditions.
As a result of mastering the discipline, the student must <b>Know:</b>	

- physical and chemical aspects of the most important biochemical processes and various types of homeostasis in the body: the theoretical foundations of bioenergetics, factors affecting the shift in the balance of biochemical processes;
- Fundamentals of chemistry of biogenic elements, their role in the life of the organism;
- the essence of the metal-ligand balance in the body and the causes of its violation.
- physical and chemical foundations of surface phenomena, dispersed systems, macromolecular compounds, their essence, role in metabolism, basic principles of their use in medicine;
- the chemical nature, structure and functions of biologically important organic compounds (nucleic acids, natural proteins, carbohydrates, fats, water-soluble and fat-soluble vitamins, hormones, etc.) in ensuring the normal functioning of a healthy human body, in the formation of basic physiological indicators that contribute to the preservation and health promotion, prevention of diseases and viral infections: SARS, influenza, COVID - 19.

**Be able to:**

- to interpret the data of the main physical-chemical, mathematical and natural-science research methods in solving professional problems;
- predict the direction, completeness and results of chemical and physico-chemical processes, based on the theoretical positions of chemistry, the results of calculations and observations;
- explain the causes and consequences of changes in the direction, completeness and results of chemical and physico-chemical processes occurring in the human body;
- to make physical and chemical measurements that characterize certain properties of solutions, mixtures and drugs;
- classify chemical compounds based on their structural formulas; predict the behavior and functions of organic substances in a living organism based on their classification (structure and presence of functional groups); analyze the effect of certain drugs on the basis of the classification of its functional group and structure;
- to observe the course of chemical reactions and draw reasonable conclusions;
- predict the course of reactions of different types, taking into account their competitive nature;
- scientifically substantiate the results obtained, solve typical practical problems and master the theoretical minimum at a more abstract level;
- present the results of experiments and observations in the form of graphs and tables;
- carry out statistical processing of the obtained results..

**Own:**

- terminology and the technique of conducting qualitative reactions to some biologically important compounds and drugs;
- ideas about the main chemical and physico-chemical research methods and technologies used in medicine; skills in analysis and calculation of the parameters of the most important chemical and physico-chemical processes;
- basic skills of obtaining and processing data of a chemical experiment, their use in medical practice; calculations of the composition and preparation of solutions.

### **III. THE PLACE OF THE EDUCATIONAL DISCIPLINE IN THE STRUCTURE OF THE EDUCATIONAL PROGRAM**

The academic discipline "Chemistry" is included in the basic part of the working curriculum for training in the specialty 31. 05. 01 General Medicine with the index B1.0.11.

In accordance with the current curriculum, this discipline is studied in the second semester.

The material of the discipline is based on previously acquired knowledge in biology, mathematics, physics. The discipline "Chemistry" is fundamental for the study of the following disciplines: biological chemistry, normal and pathophysiology, pharmacology, toxicological chemistry, hygiene, internal medicine and physiotherapy.

The development of competencies in the process of studying the discipline contributes to the formation of knowledge, skills and abilities that allow for effective work on the implementation of the following types of tasks of professional activity: therapeutic and research.

#### IV. VOLUME OF DISCIPLINE AND TYPES OF TRAINING

The total complexity of the discipline is 2 credit units.

Types of work		Number of hours per semester
Contact work (total), including:		<b>54</b>
Classroom work		<b>54</b>
Lectures (L)		<b>18</b>
Laboratory studies (LS)		<b>12</b>
Practical classes (PC)		<b>24</b>
Independent work of the student (IWS)		<b>18</b>
Type of intermediate certification		credit
TOTAL: Total	a.h.	<b>72</b>
labor intensity	z.e.	<b>2</b>

#### V. SECTIONS OF THE DISCIPLINE

№ section	Name of the discipline section
<b>1.1</b>	General chemistry. Biologically active low molecular weight inorganic substances (structure, properties, participation in the functioning of living systems).
<b>1.2</b>	Elements of chemical thermodynamics, thermodynamics of solutions and chemical kinetics.
<b>1.3</b>	The main types of chemical equilibria and processes in the functioning of living systems.
<b>1.4</b>	Physical chemistry of surface phenomena in the functioning of living systems.
<b>1.5</b>	Physical chemistry of dispersed systems in the functioning of living systems.
<b>2.1</b>	Bioorganic chemistry. Poly - and heterofunctional compounds involved in the processes of vital activity.
<b>2.2</b>	Biopolymers and their structural components.

#### VI. Form of intermediate certification.

**1st semester credit**

**Department - Developer : Department of General and Biological Chemistry**