

**Abstract of the work program of the discipline  
“Physics and mathematics”**

of the main professional educational program of higher education - specialty program in  
the specialty 31.05.03 Dentistry,  
approved on May 24, 2023

Form of education: Full-time

The period of development: 5 years

Department of Chemistry and Physics

**1. The purpose of the discipline:** the formation of systematic knowledge in medical students about physical properties and physical processes occurring in biological objects, including in the human body, necessary for mastering other academic disciplines and forming professional medical qualities.

**2. The place of discipline in the structure of the general education program:** the discipline "Physics, Mathematics" refers to the basic part of the program of Block 1 of the Federal State Educational Standard of Higher Education in specialty 31.05.03 Dentistry.

**3. Requirements for the results of the discipline:**

The process of studying the discipline is aimed at the formation and development of competences: GPC-8.

As a result of studying the discipline, the student must  
*know:*

- the basic laws of physics, physical phenomena and patterns underlying the processes occurring in the human body;
- physicochemical essence of the processes occurring in a living organism at the molecular, cellular, tissue and organ levels;
- characteristics of various physical factors that affect the body;
- dosimetry of ionizing radiation;
- rules for the use of ionizing radiation and the risks associated with their effect on biological tissues;
- mathematical methods for solving intellectual problems and their application in medicine;
- the physical basis of the functioning of medical equipment, the design and designation of medical equipment;
- safety rules and work in physical laboratories with instruments.

*Be able to:*

- to use educational, scientific, popular scientific literature for professional work;
- use physical equipment;
- make calculations based on the results of the experiment, perform an elementary statistical processing of the experimental data.

*Master:*

- conceptual and functional apparatus in physics and mathematics in the amount stipulated by the content of the sections of this Program;

-skills in the use of measuring instruments, computers and methods of statistical processing of results, the basics of safety engineering when working with equipment.

**4. The total complexity of the discipline** is 2 credit units (72 hours).

**5. Semester:** I.

**6. The main sections of the discipline:**

1. Fundamentals of mathematical analysis, probability theory and mathematical of statistics.
2. Mechanics of liquids and gases. Biomechanics. Acoustics.
3. Electrical and magnetic properties of tissues and the surrounding environment.
4. Optics.
5. The quantum physics, ionizing radiation.

Head of the Department of

Chemistry and Physics of the NOSMA



R.V. Kalagova

Senior lecturer of the Department  
of Chemistry and Physics



R.Y. Gazdanova