**Abstract**

**of the work program of the discipline**

**«Medical equipment with basics of biophysics»**

Direction of training (specialty): ***31.05.01 – Medical affair***

Level of higher education: ***specialist***

Graduate Qualification: ***Physician***

Faculty: ***Medical***

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

**Purpose**: to form systematic knowledge among medical students about physical properties and physical processes occurring in biological objects, including the human body, necessary both for studying other academic disciplines and for direct formation of a doctor; structure and principle of operation of modern medical and diagnostic equipment, as well as safety precautions when working with medical equipment.

**Tasks**:

1. the formation of modern natural-science ideas about the surrounding material world;

2. the development of students' methodological orientation, essential for solving the problems of modern medicine;

3. the formation of students' logical thinking, the ability to accurately formulate a problem, the ability to calculate the main and secondary, the ability to draw conclusions based on the measurement results;

4. students mastering physical methods for solving intellectual problems aimed at preserving the health of the population, taking into account the factors of adverse effects of the environment.

1. **PLANNED TRAINING OUTCOMES IN THE DISCIPLINE**

**Competences formed in the process of studying the discipline**

**Federal State Educational Standard 3++**

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| ***Code and name of competence*** |
| ***General professional competencies*** |
| **GPC-4** - Able to use medical devices provided for by the order of medical care, as well as conduct examinations of the patient in order to establish a diagnosis |
| **AID-1 GPC-4** - Uses medical devices provided for by the procedure for providing medical care |
| ***Know***: safety rules and work in physical laboratories with instruments and apparatus; the basic laws of physics, physical phenomena and patterns underlying the processes occurring in the human body; the physical foundations of the functioning of medical equipment, the design and purpose of medical equipment; physical and chemical essence of the processes occurring in a living organism at the molecular, cellular, tissue and organ levels |
| ***Be able to***: use physical equipment; predict the direction and result of physical processes and chemical transformations of biologically important substances. |
| ***Skill***: the skills of using measuring, computing tools, the basics of safety when working with devices. |

1. **THE PLACE OF DISCIPLINE IN THE STRUCTURE**

**OF THE EDUCATIONAL PROGRAM**

 The discipline "***Medical equipment with basics of biophysics***" is studied in the first semester and belongs to the mandatory part ***Б1*** of the curriculum for the specialty ***31. 05. 01 Medical affair.***

The discipline "***Medical equipment with basics of biophysics***" is fundamental for the study of the following disciplines: normal physiology, biochemistry, microbiology and virology, hygiene, public health and healthcare, neurology, medical genetics, ophthalmology, propaedeutic of internal diseases, radiation diagnostics and therapy, forensic medicine of catastrophes.

The previous ones, on which the discipline "***Medical equipment with basics of biophysics***" is directly based, are school courses in ***Physics*** and ***Mathematics***.

The development of competencies in the process of studying the discipline contributes to the formation of knowledge, skills and abilities that allow to carry out effective work on the implementation of the following type of tasks of professional activity: to know the physical foundations of the functioning of medical equipment, the design and purpose of medical equipment; physical and chemical essence of the processes occurring in a living organism at the molecular, cellular, tissue and organ levels.

1. **The total labor intensity of the discipline**

The total labor intensity of the discipline is ***2*** credit units, academic hours ***72***.

Lectures: ***18*** hours

Practical training: ***36*** hours

Independent work: ***18*** hours

Type of intermediate certification – ***offset***.

1. **The main sections of the discipline**

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| *Section number* | *Name of the discipline section* |
| 1 | ***Fundamentals of Medical electronic equipment*** |
| 2 | ***Acoustics. Devices for measuring the mechanical characteristics of the body*** |
| 3 | ***Electric current in biological tissues. Devices and apparatus for diagnosing the state of the main functional systems of the body.*** |
| 4 | ***Devices and apparatus for non-drug therapeutic effects of various physical factors.*** |
| 5 | ***Quantum physics, ionizing radiation. Dosimetric devices. Diagnostic equipment based on the principles of visualization and image analysis.*** |

1. **Form of intermediate certification**

***Offset***, semester ***1.***

Intermediate certification procedure - the offset is conducted orally in the form of an ***interview*** on tickets.