**Annotation**

**Laboratory practice**

**1. Objectives of educational practice:**

The objectives of educational practice in obtaining primary professional skills are the consolidation of theoretical knowledge obtained by students, the deepening of theoretical training and the acquisition of practical skills and competences, as well as the experience of independent professional activity.

**2. Tasks of educational practice:**

The objectives of educational practice are:

in the field of biochemistry:

• familiarity with the methods of isolation and fractionation of biological material for biochemical, molecular-biological and immunological studies;

• deepening of basic knowledge in the field of structural organization and function of proteins, acquaintance with the methods of their separation and identification, qualitative and quantitative assessment of protein content in biological fluids;

• formation of ideas about the principles and fundamentals of practical enzymology and the study of methods for determining enzyme activity in biological fluids and tissues;

• assimilation of knowledge in the field of structural organization of nucleic acids, acquaintance with the methods of their isolation, qualitative and quantitative assessment of nucleic acids, familiarization with the method of polymerase chain reaction and the use of this method in various practical areas of knowledge;

• development of skills for determining lipid metabolism and free radical homeostasis in the blood of animal and human tissues;

• study of the features of the structure and functions of representatives of the main classes of carbohydrates, the study of the most important metabolic pathways of carbohydrate metabolism; development of modern methods for determining the concentration of glucose and products of its metabolism;

• study of automated research methods used in modern biochemistry and related disciplines in the biochemical laboratory: types and features of work on biochemical, hematological and enzyme immunoassay;

• study of the characteristics of laboratory evaluation of immune status.

in the field of microbiology:

• development of skills for preparing microbiological crops: preparing nutrient media, preparing laboratory supplies (dishes) for sterilization;

• study of the principles of work organization in the microbiological laboratory;

• formation of skills for isolation and cultivation of microorganisms;

• formation of specific species identification of bacteria;

• study of automated research methods used in modern microbiology and related disciplines - the use of test systems for the identification of microorganisms and web applications for analyzing results.

1. **Requirements for the results of mastering the discipline**

In accordance with the federal state educational standard of higher education in the direction of training 06.04.01 Biology (master’s degree level) discipline is aimed at the formation of the following competencies:

readiness to use fundamental biological ideas in the field of professional activity for setting and solving new problems

the ability to creatively use in the scientific and industrial-technological activity knowledge of the fundamental and applied sections of the disciplines (modules) that determine the direction (profile) of the graduate program;

the ability to plan and implement professional activities (in accordance with the orientation (profile) of the graduate program)

**As a result of mastering the educational practice, the student must:**

Know: the structural organization and function of proteins; principles and main provisions of practical enzymology; structural organization of nucleic acids; features of the structure and functions of representatives of the main classes of lipids and carbohydrates, the most important metabolic pathways of energy and plastic metabolism; have an idea of ​​the immune status and its main indicators.

To be able to: qualitatively and quantitatively assess the protein content in biological fluids; use the method of polymerase chain reaction in various practical areas of knowledge; determine indicators of carbohydrate, lipid metabolism and free radical homeostasis in the blood of mammals; to plan properly the conduct of a laboratory immunological study, in combination with the selection of the most appropriate research methods; use computer programs to analyze the results of practical work and bio-information databases. Use knowledge of the morphology, physiology and metabolism of bacteria for their isolation, cultivation, identification and determination of the systematic position. To be able to use the knowledge gained in practical and theoretical biomedical research. To be able to carry out the formulation of planned experiments, analyze the data obtained and formulate adequate conclusions, critically evaluate the results in comparison with the studies of other authors

Possess: methods for the isolation and fractionation of biological material for biochemical, molecular-biological and immunological studies; modern methods for determining the concentration of glucose and products of its metabolism; modern methods of assessing the lipid profile of animal serum; automated research methods in the biochemical laboratory: types and features of work on biochemical, hematological and enzyme immunoassay; enzyme immunoassay as one of the modern methods for determining hormonal status. Comply with safety regulations when working with microorganisms, obtain pure cultures of bacteria, select nutrient media and conditions for cultivation, be able to work with a microscope and prepare objects for microscopic examination. Possess the skills of working with cultures of model microorganisms, various methods of planting and cultivation, the formulation of identification tests to identify the biochemical characteristics of microorganisms that are potentially important for the industrial use of microorganisms.

**4. Structure and content of educational practice**

The total complexity of educational practice in obtaining primary professional skills is 3 credit units, 108 hours.

**5. Requirements for the content of practical classes performed by foreign students**

• During the course of study practice, foreign students cannot work with information constituting state, commercial secrets and other information of limited access.

• They are also not allowed to interact with objects and technologies included in the Lists (lists) of goods and technologies for which export controls are carried out.