

ANNOTATION
work program of the discipline
"Chemistry"

Speciality	05/31/01 General medicine
Number of credits	In accordance with the RUP
Interim certification form	exam

1. The purpose of studying the discipline

The goal is to develop in students systemic knowledge and skills to perform calculations of the parameters of physical and chemical processes, when considering their physical and chemical essence and the mechanisms of interaction of substances occurring in the human body at the cellular and molecular levels, as well as when a living organism is exposed to the environment.

2. Brief With maintaining discipline

Section 1: "Elements of chemical thermodynamics and chemical kinetics."

Section Contents

Subject and methods of chemical thermodynamics. The relationship between metabolic and energy processes in the body. Chemical thermodynamics as a theoretical basis of bioenergy. Basic concepts of thermodynamics. Chemical kinetics as a basis for studying the rates and mechanisms of biochemical processes. Reaction speed, average reaction speed in the interval, true speed.

Section 2: "The doctrine of solutions."

» Section Contents

The concept of an ideal solution. Ways to express the concentrations of solutions: mass fraction of the solute, molar concentration, molar concentration of the equivalent, molal fraction. The concept of colligative properties of solutions. Properties of IUD solutions. **Section 3: "Main types of chemical equilibria and processes in the functioning of living systems."**

Section Contents

Protolytic reactions. The buffering effect is the main mechanism of protolytic homeostasis in the body. Mechanism of action of buffer systems. Buffer zone and buffer capacity. Calculation of pH of protolytic systems. Heterogeneous reactions in electrolyte solutions. Oxidation-reduction (redox) reactions.

Section 4: "Physico-chemistry of surface phenomena in the functioning of living systems."

Section Contents

Adsorption equilibria and processes at moving phase boundaries. Surface Gibbs energy and surface tension. Adsorption. Gibbs equation. Surfactants and non-surfactants.

Section 5: "Physico-chemistry of dispersed systems in the functioning of living systems"

Section Contents :

Classification of disperse systems. Preparation and properties of disperse systems. Colloidal surfactants; biologically important colloidal surfactants (soaps, detergents, bile acids). Micelle formation V surfactant solutions. Determination of critical concentration micellization.

Section 6: "Basic concepts bioorganic chemistry. Low molecular weight bioorganic compounds: structure, properties, biological significance."

Section Contents

The concept of biogenicity of chemical elements. Chemistry of biogenic elements s-block, d-block, p-block. Poly- and heterofunctionality as one of the characteristic features of organic compounds involved in vital processes and used as medicinal substances.

Section 7: "High molecular weight bioorganic substances and their components"

Section Contents

Peptides and proteins structure, properties, participation in the functioning of living systems. Carbohydrates structure, properties, participation in the functioning of living systems. Lipids structure, properties, participation in the functioning of living systems. Nucleic acids structure, properties, participation in the functioning of living systems.