

**Abstract of the work program of the
discipline "Biology"**

The main professional educational program of higher education is the specialty program in the specialty 31.05.03 Dentistry, approved in 17.04.2024г..

- Form of study- full-time
- The period of development of OPOP IN -5 years
- Department-Biology and Histology

The place of the discipline in the structure of the OPOP HE: the discipline biology belongs to the mandatory part of Block 1 of the Federal State Educational Standard HE.

Requirements to results of mastering the discipline:

The process of studying the discipline is directed to formation and development of competencies: Universal Competencies -1; General Professional Competences-8; Professional Competences-1;

As a result of studying discipline the student should **Know**:

- Structure and operation rules of the light microscope use;
- Main types of cell organization. The structure of Pro- and eukaryotes. Structure and functions of the cell organelles. The main concepts of the Cell Theory;
- Principles of the structure of DNA and RNA as the major biopolymers of the cell;
- The main stages and process of replication, transcription, translation;
- The principle of the genetic information recording in molecules of nucleic acids and code biological properties; the most important types of genetic mutations and their possible consequences in human;
- Structure and classification of chromosomes, human karyotype features major types of chromosomal and genomic mutations, mechanisms of their occurrence and the possible consequences in human;
- Means of cell division, similarities and differences of the concepts of "cell cycle" and "mitotic cycle", the processes occurring in the cell interphase and mitosis;
- Distinctive features and biological significance of meiosis;
- Periods of organism ontogeny and types of its post-embryonic development;
- Structure of germ cells;
- The course of fertilization process, its stages, the essence of fertilization;
- Main types of the egg cells, cleavage, blastula, cleavage mechanisms;
- Main gastrulation types, characteristic for Chordata and the possible consequences of gastrulation and cleavage disorders; the main stages of organogenesis;
- The germ layer derivatives;
- Development, structure and functions of Amniota's extraembryonic organs and their features in human, the possible consequences of the human provisory organs development disorders;
- The basic concepts definitions of Genetics and examples, illustrating them;
- Mendel rules formulations and their cytological foundation;
- Chromosome theory of heredity;
- The genetic balance and its disorder consequences, features of various types of allelic and non-allelic genes interaction;
- Distinctive features of the various types of inheritance;
- Cytological mechanisms of combinative variability;
- Methods of Human Genetics;
- Forms of biotic interactions;
- Classification of parasitism and parasites;
- Methods of transmission and infection with parasitic diseases;
- Types of morpho-functional transformations of organs and systems;
- Basic biogenetic law of Müller-Haeckel and the law of embryonic similarity of K. Baer;
- Progressive direction of evolution of the organ systems of Chordates;
- General regularities of origin and development of life;
- Systematic of the species Homo sapiens;
- Proof of the natural origin of man;
- Racial features and the morpho-functional adaptation to different environmental conditions;

To be able to:

- To regulate the light on the microscope;
- To find the object at low and high microscope magnification;

- To work with the microscope immersion;
- To find the structural differences of unicellular, multicellular, plant, animal cells with the help of study tables;
- To prepare a temporary onion epiderm microscopic slide, to identify parts of the cell;
- To sketch the observed object correctly;
- To discern a “simple feature” and a “complex feature”;
- To solve the problems of processes of replication, transcription translation modeling.
- To use the table of the genetic code;
- To analyze the karyotype, to determine the sex of an organism with the help of chromosome sets;
- To identify the different types of human aneuploidy
- To characterize the hereditary syndrome, associated with abnormal karyotype with the help of study tables;
- To determine the number of chromosomes and DNA (n, c) in any period of mitotic cycle, and at different stages of meiosis;
- To detect various phases of mitosis and meiosis on microscopic slide;
- To sketch different stages of embryogenesis, to indicate the drawing symbols correctly.
- To apply the knowledge obtained for understanding of the modern methods of prenatal diagnostics of hereditary diseases of the fetus;
- To use the genealogical symbols correctly;
- To analyze the genotype and phenotype of the parental generation and offspring; to determine the probability of birth of sick children;
- To create and analyze pedigree diagrams;
- To diagnose the situational problems of parasitic diseases on slides and photos;
- To sketch the observed object correctly.
- To solve situational problems on parasitology
- To make comparative analysis of the structure of organs and systems of Chordates;
- To identify the main directions of the evolution of these systems;
- To solve situational problems;
- To establish the sequence of evolutionary processes;
- To determine race of the individual, basing on phenotype.

To possess:

Light microscope technique and preparing a temporary microscopic slide;

The methods of solving the problems on Cytology.

The methods of solving problems on Genetics.

The methods of studying human heredity(cytogenetic method, genealogical method, twins method)

The microscopy skills, ovoidhelminthoscopy.

The total complexity of the discipline Total complexity of the discipline is 5 credits. 180 hours

The main sections of the discipline:

1. Cytology.
2. Ontogenesis.
3. Evolutionary teaching. Anthropogenesis. Evolution of the organic world. Phylogeny of systems of organs of vertebrates.
4. Fundamentals of general and medical genetics.
5. Ecology. Medical parasitology.
 - 1) medical protozoology
 - 2) medical helminthology
 - 3) medical arachnoentomology