ANNOTATION
work program of the discipline

"BIOLOGY"

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

1. The purpose of studying the discipline "Biology"

mastering general theoretical knowledge and the ability to apply basic concepts in the field of biology, necessary for the formation of a natural science worldview in the practical activities of a doctor.

2. Briefcontent of the discipline

Section 1. General characteristics of life. Biology is the science of living systems, patterns and mechanisms of their occurrence, existence and development. Biological sciences, their tasks, objects of study. Methods of biology, man as an object of biology. Biosocial nature of man. Development of ideas about the essence of life. The main stages of the emergence and development of life. Hierarchical levels of life organization. Elementary units, elementary phenomena and manifestations of the main properties of life at various levels of its organization.

Section 2. Cytology with the basics of molecular biology.A cell is an elementary biological system. Cell theory as proof of the unity of all living things. Structural and functional organization of pro- and eukaryotic cells. Cell life cycle, its variants. Chemical organization of genetic material (DNA, RNA). Self-reproduction of genetic material (DNA replication). Mutations, their classifications and mechanisms of occurrence. Gene as a functional unit of heredity. Stages of implementation of genetic information (transcription, post-transcriptional processes, translation, post-translational processes). Functional classification of genes (structural, regulators, modulators). Chromosomal level of organization of hereditary material. Structural organization of chromatin. Mitotic (proliferative) cell cycle. Regulation of mitosis. Direct cell division is amitosis. The meaning of endomitosis and polyteny. Meiosis.

Section 3. General and medical genetics. History of the development of genetics. The concepts of "genotype" and "phenotype". Interaction of genes in a genotype: allelic (dominance, incomplete dominance, codominance, interallelic complementation, allelic exclusion) and non-allelic (epistasis, polymerization, complementarity, position effect, modifying effect). Features of autosomal, X-linked and holandric types of inheritance. The importance of environmental and genotypic factors in the formation of a pathologically altered human phenotype. Methods for studying human genetics: genealogical, cytogenetic,

biochemical, twin, population-statistical, genetics of somatic cells, methods for studying DNA. Medical genetic counseling, its medical significance.

Section 4. Reproduction of organisms. Onto and phylogeny. Methods and forms of reproduction of organisms. Ontogenesis as the process of realizing hereditary information under certain environmental conditions. Main stages of ontogenesis. Fertilization. Characteristics and significance of the main stages of embryonic development: cleavage, gastrulation, primary organogenesis (neurulation). Provisional organs of chordates. Postembryonic period of ontogenesis: growth, formation of definitive structures, puberty, reproduction, aging. Environmental factors regulating development in the early stages of ontogenesis. Critical periods in human ontogenesis. Anomalies and malformations. Classification of developmental defects. Teratogenesis, carcinogenesis. Regeneration as a process of maintaining the morphophysiological integrity of biological systems at the organism level. Manifestation of homeostasis at different levels of organization of biological systems.

Section 5. Parasitism and human parasitic diseases. Forms of biotic connections in nature. Parasitism as an ecological phenomenon, its features as a form of interspecific interactions. Classification of parasitism and parasites. Relationships in the parasite-host system at the level of the individual. Adaptations to a parasitic lifestyle. Development cycles of parasites, alternation of generations in the development cycles of parasites. Primary, reservoir and intermediate hosts. Genetic and non-genetic factors determining host susceptibility to the parasite. Teachings of E.N. Pavlovsky about the natural focality of diseases. Ways and methods of infection by parasitic diseases. General and medical protozoology. Characteristics of the types Sarcodaceae, Flagellates, Sporozoans, Ciliates. General and medical helminthology. Type Flatworms - class Flukes, class Cestodes. Type Roundworms. General and medical arachnoentomology.

Section 6. General ecology. Human ecology and medical ecology.

Subject, structure, content and methods of ecology. Levels of organization of living nature and the main structural sections of ecology: endo-, out-, dem-, synecology, landscape ecology (geographical), global ecology. The doctrine of the biosphere. The place of ecology among the biological sciences and its connection with other areas of natural science. Systems approach in human ecology. Anthropobioecosystem, its structure, properties and functions. Adaptation and acclimatization. Subject, content, tasks and methods of medical ecology. The concept of human environmental safety. Ecomonitoring and autecological regulation in human ecology.