**Speciality "General Medicine"**

**ACADEMIC DISCIPLINE "MEDICAL BIOLOGY AND GENERAL GENETICS"**

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| **Academic discipline outline** | The basic concepts of cytology, molecular and cell biology, genetic engineering, genetics, developmental biology and evolutionary theory, parasitology, and the study of the biosphere. Mechanisms of storage and implementation of genetic information in prokaryotes and eukaryotes. Mechanisms of transgenesis and genome editing. Causes and mechanisms of development of hereditary, multifactorial and parasitic diseases of humans. Genetic basis for the implementation of hereditary information in the process of individual human development. The most important clinical manifestations of parasitic diseases, methods of their diagnosis and prevention. Mutagenic, teratogenic and carcinogenic factors. Natural and anthropogenic factors affecting human health. |
| **Resulting skills** | Advanced professional skills. A student who has mastered the discipline material should possess the following basic professional competencies: work with optical instruments, compile a pedigree, solve problems in molecular biology, general genetics, medical genetics, and parasitology, and recognize parasites and their vectors in macro- and microscopic specimens. |
| **Learning outcomes** | A student must<br>**know:**<br>general biological processes that reveal the essence of life at various levels of living organization;<br>the position of humans in the natural system, their characteristics as biological and social beings, and their relationship with the environment;<br>processes of matter, energy, and information flow in the cell;<br>mechanisms of gene expression regulation;<br>methods of transgenesis, genome editing and gene therapy;<br>patterns of inheritance of physiological and pathological traits in humans;<br>main types of variability and their manifestations in humans;<br>the influence of genetic factors on human health;<br>methods of diagnostics of hereditary diseases;<br>features of human reproduction and associated bioethical problems;<br>features of embryonic and postembryonic ontogenesis in |

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| | humans;<br>biological aspects of aging and death;<br>phylogenesis of human organ systems, mechanisms for the occurrence of developmental defects that associated with phylogenesis;<br>features of regeneration in humans;<br>problems of organ and tissue transplantation;<br>fundamentals of homeostasis, biorhythmology and their medical aspects;<br>biological and medical features of human ecology and valeology; forms of biotic relationships in nature;<br>forms of relationships in nature;<br>host-parasite relationships at the organism and population levels;<br>morphological features, life cycles, and ways of human infection;<br>the pathogenic effects of the main parasitic protists, helminths, and arthropods;<br>methods for diagnosing and preventing the diseases they cause;<br>the main groups of poisonous organisms;<br>**be able to:**<br>solve situational problems in molecular biology, general and medical genetics, and parasitology;<br>provide recommendations on the use of prenatal diagnostic methods for hereditary human pathologies;<br>calculate gene and genotype frequencies in human populations using the Hardy-Weinberg laws;<br>conduct comparative characterizations of the structure, life processes, and natural roles of organisms belonging to different taxonomic groups;<br>determine cause-and-effect relationships between the structure and functions of cellular organelles and diseases that arise when their functioning is impaired;<br>apply knowledge of the basic methods of diagnosis and prevention of diseases caused by parasitic protists, helminths, and arthropods in their professional activities<br>**master:**<br>skills in using optical instruments (magnifying glass, light microscope);<br>skills in constructing and analyzing of human karyotype;<br>skills in constructing and analyzing human pedigrees, concluding on the mode of inheritance and the probability of having an ill child; |

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| | skills in diagnosing parasitological microscopic slides;<br>skills in determining of a sex chromatin. |
| **Semester(s)** | 1, 2 semesters |
| **Prerequisite** | Biology (school course) |
| **Credit value** | 6 credits |
| **Academic hours** | 180 academic hours, of which:<br>86 classroom hours (16 hours of lectures and 70 hours of laboratory classes);<br>94 hours of self-independent work. |
| **Forms of midterm attestation** | Credit<br>Test<br>Examination |