

Abstract of the optional educational component «Molecular genetic research methods at the creature»

Academic discipline	Molecular genetic research methods at the creature
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Courses and semesters, when the discipline is planning to study	6 course (master degree), 1 semester
Faculties whose students are invited to study discipline	Biological-technological faculty
List of competencies and learning-related outcomes that discipline provides	<p>According to the requirements of the educational-professional program "Technology of production and processing of livestock products" applicants must acquire the ability to obtain the following competencies:</p> <p>GC 1 (general competence). Ability to abstract thinking, analysis and synthesis.</p> <p>GC 2. Ability to conduct research at the appropriate level.</p> <p>GC 3. Ability to learn and master modern knowledge.</p> <p>GC 4. Skills of using information and communication technologies.</p> <p>PC 1 (professional competence). The ability to use modern ideas about the principles of the organization of the animal body on the basis of knowledge about the course of physiological and biochemical processes.</p> <p>PC 14. The ability to apply basic modern fundamental knowledge of animal and poultry breeding, principles of inheritance of economic and useful traits of the gene pool of agricultural animals and poultry.</p> <p>PC 15. The ability to use professional knowledge in the field of animal breeding and selection, to master the basic processes of genetic analysis in the latest technologies for the production and processing of livestock products.</p> <p>PC 16. The ability to use knowledge of the basic processes of changing genetic information in animal populations.</p> <p>PC 17. The ability to apply various methods of genetic engineering; methods and methods of improving the technological process of selection and breeding of animals.</p> <p>The result of studying the discipline is the students' acquisition of such knowledge and skills:</p> <ul style="list-style-type: none"> - To combine abstract thinking with the analysis and synthesis of technological processes (Search, systematize and analyze scientific and technical information from various sources to solve professional and scientific tasks in the field of molecular genetic research methods); - To coordinate the conduct of research at the appropriate level (Use special equipment, modern methods and tools for conducting molecular genetic research methods; apply mathematical and computer modeling to solve individual problems of molecular genetic research methods); - To pursue self-improvement and acquire modern knowledge

	<p>(Search, processing and analysis of information from various sources regarding the conduct of molecular genetic research; Conduct research at the appropriate level; Generate new ideas in order to improve the quality of research; Ability to choose and use specialized laboratory and technological equipment and devices, science-based methods and software for conducting scientific research in the field of food technology; Plan and carry out scientific research taking into account global trends in the scientific and technical development of the industry);</p> <ul style="list-style-type: none"> - To organize scientific research and process their results (Act socially responsibly and consciously in conducting molecular genetic research; Conduct research in accordance with world standards); - To apply biological, physiological and biochemical features of animals and their products when choosing production technology and conducting research activities (Effectively use biological, physiological and biochemical features of animals for conducting research activities, using molecular genetic research methods to increase the level of productivity of animals and the quality of their products); - The ability to use knowledge of the basic principles of scientific methodology and methods of conducting laboratory and industrial research (Know modern achievements of laboratory work, genetics, biology and chemistry in Ukraine and abroad; Be able to apply acquired domestic and foreign experience in the organization of laboratory and industrial research).
Description of the discipline	
Preconditions necessary for the study of discipline	The selective educational discipline "Molecular genetic research methods" is based on the knowledge of such disciplines as "Chemistry", "Genetics with biometrics", "Breeding of agricultural animals" studied in the 1 st , 3 rd and 4 th courses of the bachelor's level of training and "Methodology and the organization of scientific research", studied in the 5 th year of master's training.
Maximum number of students who can study simultaneously	25
Lesson plans	<p>Lectures:</p> <ol style="list-style-type: none"> 1. Structure of genetic material and its reproduction 2. Enzymes in molecular genetic research 3. Electrophoresis of proteins and nucleic acids 4. Isolation of DNA. Spectrophotometry of DNA and RNA preparations 5. Polymerase chain reaction. Sequencing. 6. Methods of DNA analysis. Molecular markers 7. Peculiarities of molecular genetic diagnostics in the kingdoms of flora and fauna 8. Peculiarities of molecular genetic diagnostics in Homo sapiens <p>Practical classes:</p> <ol style="list-style-type: none"> 1. Structure of hereditary material. Structural organization of biota genomes. Reproduction of genetic information. Regulation of gene expression. Protection and restoration of the hereditary apparatus 2. Genetic engineering and genomics. Enzymes of genetic

<p>Teaching language</p>	<p>engineering. Methods of obtaining genes. Distribution of DNA fragments. Types of vectors. Fundamentals of genomics.</p> <p>3. Gel electrophoresis in agarose and polyacrylamide gel. Conformation of nucleic acids. Indicator of electric field voltage. Content of nitrogenous bases and temperature. Buffer systems for electrophoresis</p> <p>4. RNase cleavage. Quantitative determination of protein and nucleic acids in biological material. Methods of isolation of biological objects and analysis of biopolymers. Enzyme analysis.</p> <p>5. Polymerase chain reaction. Sequence of PCR. Initial PCR components. Types of PCR and its use. DNA sequencing</p> <p>6. Methods of DNA analysis. Classification and application of molecular markers, their role in selection and genetics. Physical mapping of DNA.</p> <p>7. Preservation of genetic information, evolution of genetic systems of cells and viruses. Transmission and realization of genetic information: expression of genes manifested in specific traits and properties. Alteration of genetic information: molecular nature and mechanisms of mutations, recombinations, crossover and repairs. Development of new methods and biotechnologies for practical use.</p> <p>8. Methods of anthropogenetics. Mechanisms of development of hereditary diseases. Chromosomal and genetic diseases. Prevention and treatment of genetic diseases.</p> <p>Ukrainian</p>
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