



CATALOG OF ELECTIVE DISCIPLINES
For students in the direction of preparation 7M051 Biological and related sciences

Brief description of the elective disciplines of the educational program

EFG	EP	Form of education	The name of discipline	Code of subject	Discipline cycle	Number of credits	Level of training	Cafedra	Course	Academic per hour	Pre-requisites	Post-requisites	Brief content of the discipline	Key learning outcomes	Name of the alternative discipline
M082 - «Biotechnolo gy»	7M05102 - «Plant Biotechnolo gy»	Full-time (MS 2 years) trimester	Theory and Methods experiment	TME 5309 BS	Elective subjects	5,0	Master's program by specialization (Scientific & pedagogical direction)	Microbiolog y and biotechnolog y	1	1	Undergraduate disciplines; basics of biotechnology, research work with the basics of patent science	Bioethics and biosafety in biotechnology. Bionanotechnology. Biotechnology of mushrooms. Fundamentals of scientific research. Laboratory diagnosis of zoonoses. Master student's research work, including implementation of master's thesis, Modern problems of biotechnology in veterinary and animal husbandry, Molecular genetic basics of biotechnology. Research practice, Scientific basis of animal breeding, Undergraduate research work, including the implementation of the master's thesis.	Develops the skills of organizing and conducting scientific research, studies the problems of monitoring and methodological approach to substantiating the choice of research methods. To link the theory and methods of experiment with the results of research work and interpret them.	Make conclusions and interpret scientific research methodology in carrying out scientific projects or research. Use the acquired knowledge and ideas in the context of scientific research. Introduce scientific research methods into the educational, scientific process.	Fundamentals of scientific research
M082 - «Biotechnolo gy»	7M05102 - «Plant Biotechnolo gy»	Full-time (MS 2 years) trimester	Modern methods of division and purification of target products	AS	Elective subjects	6,0	Master's program by specialization (Scientific & pedagogical direction)	Microbiolog y and biotechnolog y	1	1	Undergraduate disciplines; fundamentals of biotechnology, industrial biotechnology	Bioethics and biosafety in biotechnology. Bionanotechnology. Research practice. Selection of industrial strains of microorganisms, Undergraduate research work, including the implementation of the master's thesis.	diversity of biotechnological target products (biomass, primary and secondary metabolites), methods for their separation and purification, the principle of operation of the main biotechnological equipment, the conditions of the actual separation methods for obtaining various products. Draw conclusions about the latest advances in the preparation of various biotechnological products and methods for the separation and purification of target products.	Bioethics and biosafety in biotechnology	

M082 - «Biotechnology» 87?	7M05102 - «Plant Biotechnology» 87?	Full-time (MS 2 years) trimester	English for Academic Purposes	AYADAC 5212	Elective subject	5.0 cts	Master's program by specialization (Scientific & pedagogical direction)	Technology of production of products of stock-raising	1	Undergraduate disciplines, foreign language, Professionally oriented foreign language	Foreign language (professional), Master student's research work, including implementation of master's thesis, Molecular genetic basics of biotechnology, Research practice, Teaching practice, Undergraduate research work, including the implementation of the master's thesis.	Foreign language (professional), History and philosophy of science, Master student's research work, including implementation of master's thesis, Molecular genetic basics of biotechnology, Research practice, Undergraduate research work, including the implementation of the master's thesis.	comprehensive theoretical and linguistic, practical and informational- analytical training in order to perform functions related to the use of a foreign language in professional and scientific activities: possession of public speaking skills, conducting discussions, the ability to work with information from various sources, edit texts of professionally significant content in a foreign language. Course is designed to develop and sharpen students' academic and professional writing skills and strategies in English necessary for successful written communication in academic, professional, and workplace settings. During the course, students study the features of academic writing, using library catalogues and websites. Practice discursive essay writing: outline, thesis statement, body paragraphs and conclusion. Methods of paraphrasing, and the terminological	Present the basics of scientific research methodology. Apply the means of collecting, processing experimental data and analyzing the results. Make a review of literary information, formulate the results of business written and oral speech in the state and foreign languages Academic writing	English for Academic Purposes
M082 - «Biotechnology» 87?	7M05102 - «Plant Biotechnology» 87?	Full-time (MS 2 years) trimester	Academic writing		Elective subject	5.0 cts	Master's program by specialization (Scientific & pedagogical direction)	Иностранному языку	1	Undergraduate disciplines, foreign language, Professionally oriented foreign language	Foreign language (professional), History and philosophy of science, Master student's research work, including implementation of master's thesis, Molecular genetic basics of biotechnology, Research practice, Undergraduate research work, including the implementation of the master's thesis.	Microscopic lower and higher fungi. Morphological features of the structure and methods of reproduction of fungi, yeast. Primary and secondary metabolites of fungi, their importance and biotechnology. Methodology of search and production of fungal producer strains, storage of cultures of fungi. Principles of industrial cultivation of mold, yeast, basidiomycetes. Biosynthesis of antibiotics by mold fungi. Feed antibiotics. Biosynthesis of vitamins, organic acids and solvents, enzymes. Technology of producing mycoprotein, Roquefort cheese and Camembert, basidiomycetes mycelium. Mycotoxins, development of methods for their identification.	Describe the life activity of a fungal cell, the characteristics of fungi, their classification and features of metabolism. Develop a modern classification and technology for obtaining fungal diagnostic preparations, test systems and vaccines	Molecular genetic basics of biotechnology	
M082 - «Biotechnology» 87?	7M05102 - «Plant Biotechnology» 87?	Full-time (MS 2 years) trimester	Biotechnology of mushrooms	BG 5213	Elective subject	5.0 cts	Master's program by specialization (Scientific & pedagogical direction)	Microbiology and virology, fundamentals of biotechnology	1 2	Master student's research work, including implementation of master's thesis, Scientific basics of animal breeding, implementation of the master's thesis.	Bioethics and biosafety in biotechnology, Bionanotechnology, Fundamentals of scientific research, Laboratory diagnosis of zoonoses, Master student's research work, including implementation of master's thesis, Modern problems of biotechnology in veterinary and animal husbandry, Scientific basis of animal breeding, Selection of industrial strains of microorganisms	Application of knowledge and methods of molecular biology and genetics in the performance of scientific research; Hereditary information, composition, structure, functions and patterns of chromosomes, genes and genomes. Getting new varieties and improving the existing qualities of agricultural plants. Recombinant DNA based on molecular biology and genetics. Biological systems used in biotechnology, their features. Chimeric proteins and protein stabilization. Synthesis and DNA sequencing methods	molecular biology and genetics in the performance of scientific research; know genetic information, composition, structure, functions and patterns of chromosomes, genes and genomes. Use the knowledge gained in genetics and animal breeding, obtaining new breeds and improving the existing qualities of farm animals. To form practical skills in working on the technology of creating recombinant DNA based on the methods of molecular	Biotechnology of mushrooms	
M082 - «Biotechnology» 87?	7M05102 - «Plant Biotechnology» 87?	Full-time (MS 2 years) trimester	Molecular genetic basics of mushrooms	BMGN 5208	Elective subject	5.0 cts	Master's program by specialization (Scientific & pedagogical direction)	Microbiology and biotechnology	1 2	Master student's research work, including implementation of the master's thesis.	Bioethics and biosafety in biotechnology, Bionanotechnology, Laboratory diagnosis of zoonoses, Master student's research work, including implementation of master's thesis, Modern problems of biotechnology in veterinary and animal husbandry, Scientific basis of animal breeding	Application of knowledge and methods of molecular biology and genetics in the performance of scientific research; Hereditary information, composition, structure, functions and patterns of chromosomes, genes and genomes. Getting new varieties and improving the existing qualities of agricultural plants. Recombinant DNA based on molecular biology and genetics. Biological systems used in biotechnology, their features. Chimeric proteins and protein stabilization. Synthesis and DNA sequencing methods	molecular biology and genetics in the performance of scientific research; know genetic information, composition, structure, functions and patterns of chromosomes, genes and genomes. Use the knowledge gained in genetics and animal breeding, obtaining new breeds and improving the existing qualities of farm animals. To form practical skills in working on the technology of creating recombinant DNA based on the methods of molecular	Biotechnology of mushrooms	

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