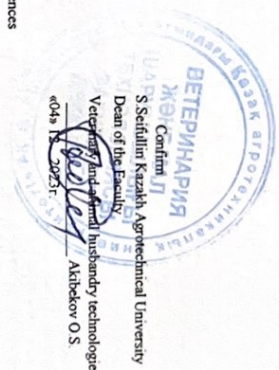


CATALOG OF ELECTIVE DISCIPLINES
For students in the direction of preparation 7M051 Biological and related sciences

Brief description of the elective disciplines of the educational program



EPG	EP	Form of education	The name of discipline	Code of subject	Discipline cycle	Number of credits	Level of training	Category	Academic period	Pre-requisites	Post-requisites	Brief content of the discipline	Key learning outcomes	Name of the alternative discipline
	7M05101 - Veterinary Biotechnology	Full-time (MS 2 years) trimester	Theory and Methods experiment	TME 2309	BS 5	5,0	Master's program by specialization (Scientific & pedagogical direction)	Microbiology and biotechnology	1	Undergraduate disciplines: basics of biotechnology; research work with the basics of parent science	Bioethics and biosafety in biotechnology, Biotechnology, Biotechnology of mushroom, Fundamentals of scientific research, Laboratory diagnosis of zoonitropisms; 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
	7M05101 - Veterinary Biotechnology	Full-time (MS 2 years) trimester	Modern methods of division and purification of target products		AS 5	6,0	Master's program by specialization (Scientific & pedagogical direction)	Microbiology and biotechnology	1	Undergraduate disciplines: fundamentals of biotechnology; industrial biotechnology	Bioethics and biosafety in biotechnology; Biotechnology; Research practice; Selection of industrial strains of microorganisms; Undergraduate research work, including the implementation of the master's thesis.	Concept of the target product in biotechnology; Equipment, consumables and reagents in the isolation and purification of biomass of microorganisms, cells and tissues of plants and animals; cellular macromolecules in the production of biotechnological products by various methods: General principles of separation of substances using: centrifugation, membrane filtration, sedimentation, extraction, coagulation, crystallization, flotation, chromatography, electrophoresis, ionation, chromatography, and other methods. Polymerase chain reaction for DNA purification and separation. Standardization of target products.	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	Bioethics and biosafety in biotechnology
M082 - Biotechnology	7M05101 - Veterinary Biotechnology	Full-time (MS 2 years) trimester	English for Academic Purposes	AYDADAC 5212	BS 5	5,0	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.	Comprehensive theoretical and linguistic, practical and information-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, oral texts of professionally significant content in a foreign language		Academic writing

MOR2 - «Biotechnology»	7M05101 - «Veterinary Biotechnology»	Full-time (MS 2 years) trimester	Academic writing		BS	Elective subject 5.0	Master's program by specialization (Scientific & pedagogical direction)	Microorganisms ranked	1	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	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 analyze features of academic writing, using library catalogues and websites. Practice discursive essay writing, outline, thesis statement, body paragraphs and conclusion. Methods of paraphrasing, APA style, references, citation. Students learn the types of abbreviations, academic vocabulary, the use of articles.	Know a foreign language at a professional level, allowing you to conduct scientific research and be able to show your leadership qualities for the development of industrial enterprises. Know the functional and systemic characteristics of the scientific presentation of the material in the studied foreign language, general scientific terminology and the terminological sublanguage of the relevant specialty in a foreign language	English for Academic Purposes
MOR2 - «Biotechnology»	7M05101 - «Veterinary Biotechnology»	Full-time (MS 2 years) trimester	Biotechnology of mushrooms		BS	Elective subject 5.0	Master's program by specialization (Scientific & pedagogical direction)	Microbiology and biotechnology	1	2	Undergraduate disciplines, biotechnology of microorganisms, microbiology and virology, fundamentals of biotechnology	Bioethics and biosafety in biotechnology, Bionanotechnology, Fundamentals of scientific research, Laboratory diagnosis of zoonitropozits, Master student's research work, including implementation of master's thesis, Modern problems of 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. Chinese proteins and protein stabilization, Synthesis and DNA sequencing methods	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
MOR2 - «Biotechnology»	7M05101 - «Veterinary Biotechnology»	Full-time (MS 2 years) trimester	Molecular genetic basics of BMOGN		BS	Elective subject 5.0	Master's program by specialization (Scientific & pedagogical direction)	Microbiology and biotechnology	1	2	Master student's research work, including implementation of master's thesis, Scientific basics of animal breeding, Undergraduate research work, including the implementation of the master's thesis	Bioethics and biosafety in biotechnology, Bionanotechnology, Laboratory diagnosis of zoonitropozits, 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	The phase and role of bioethics in the system of applied ethical knowledge. Impact of various types of GMOs of the ecological systems. Assessment of the environmental risk of using GMOs. Assessment of the aggressiveness of weed plants. Assessment of the likelihood of direct or indirect action of transgenic living organisms that is resistant or tolerant to transgene products. International	Formulate the moral guidelines of modern science; problematic field, universal principles and moral values of bioethics; ethical problems of manipulations with stem cells. Use modern laboratory and technological equipment, knowledge of fundamental sciences in their scientific work to solve specific problems.	Modern methods of division and purification of target products

M082 - Biotechnology	7M05101 - Veterinary Biotechnology	Full-time (MS 2 years) trimester	Fundamentals of scientific research	GZMO 5206	BS	Elective subject	5.0	Master's program by specialization (Scientific & pedagogical direction)	Technology of production of products of stock-raising	2	1	History and philosophy of science, Pedagogics of higher school, Scientific basis of animal breeding, Selection of industrial strains of microorganisms	Laboratory diagnosis of zoonitropo-nosis Master student's research work, including implementation of master's thesis, Modern problems of biotechnology in veterinary and animal husbandry	Characteristics of the periods of the experiment. The main methodological techniques for staging zootechnical experiments. Distinctive features of feed evaluation experiments. Methods and techniques for conducting experiments on digestibility. Methods for studying the balance of substances and energy. Forms of scientific work, structure, design. Fundamentals of invention and Patent Science. Biometric processing of research results. Basic research methods in animal husbandry. Modern methods of selection in animal husbandry. The order of registration of scientific articles for publication in foreign journals. Relevance and problems for of the impact factor. Basic requirements for articles in scientific journals indexed by WebOfScience, Scopus.	Possess the skills to summarize the results of research and their implementation in production and apply to solve problematic issues in the modern world, scientific research methods necessary for conducting independent experiments. Systems for updating knowledge in the process of professional activity, providing an active search and use of new information, methods for creating and using experimental models to describe and predict various processes	Biometrics and biostatistics in biotechnology
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The catalog of elective disciplines was approved by the faculty council Minutes 1A dated 28.08.2023

Head of the Department of Microbiology and Biotechnology

M. B. Begenova A.B.