MINISTRY OF SCIENCES AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN
M.O. AUEZOV SOUTH KAZAKHSTAN UNIVERSITY

«APPROVED»
Chairman of the board -
Rector
Doctor of historical sciences,
Academician E.Kozhamzharova D.P.
«__» _____2023

EDUCATION PROGRAMME

7M05123-«Biotechnology»

Registrationnumber	7M05100026
Code and Classification of Education	7M05 Natural sciences, mathematics and statistics
Code and Classification of Areas of Training	7M051 Biological and related sciences
Group of educational programs (EP)	M082 Biotechnology
Typeof EP	Acting EP
ISCE level	7
NQF level	7
IQF level	7
Languagelearning	English, Russian, Kazakh
The complexity of the EP, not less	120 credits
Distinctive features of EP	-
University Partner (JEP)	-
University Partner (TDEP)	-

Shymkent 2023

Drafters:

Name	Position	Sign
Alpamyssova G.B.	Candidate of Aggricultural Sciences, Professor of the Department «Biotechnology»	
YelemanovaZh.R.	Candidate of Aggricultural Sciences, Senior lecturer of the Department «Biotechnology»	
Yermekbayeva A.T.	PhD, Senior lecturer of Department «Biotechnology»	
Dauylbai A.D.	Candidate of Aggricultural Sciences of the Department «Biotechnology»	
IbraimovaZh.K.	Ph. D. of the Department of "Biotechnology" of M. Auezov SKU	
Ismail Z.	MHT 22-3nk	
KaltaevA.Zh.	Head of the Department of the UCRF RSE "RVL"	

The EP was considered in the direction of training «Natural Sciences» at a meeting of the academic committee
Minutes «10» 02 2023y.

Chairman of the Committee _____ Madiyarov N. K.

The EP was considered and recommended for approval at Educational-methodical meeting of M. Auezov SKU
Minutes «22» 02 2023y.

Chairman of the EEM _____ Abisheva R.D.

The EP was approved by the decision of the Academic Council of the University
Minutes «23» 02 2023y.

1. CONCEPT OF THE PROGRAM

University Mission	Generation of new competencies, training of a leader who translates research and entrepreneurial thinking and culture
University Values	• Openness–open to change, innovation and cooperation. • Creativity – generates ideas, develops them and turns them into values. • Academic freedom – free to choose, develop and act. • Partnership – creates trust and support in a relationship where everyone wins. • Social responsibility – ready to fulfill obligations, make decisions and be responsible for their results.
Graduate Model	• Deep subject knowledge, their application and continuous expansion in professional activity. • Information and digital literacy and mobility in rapidly changing conditions. • Research skills, creativity and emotional intelligence. • Entrepreneurship, independence and responsibility for their activities and well-being. • Global and national citizenship, tolerance to cultures and languages.
The uniqueness of the educational program	• Orientation to the regional labor market and social order through the formation of professional competencies of the graduate, adjusted to the requirements of stakeholders • Practical orientation and emphasis on the development of critical thinking and entrepreneurship, the formation of a wide range of skills that will allow to be functionally literate and competitive in any life situation and be in demand in the labor market
Academic Integrity and Ethics Policy	The University has taken measures to maintain academic integrity and academic freedom, protection from any kind of intolerance and discrimination: • Rules of academic integrity (Minutes of the Academic Council No. 3 dated 30.10.2018); • Anti-Corruption Standard (Order No. 373 n/k dated 27.12.2019). • Code of Ethics (Protocol of the Academic Council No. 8 dated 31.01.2020).
Regulatory and legal framework for the development of EP	1. Law of the Republic of Kazakhstan "On Education"; 2. Standard rules of activity of educational organizations implementing educational programs of higher and (or) postgraduate education, approved by Order of the Ministry of Education and Science of the Republic of Kazakhstan dated October 30, 2018 No. 595 with amendments and additions dated December 29, 2021 No. 614 3. State obligatory standards of higher and postgraduate education, approved by order of the Ministry of Education and Science of the Republic of Kazakhstan dated July 20.2022 No. 2; 4. Rules for organizing the educational process on credit technology of education, approved by order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152; 5. Qualification directory of positions of managers, specialists and other employees, approved by order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan dated December 30, 2020 No. 553. 6. Guidelines for the use of ECTS. 7. Guidelines for the development of educational programs for higher and postgraduate education, Appendix 1 to the order of the Director of

	the Center for the Bologna Process and Academic Mobility No. 45 o / d dated June 30, 2021
Organization of the educational process	• Implementation of the principles of the Bologna Process • Student-centered learning • Availability • Inclusivity
Quality assurance of the Educational program	• Internal quality assurance system • Involvement of stakeholders in the development of the Educational Program and its evaluation • Systematic monitoring • Actualization of the content (updating)
Requirements for applicants	It is established according to the Model Rules for admission to training in educational organizations, implementing educational programs of higher and postgraduate education, Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 600 dated 31.10.2018

1. PASSPORT of the Educational program

Purpose of the OP	Training of highly qualified scientific and pedagogical personnel, fluent in three languages, able to plan and carry out scientific and pedagogical, production activities in the field of biotechnology and able to develop strategic solutions to research tasks in various branches of biotechnological production.
Tasks of the EP	- providing lifelong learning skills and abilities that will enable them to successfully adapt to changing conditions throughout their professional career; - providing conditions for acquiring a high general intellectual level of development, mastering competent and developed speech, culture of thinking and skills of scientific organization of labor in various branches of biotechnological production; - training of highly qualified specialists with in-depth scientific knowledge, able to plan and carry out scientific and industrial activities of a professional biotechnologist, developing strategic approaches to solving research tasks in environmental and agricultural biotechnology; - training of highly qualified specialists capable of analyzing scientific and technical information in the field of environmental and agricultural biotechnology for the purpose of scientific, patent and marketing support of fundamental research and technological developments; - formation of competitiveness of graduates in various branches of biotechnological production, to ensure the possibility of their fastest possible employment in the specialty or continuing education at the next stages of training.
Harmonization of EP	• **7** th level of the National Qualifications Framework of the Republic of Kazakhstan; • Dublin descriptors of the 7th level of qualification; • 2 cycle of a Framework for Qualification of the European Higher Education Area); • 7^{th} Level of European Qualification Framework for Life long Learning).
Connection of EP with the professional sphere	Professional standard: "Teacher" (Appendix to the order of the Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" No.133 dated June 8, 2017) Professional standard: "Breeding activity (breeding) in animal husbandry" (Appendix No. 25k to the order of the Deputy Chairman of the Board of the National Chamber of Pridnestrovie of the Republic of Kazakhstan "Atameken" dated December 26, 2019 No. 263) Professional standard: "Feed production for farm animals" Appendix No. 18 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated 26.12.2019 No. 263
Name of the degree awarded	After the successful completion of this EP, the graduate is awarded the degree of «Master of Natural Sciences» for EP 7M05123 – Biotechnology
List of qualifications and positions	Masters of OP 7M05123 - "Biotechnology" can hold the position of the head of the department corresponding to the specialization in the enterprise; a specialist, senior specialist, head of the department of state bodies in this field, a researcher in design and survey, research institutes, a teacher in secondary professional and higher educational institutions, in (research institutions, design and design organizations) without presenting work experience requirements in accordance with the qualification requirements of the "Qualification Handbook positions of managers, specialists and other employees", approved by the Order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan dated May 21, 2012 No. 201-o-M.

Field of professional activity	The sphere of professional activity is the field of production of biotechnological products for various purposes, scientific developments in the field of biotechnological processes, the field of education
Objects of professional activity	The objects of professional activity of graduates are higher and secondary vocational educational institutions, research institutes and design organizations.
Subjects of professional activity	The subjects of professional activity of a master's student in the specialty "Biotechnology" are: - biotechnological processes and devices; - biological objects of microbial plant and animal origin; - improvement of technological processes and equipment; - modernization of existing production facilities; - analysis and solution of problematic production situations; - management and regulation of the production process; - quality control of raw materials and products; - assessment of environmental safety of chemical production; - teaching of specialized disciplines in biology.
Types of professional activity	Undergraduates of OP 7M05123 - "Biotechnology" can perform the following types of professional activity: - production and technological; - settlement and design; - scientific research; - pedagogical.
Learning outcomes	**PO1** Interpret new know ledge by carryin go uthighly qualified scientific research that meets there quirements of peer reviewin this area of scientific know ledge, contributeto the development of scientific industry and deserve the publication of research resultsin scientific journals. **PO2**Apply theoretical and practical knowledge to carry out experiments using modern biotechnological methods, solve theoretical and practical problems in various branches of biotechnology. **PO3** Create and improve bioobjects for biotechnological productions, independently combine methods of biotechnology for production of modern bioproducts. **PO4** To be able to competently design and implement energy-saving, low-waste, environmentally friendly technologies that ensure high quality of finished products, technological processes for processing raw materials of plant and animal origin. **PO5** Apply the complex of acquired knowledge and skills in the management of biotechnological science. Analyze and apply modern technological methods to solve complex engineering problems in processing raw materials of plant and animal origin. Create intensive environmental cleaning technologies in the agro-industrial complex using various biotechnological methods. **PO6** Have high motivation to perform professional activities; own technologies of independent learning and self-education, ability to improve and develop own intellectual and professional level. Solve engineering, analytical and management tasks using basic principles of devices, processes and technologies for creating new functional products, as well as regulating reproduction of farm animals. **PO7** Use research, entrepreneurial skills and skills of work in the face of uncertainty. Effectively work individually and as a member of a team, correctly defend own point of view, correct own actions and use

	various methods, ably and effectively inform to any audience the meaning of own ideas and conclusions on problems in the field of biotechnology.

3 COMPETENCIES OF AN EP GRADUATE

GENERAL COMPETENCIES (SOFT SKILLS) (Behavioral skills and personal qualities)	
GC 1. Competence in managing your literacy	GC 1.1. Strive for professional and personal growth throughout life. GC 1.2. Constantly update their knowledge within the chosen trajectory and in the conditions of interdisciplinarity, carry out further training with a high degree of independence and self-regulation. GC 1.3. Be capable of reflection, objective assessment of their achievements, awareness of the need to form new competencies and continue their education in doctoral studies.
GC 2. Language competence	GC 2.1. The ability to possess a sufficient level of communication in the professional field in the state, Russian and foreign languages for negotiations and business correspondence. GC 2.2. The ability to possess mediation skills and intercultural understanding.
GC 3. Mathematical competence and competence in the field of science	GC 3.1. The ability to interpret methods of mathematical analysis and modeling for solving applied problems in the studied area. GC 3.2. The ability to plan scientific experiments, integrate and implement the results of scientific research in the professional field. GC 3.3. The ability to analyze and comprehend modern methods of pedagogical and psychological science and apply them in pedagogical activity.
GC 4. Digital competence, technological literacy	GC 4.1. The ability to confidently use modern information and digital technologies, artificial intelligence systems for work, leisure and communication. GC 4.2. Proficiency in the use, recovery, evaluation, storage, production, presentation and exchange of information in a wide range of digital devices. GC 4.3. The ability to confidently use global information resources and apply technological literacy in research and computational and analytical activities.
GC 5. Personal, social and educational competencies	GC 5.1. Knowledge of the norms of business ethics, social and ethical values and focus on them in professional activities. GC 5.2. Formation of a personality capable of mobility in the modern world, critical thinking and physical self-improvement. GC 5.3. The ability to work in a team, correctly, clearly and argumentatively defend their position during discussions and make professional decisions. GC 5.4. The ability to adequately navigate in various social spheres of activity and in conditions of uncertainty. GC 5.5. The ability to find compromises, correlate your opinion with the opinion of the team.
GC 6. Entrepreneurial competence	GC 6.1. The manifestation of leadership qualities and the ability to have a positive impact on others, to lead a team. GC 6.2. The ability to create conditions for the development of creative and entrepreneurial skills of the team. GC 6.3. The ability to work in the mode of uncertainty and rapid change of task conditions, make decisions, respond to changes in work conditions, allocate resources and manage your time.

	GC 6.4. Ability to work with consumer requests.
GC 7. Cultural awareness and ability to express oneself	7.1. The ability to show ideological, civic and moral positions. 7.2. The ability to be tolerant of the traditions and culture of the peoples of the world, to possess high spiritual qualities.
PROFESSIONAL COMPETENCIES (HARD SKILLS)	
Theoretical knowledge, practical skills and abilities specific to this field	PC 1. The ability to carry out the technological process in accordance with the regulations to use technical means to measure the main parameters of biotechnological processes, properties of raw materials and products; the ability to crealize and manage biotechnological processes; the willingness to evaluate technical means and technologies with account of the ecological consequences of their application; the ability to ensure compliance with the rules of safety technology, industrial sanitation, fire safety and labor protection.
	PC2. ability to work with scientific and technical information, to use Russian and international experience in professional activities; possession of basic methods and techniques for conducting experimental studies in their professional area; ability to conduct standard certification tests of raw materials, finished products and technological processes; possession of experiment planning, processing and presentation of the results obtained; readiness to use modern information technologies in your professional field, including databases and software packages.
	PC 3. ability to participate in the development of technological projects as part of the team of authors; readiness to use modern systems of automated design. willingness to use their knowledge and achievements in solving problems and problems of biotechnology

3.1 Matrix of correlation of EP learning outcomes in general with modules formed by competencies

	LO1	LO2	LO3	LO4	LO5	LO6	LO7
GC 1.1	+				+	+	+
GC 1.2		+					
GC 1.3	+						
GC 2.1	+						
GC 2.2	+						+
GC 3.1	+						
GC 3.2	+					+	
GC 3.3	+						
GC 4.1	+				+		
GC 4.2		+					
GC 4.3				+			
GC 5.1					+		
GC 5.2		+					
GC 5.3			+				
GC 5.4						+	
GC 5.5				+			
GC 6.1		+					
GC 6.2					+		
GC 6.3			+				
GC 6.4							+
GC 7.1	+	+					
GC 7.2	+						
PK 1				+			
PK 2					+		
PK 3						+	

5. Information about disciplines

№	Module name	Cycle	VC/ EC	Component Name	Brief course description	Number of credits	Generated learning outcomes (codes)						
							PO1	PO2	PO3	PO4	PO5	PO6	PO7
1	Module of scientific and pedagogical training	BD	VC	History and Philosophy of Science	Examines history and philosophy of natural and technical sciences. New European science in culture and civilization, emergence of science, its historical dynamics, structure of scientific knowledge, philosophical problems of specific sciences. Communication technologies of the XXI century and their role in modern science. Philosophical problems of development of modern global civilization. Modern actual methodological and philosophical problems of natural and social sciences and humanities.	4	v						v
		BD	VC	Foreign Language (Professional)	Examines development of skills for preparing written messages on scientific topics in the specialty: scientific report, theseson the topic of scientific research,abstracting of original sources in a foreign language, annotation of a scientific text, summary. Understanding the general content of authentic records. Listening to lectures, messages containing professional information. Development of oral communication skills in the specialty: presentation with a scientific report, presentation of scientific research, scientific discussion, scientific debates, use of situational games.	4	v						v
		BD	VC	Psihology of management	Examines methodological problems of psychological analysis of management processes and phenomena; Development of business and interpersonal skills in the context of contact of different managerial cultures; Mastering the theoretical laws of life and dynamics of control systems; forming ideas about the methods of management and psychological consultation; critical analysis of the structure of a team and socio-psychological climate in a team; apply leadership styles in an organization's management.	4	v						v
2		BD	VC	Higher School Pedagogy	Examines modern paradigms of higher education.System of higher professional education in Kazakhstan. Methodology of pedagogical science. Professional competence of a high school teacher. Organization of educational process on the basis of the credit system of education in a high school. Methods and forms of training in the training of future specialists. New educational technologies in a high school. High school as a social institution of education and formation of personality of a specialist.	4	v						v
3	Methodical bases of teaching	PD	VC	Teaching methods of Specialty Disciplines	Examines technology of individual training, integrated, block and paracentric training. Multimedia technology of training. Teaching specialized disciplines by parsing and solving problem situations and	5	v						v

					cases. Solving problems by compiling a group project, carrying out a role-playing game. Logical methods and techniques. Organization, planning of training process in a high school. Organization of creative work of students. Methodical features of the study of specialized disciplines in the specialty "Biotechnology". Development and updating of training methodical documentation.								
		BD	VC	Pedagogical Practice	Examines development of professional research culture in the field of biotechnology as a condition of pedagogical skills and pedagogical creativity, formation of professional pedagogical skills, culture of scientific and pedagogical thinking. Development of training methodical documents on the specialized discipline. Attendance of lectures by leading teachers. Preparation and carrying out of practical and laboratory lessons in special disciplines. Development of new active forms of carrying out lessons with students and their application in practical lessons.	4	v						v
				Research Practice	Practical study of the latest theoretical, methodological and technological achievements of domestic and foreign science: modern methodology of scientific research; analysis of state of development of chemical technology and science in the world and Kazakhstan; role of science and innovation in the improvement and modernization of technology; modern trends in the production of inorganic substances. Performance of theoretical and experimental research on the topic of dissertation.							v	v
		BD	EC	Modern Methods in Biotechnology	Characterizes methods for studying membrane structures, proteomic analysis, molecular diagnosis of genetic diseases, isolation and analysis of nucleic acids, physical methods of gene transfer into plant cells and immunohistochemical methods for studying the interaction of antigen-antibody. Considers issues of cloning technology at the molecular and cellular level.	6		v	v				v
		BD	EC	Photobiological Processes and Bioenergy	Forms ideas about the most important physical processes occurring in living organisms, basic principles and theoretical provisions of photobiological processes. Substantiates interrelation of physical and biological aspects of living systems' functioning. Formation of skills of biophysical approach to the experimental study of biological phenomena and patterns. Forms skills of using the knowledge of biophysics to explain the most important physiological processes occurring in living organisms, both in normal conditions and under stress and occurrence of pathology.Considers laws of thermodynamics as applied to biological systems. Characterizes methods of research and analysis of living systems.	4		v	v				

		BD	EC	Principles of waste management in Biotechnological industries	The main principles of effective waste management for improving the environment, promoting the recovery, reuse and recycling of material flows from industry and municipalities, which are priority issues in Kazakhstan and the world, are considered. The issues of the structure of production and consumption, the development of project standards for the formation and location of production and waste disposal, the planning, implementation, monitoring and analysis of measures for the management of production and waste disposal are considered.	4				v	v	v	v
		BD	EC	Ecological management of Biotechnological Production	The issues of long-term waste recycling programs in biotechnological industries are considered, taking into account the best European and world practices, technologies and industry features. Analysis of new biotechnological methods of waste disposal and recycling, recommendations for waste disposal. Students learn how to calculate the risks associated with management in biotechnological industries. The issues of regulation are considered as a set of measures to improve the state of the environment, various standards for the protection of natural resources. Operations to minimize production waste, including process improvement through waste-free technologies.					v	v		
		BD	EC	Equipment of enterprises of biotechnological industry	Considersequipment of biotechnological industries: rules of work and safety. Classification of processes of biotechnological productions and requirements for equipment. Typical scheme of biotechnological production and instrumentation process. Drying process and its hardware design. Studying the effect of filter pore size on sediment formation during filtration. Effect of centrifugation rate on sediment formation. Forms the concept of nutrient media and hardware design processes for their preparation.	6		v		v	v	v	
		PD	EC	Equipment for conducting of biotechnological processes	Considers equipment for malting and production of enzyme preparations. Yeast and yeast growth apparatus. Equipment for alcoholic fermentation of food environments. Equipment for fermentation of wort in the production of alcohol. Apparatus for maturation of dairy products. Equipment for cream ripening, milk coagulating and clot processing. Equipment for meat salting. Apparatus for meat ripening. Meat smoking equipment. Automatic smoking chambers andsmoking installations.			v		v	v	v	
		PD	EC	Modern Problems of Branch Biotechnology	Considers biotechnological ways to solve the problem of protein deficiency in agriculture, problems in food industry, problems of production of functional foods and biologically active food additives. Considers ways to solve the problems of biomedical industry and molecular mechanisms of intracellular regulation and their use in selection of microorganisms.	6			v	v			

		PD	EC	Achievements and Prospects of Biotechnology	Examines theoretical foundations of biotechnology by industries. Characterizes physical and biophysical methods used in biotechnology, methods for studying and using membrane structures, methods for studying biopolymers, methods for analyzing and synthesizing nucleic acids. Forms skills of obtaining enzyme preparations and their use in food industry. Considers issues of achievement and prospects of food biotechnology, achievements and prospects of biotechnology in medicine and agriculture, achievements and prospects of environmental biotechnology.				v	v	v	v	
4	Appliedaspectsof biotechnology	PD	EC	Biotechnology of Biomass Production and Processing	Characterizes main methods of obtaining biotechnology products from renewable raw materials (biomass), methods of preparing biomass for its processing using enzymatic processes and methods of raw materials pre-processing, as well as methods of raw materials bioconversion using various biotechnological agents and cultivation methods. Justifies the choice of methods and technologies for processing plant raw materials, technological control of biotechnological products and analyzing the quality and safety indicators of raw materials and processed products.	4			v	v	v		
		PD	EC	Progressive Course of Genetic Engineering	Forms theoretical foundations of genetic engineering and applied aspects of its application, ability to present and critically analyze information about achievements and prospects for introducing methods of genetic engineering into the practice of creating new forms of plants, animals and microorganisms. Deepens knowledge in the field of genetic engineering and main methods of genetic engineering, problems of using genetically modified products and transgenic plants, animals for the purposes of practical breeding.					v	v		
		PD	EC	Cellular and Tissue Biotechnology	Considers issues of plant cell culture as an object of biological design, new experimental systems for synthesis of secondary metabolites using plant tissue culture and animal cells. Forms skills of obtaining artificial associations of cultivated cells of higher plants with microorganisms. Deepening knowledge of cell selection, clonal micropropagation and plant health and methods of preserving the gene pool of plants and animals, regulating the reproduction of farm animals.	4			v	v	v		
		PD	EC	Kinetics of Biochemical Processes	Considersmain issues of kinetic regularities of the course of chemical and enzymatic reactions, physical essence of chemical equilibrium, dependence of rate of a chemical reaction on temperature and concentration of reactants. Characterizes main stages of protein biosynthesis: transcription, translation, basic principles of protein engineering, properties of genetic code and principles of regulation of metabolic processes.				v	v	v		

		PD	EC	Molecular genetic research in the biotechnology	Deepens knowledge of molecular genetic bases of modern biotechnology, vector system used for cloning in cells of prokaryotes and eukaryotes and molecular genetic basis for implementation of genetic information in the cell. Substantiates organization of modern microbiological production of biologically active substances for animal husbandry, crop production and technical purposes, modern microbiological production based on living cells and spores, and microbiological production of highly purified preparations of biologically active substances for medical and food purposes.	6				v	v		
		PD	EC	Industrial Microbiology	Considers main types of nutrient media used for cultivation of industrial microorganisms and principles of formulation of industrial nutrient media andtechnology of cultivation of microorganisms, use of microorganisms in industrial production of steroid hormones and metabolites. Justifies advantages of microbiological method of obtaining primary and secondary metabolites, application of biotechnological methods in various branches of industrial production. Characterizes methods for obtaining pure cultures of microorganisms and microbial biomass for agriculture, medicine, and food industry.				v		v	v	v	
		PD	EC	Basics of scientific Research work	Examines modern achievements of science and technology in a specific area of biotechnological productions with the study of practical recommendations and methods for solving research problems. Justifies relevance of selected topic, setting objectives and tasks of the research. Examines issues of carrying out a literature review and patent search for new production methods in the studied field of research and new technologies on the topic of master's dissertation using electronic databases and developing a methodology for theoretical, experimental research, execution and defense of a report on research activities.	5						v	v
5		PD	EC	Ensure Genetic Security in the Biotechnological Production	Considers biosafety issues regarding basic principles and methodology for assessing the risk of adverse effects of genetic engineering activities at biotechnological enterprises and possible adverse effects of genetic engineering organisms on the environment and human health. Regulatory and legislative framework for food safety in the Republic of Kazakhstan. Forms skills to comply with the biological safety of genetically modified sources in food production and to carry out food toxicological and hygienic assessment of genetically modified food sources.						v	v	v
16		BD	EC	Ecobiosafety in the agricltural and industrial zone	Deepens knowledge of problems of environmental pollution in agricultural industry, its importance in modern society. Considers issues of biological processing of industrial wastes of various	7		v	v	v			

					industries, use of microorganisms – hydrocarbondestructors for cleaning contaminated soils and safety problems of using microorganisms obtained by genetic engineering methods, and some products of microbial synthesis. Allows to acquire skills of applying in practice a complex of modern research methods in the field of environmental biotechnology for treatment of wastewaters and soils.								
17		PD	EC	Environmental Aspects of Biotechnological Processes	Characterizes methods of biological wastewaters treatment, biotechnological methods of leaching, disposal of solid wastes and obtaining non-traditional energy sources, aerobic and anaerobic methods of processing industrial and agricultural wastes, biotechnological methods of cleaning objects contaminated with heavy metals and radionuclides. Substantiates the role of microorganisms in biodegradation of organic substances of the environment and relationship of plants with soil microorganisms in the efficiency of extraction of toxicants. Considers issues of using sulfate-reducing bacteria in deposition of metals, conditions of their functioning, use of microorganisms for biosorption of metals, biological processing of industrial wastes of various industries, use of microorganisms – destructorsof hydrocarbons for cleaning wastewaters from oil refineries and soils polluted with oil.				v	v	v		
18	Biotechnological development in the agro-industrial complex	PD	EC	Technology of production and storage of the biotechnological industries products	Considers questions of organization of biotechnological productions in agriculture and biotechnology for storage and processing of crop and livestock products. Characterizes modern methods of biotechnology in production and processing of agricultural products and microorganisms used in biotechnology for storage and processing of agricultural products. Substantiates the use of micromycetes in the production of products of plant origin and bacteria in the production of feed.	6				v	v	v	v
19		PD	EC	Achievements of Genetic Engineering in the Agro-Industrial Complex	Considers problems and prospects of obtaining new varieties of plants resistant to stress factors, problems and prospects of applying methods of genetic engineering, basics of molecular bioengineering, cellular and tissue biotechnology in plant breeding, problems and prospects of obtaining new breeds of animals resistant to diseases using genetic engineering methods. Characterizes methods of selection of a recipient plant genotype, introduction of alien genes into a plant cell using agrobacterial vectors, methods for producing transgenic plants resistant to insects, fungal, bacterial and viral infections, transgenic plants producing drugs and obtaining new breeds of animals resistant to diseases using genetic engineering techniques.						v	v	v

20				Business in Biotechnological sphere	In order to move to a new path of economic development, it is necessary to create favorable conditions for the transfer of science to business. Active involvement of young scientists in current scientific issues, business dialogue with science, commercialization of domestic developments and promotion to the market should be initiated. In this regard, in order to stimulate innovative activity, one of the main tasks of innovative development is to create favorable infrastructural conditions for the transfer of science to a commercially attractive product. The goal of teaching the subject is to develop an entrepreneurial culture that encourages risk in order to realize the commercial potential of scientific research and human capital.	5			v	v	v		
				Creation of Business Plan for Production of Biotechnological Products	By forming the appropriate potential and the necessary mechanisms for its implementation, innovative and production development creates the necessary objective prerequisites for increasing the pace of competitive advantages in industrial enterprises using potential development opportunities. Thus, there was an objective need to organize the management of innovative development of industrial enterprises and their complexes in the strategic planning of industrial and economic development of enterprises from the level of small enterprises. The purpose of teaching the subject is to develop theoretical and methodological approaches to improve the management mechanism of the innovative development of production in order to increase competitiveness, and to quickly introduce it into the practice of working in industrial enterprises.				v	v	v		
21	Module research work and Final Attestation			Master Research Scientific Work Including internship and master thesis (MRSW)	Allows to use the obtained theoretical knowledge of modern methods of biotechnology for experimental work. Allows to acquire the skills of research work according to the plan of academic period with the use of instrumentation base of the chair's laboratory. Justifies choice of technological scheme of production in accordance with the topic of master's dissertation. Forms skills in the use of information technologies, computer programs in the performance of final qualifying work, conclusions, modeling, processing and interpretation of the results obtained.	24					v	v	v
22				Registration and Defense of a Master's Thesis	The final qualifying work of a graduate of the Master's program, confirming the competencies acquired during the training process in accordance with the chosen specialization of training. Defense of the master's dissertation at the open meeting of the State Attestation Commission with participation of the chairman of the commission and at least half of its composition. The procedure and regulations for the defense of the master's dissertation are established by the chairman.	8	v		v				v

5.SUMMARY TABLE REFLECTING THE VOLUME ASSIMILATED CREDITS OF EDUCATION PROGRAM MODULES

Course of Study	Semester	The number of mastered modules	The number of studied disciplines		Number of credits					Total hours	Totalcredits	The number of	
			VC	EC	Theoretical training	Educational practice	Research practice	MRSW	Final examination			exam	diff. offset
1	1	4	5	3	29			1		900	30	7	
	2	3		4	23	4		3		900	30	4	1
2	3	3		4	21		7	2		900	30	5	1
	4							18	12	900	30		
Total		10	5	11	73	4	7	24	12	3600	120	16	2

6. LEARNING STRATEGIES AND METHODS, MONITORING AND EVALUATION

Learning strategies	Student–centered learning: the student is a center of teaching/learning and an active participant in the learning and decision-making process. Practice-oriented training: orientation to the development of practical skills.
Teaching methods	Conducting lectures, seminars, various types of practices with: • the use of innovative technologies: • problem-based learning; • case study; • work in a group and creative groups; • discussions and dialogues, intellectual games, olympiads, quizzes; • reflection methods, projects, benchmarking; • Bloom's taxonomies; • presentations; • rational and creative use of information sources: • multimedia training programs; • electronic textbooks; • digital resources. Organization of independent work of students, individual consultations.
Monitoring and evaluation of the achievability of learning outcomes	Current control on each topic of the discipline, control of knowledge in classroom and extracurricular classes (according to syllabus). Assessment forms: • survey in the classroom; • testing on the topics of the academic discipline; • control works; • protection of independent creative works; • discussions; • trainings; • colloquiums; • essays, etc. Boundary control at least twice during one academic period within the framework of one academic discipline. Intermediate certification is carried out in accordance with the working curriculum, academic calendar. Forms of holding: • exam in the form of testing; • oral examination; • written exam; • combined exam; • project defense; • protection of practice reports. Final state certification.

EDUCATIONAL AND RESOURCE SUPPORT OF THE PLO

Information Resource Center	The structure of the JRC has 6 subscriptions, 16 reading rooms, 2 electronic resource centers (IRC). The basis of the network

	infrastructure of the OIC consists of 180 computers with Internet access, 110 automated workstations, 6 interactive whiteboards, 2 video doubles, 1 videoconferencing system, 3 scanners of A-4 format, 3. The software of the OIC – AIBS "IRBIS-64" for MSWindows (a basic set of 6 modules), an autonomous server for uninterrupted operation in the IRBIS system. The library fund is reflected in the electronic catalog available to users on the website http://lib.ukgu .kz is on-line 24 hours 7 days a week. Thematic databases of their own generation have been created: "Almamater", "Works of scientists of SKSU", "Electronic Archive".Online access from any device 24/7 via an external linkhttp://articles.ukgu.kz/ru/pps. Working with catalogs in electronic form. The EC consists of 9 databases: "Books", "Articles", "Periodicals", "Works of the teaching staff of SKSU", "Rare books", "Electronic Fund", "SKSU in print", "Readers" of "SKU". The JIC provides its users with 3 options for accessing its own electronic information resources: from the Electronic Catalog terminals in the catalog hall and divisions of the JIC; through the university's information network for faculties and departments; remotely on the library's website http://lib.ukgu.kz /. Access to international and republican resources is open: "SpringerLink", "Envoy", "Web of Science", "EVSSO", "Epigraph", to electronic versions of scientific journals in open access, "Zan", "RMEB", "Adebiet", Digital library "Akpigress", "Smart-kitar", "Kitar.kz", etc. For people with special needs and disabilities, the library's website has been adapted to the work of visually impaired users in the JRC
Material and technical base	Research Laboratory of undergraduates and doctoral students Laboratory"Biochemistry and Microbiology" BOX"Biotechnology of microorganisms" Laboratory "Biotechnology BASES" Autoclave Laboratory "Biotechnology of animals and plants" The room of teachers The room of the head of the department The room of teachers The lecture hall "Food biotechnology" The room of the Erasmus preparator and the office for shooting video lectures The laboratory "agricultural biotechnology"

AGREEMENT SHEET

by Education Program code 7M05123- «Biotechnology»

Director of DAA _____ Naukenova A.S.
signature

Director of ASD _____ Nazarbek U.B.
signature

Director of the DEK _____ Bazhirov T.S.
signature

РЕЦЕНЗИЯ

на образовательную программу «7М05123-Биотехнология»,
разработанной коллективом преподавателей кафедры «Биотехнология»
ЮКУ им. М. Ауэзова

Научно-исследовательский институт экологии и биологии Шымкентского университета начал функционировать с 02.09.2019 г. (Приказ № 147-жк) на основе переименованного научно-исследовательского института фундаментальных и прикладных проблем естествознания, созданного приказом №16 от 01.02.2012 (Протокол №8 от 10.01.2012 г.)

Данная организация выполняет научно-исследовательские работы в области экологической биотехнологии, включая разработку методов биоконверсии минеральных и техногенных отходов в товарные продукты, производство косметологической продукции на основе местного растительного сырья, технологии биологической очистки сточных вод, биологической утилизации газообразных отходов и т.д.

Стратегическая цель образовательной программы «7М05123-Биотехнология» направлена на подготовку магистров, владеющих современными, высокоэффективными методами исследований в области биотехнологии и умеющих применять полученные знания и анализировать современное состояние развития отрасли.

Образовательная программа полностью отвечает требованиям по развитию и уровню подготовки магистрантов по междисциплинарному курсу профессионального модуля.

Объектами профессиональной деятельности выпускников по ОП «7М05123-Биотехнология» являются: научно-исследовательские институты и вузы; проектные биотехнологические организация; предприятия микробиологической, фармацевтической, пищевой и экологической промышленности и аграрно-промышленного комплекса.

Программа направлена на удовлетворение потребностей государства, региона, работодателей и обучающихся, согласованы с национальными приоритетами развития и стратегией развития вуза, направлены на практическое применение знаний, на самосовершенствование и получение образования в течение всего цикла обучения по специальности биотехнология.

Формирование профессиональной компетенции осуществляется благодаря содержанию, объему и логике построения индивидуальной траектории обучающихся. В качестве элективных курсов в учебном плане предусмотрены модули «Объекты и продукты биотехнологии», «Биотехнология агропромышленного комплекса» направленные на применение инновационных технологий в учебном процессе и критического мышление.

Процесс формирования учебных планов прозрачны, к ним привлекаются обучающиеся и работодатели–представители профильных НИИ и предприятии (ТОО «Компания ФудМастер - Шымкент», Институт

генетики и физиологии), ППС активно развивает сотрудничество с профильными НИИ, принимает участие в различных семинарах, ведут совместные научные исследования, консультируется по вопросам содержания образовательных программ, что в конечном итоге приводит к эффективному трудоустройству выпускников.

Образовательная программа может быть рекомендована для подготовки магистрантов по направлению «Биотехнология» с присвоением квалификации «магистр».

Директор НИИ ЭиБ,
д.б.н., профессор Исаева А.У.

Экспертное заключение
на образовательную программу
«7М05123-Биотехнология»

Стратегическая цель образовательной программы «7М05123-Биотехнология» направлена на подготовку магистрантов, владеющих современными, высокоэффективными методами исследований в области биотехнологии и умеющих применять полученные знания и анализировать современное состояние развития отрасли.

К разработке образовательной программы привлечены представители организаций работодателей биотехнологической отрасли.

Структура программы представлена в соответствии с требованиями к составлению программы: отражены паспорт образовательной программы; результаты обучения ОП, компетенции ОП, сводная таблица, отражающая объем освоенных кредитов в разрезе модулей образовательной программы, сведения о дисциплинах.

Цели образовательной программы соответствуют 6 уровню Национальной рамки квалификаций Республики Казахстан, они также гармонизированы с Дублинскими дескрипторами, 1 циклом Квалификационной Рамки Европейского Пространства Высшего Образования, а также 6 уровнем Европейской квалификационной рамки для образования в течение всей жизни.

Образовательная программа направлена на подготовку специалистов в соответствии с существующими требованиями нормативных документов в области высшего образования и включает циклы базовых и профессиональных дисциплин способствующих приобретению навыков владения специальной терминологии; использование современных методов исследования при выполнении исследовательской работы; изучение методов биотехнологических процессов, особенности инновационных технологий в области биотехнологии; работы с технической и справочной литературой, научно-технической документацией и на приобретение обучающимися необходимых знаний, умений, навыков и компетенций.

Для магистрантов читают лекции ведущие зарубежние профессора Университета Загреб (Хорватия), Бухарский государственный университет имени Абу али Ибн Сина, Узбекистанский Национальный университет имени Мирза Улугбек, Джизакский государственный технологический институт, Чирчикский педагогический институт. Кроме того проводятся дисциплины обеспечивающие знания в области обеспечивание совершенствования технологий биотехнологической отрасли, выполнение услуг, внедрение достижений науки и техники, прогрессивных базовых технологий.

Объектами профессиональной деятельности выпускников по ОП «7М05123-Биотехнология» являются: научно-исследовательские институты и вузы; проектные биотехнологические организация; предприятия

микробиологической, фармацевтической, пищевой и экологической промышленности и аграрно-промышленного комплекса.

Образовательная программа ориентирована на результаты обучения, соответствующие требованиям профессиональных стандартов, потребностям отраслевых рынков труда и организаций работодателей.

Из выше изложенного, можно сделать вывод, что образовательная программа «7М05123-Биотехнология» отвечает предъявляемым требованиям и обеспечивает условия для формирования конкурентоспособности выпускников для максимально быстрого трудоустройства по специальности и профессионального роста.

Председатель экспертной комиссии _____ к.п.н., доцент Мадьяров Н.К.

Члены экспертной комиссии: _____ к.б.н., доцент Исаев Е.Б.

_____ к.б.н., ст.препод. Сенкебаева А.А.

_____ к.т.н., доцент Абдуова А.А.