

**MINISTRY OF AGRICULTURE OF THE REPUBLIC OF KAZAKHSTAN
NCJSC "KAZAKH AGROTECHNICAL RESEARCH UNIVERSITY NAMED AFTER S. SEIFULLIN"**

Considered at the meeting of the Faculty Council
Protocol No. 1 dated 27/12/2023

APPROVE
Dean of the Faculty of «Veterinary Medicine and Animal
Husbandry Technology»
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2024г.



**PLAN
DEVELOPMENT OF THE EDUCATIONAL PROGRAM
EP 6B05102-"Biotechnology"
training area - Biological and related sciences for 2024-2027**

It was considered at the extended meeting
of the Department of Microbiology and Biotechnology
Protocol No. 1 dated 28/08/2023.

Content

№	Name of the component	Page
1	Passport of the educational program Development Plan (EP)	3
2	Analytical justification of the EP	4
2.1	Information about the educational program	4
2.2	Analysis of the student body	8
2.3	Analysis of the internal environment of the EP	9
2.4	Analysis of the external environment of the EP	11
2.5	Analysis of teaching staff implementing the educational program.	13
2.6	Analysis of the achievements of the EP	15
3	Analysis of the problems that the EP development plan is aimed at solving, justification of the need to solve them	16
4	The main goals and objectives of the EP development plan with an indication of the timing and stages of its implementation	16
5	Measures to reduce the impact of risks for EP	18
6	Action plan for the development of the educational program	19
7	The mechanism of implementation of the development plan of the EP	23

1. Passport of the educational programme development plan

for 2024-2027

Name of the Programme - Educational Programme Development Plan

	<p>The grounds for developing a development plan for the EP</p>	<p>The Department of Microbiology and Biotechnology carries out its activities in accordance with the normative legal acts of the Ministry of Higher Education and Science of the Republic of Kazakhstan in the implementation of educational programs for the preparation of bachelors and undergraduates. Educational programs have been developed in accordance with the NRK and professional standards, in accordance with the Dublin Descriptors and the European Qualifications Framework, based on:</p> <ol style="list-style-type: none"> 1. The Law of the Republic of Kazakhstan "On Education". 2. Law of the Republic of Kazakhstan "On Science". 3. Message of the Head of State to the people of Kazakhstan from 1 September 2021 "Unity of the people and system reforms - a solid basis for the prosperity of the country"; 4. Message of the Head of State to the people of Kazakhstan "Economic Course of Fair Kazakhstan" dated 1 September 2023. 5. Concepts of development of higher education and science in the Republic of Kazakhstan for the years 2023 - 2029 6. "Model rules of activity of organisations of higher and postgraduate education" Order of the Minister of Education and Science of the Republic of Kazakhstan dated 30 October 2018 No. 595. Registered with the Ministry of Justice of the Republic of Kazakhstan on 31 October 2018 No. 17657. 7. State obligatory standard of education of all levels of education. Order of the Ministry of Education and Science of the Republic of Kazakhstan dated 20 July 2022 No. 2. Registered with the Ministry of Justice of the Republic of Kazakhstan on 27 July 2022 No. 28916. 8. "Qualification requirements for educational activities and the list of documents confirming compliance with them" Order of the Ministry of Education and Higher Education of the Republic of Kazakhstan from 22.11.2022 № 152. 9. Model rules of admission to training in educational organisations implementing educational programmes of higher and postgraduate education. Order of the Ministry of Education and Higher Education of the Republic of Kazakhstan from 15.12.2022 № 189. 10. Development Programme of NAO "Kazakh Agrotechnical Research University named after S.Seyfullin" for the period of 15.12.2022 No. 189. S. Seifullin" for 2023-2029.
2	<p>Main developers of the EP development plan</p>	<p>Work Plan Committee, Department of "Microbiology and Biotechnology", Academic Council on Quality, involved researchers, specialists and employers: LLP "National Centre of Biotechnology" MH RK, LLP "Republican Collection of Microorganisms" MH RK.</p>

3	Timeframe for the implementation of the EP development plan	2024 to 2027
4	Amount and sources of funding	Budgetary and attracted funds
5	Expected end results of the implementation of the EP development plan	<p>Availability of effective author's developments (programmes, teaching aids, methodical) and activities for their dissemination;</p> <p>Effective implementation of educational programmes providing continuous education of students:</p> <ul style="list-style-type: none"> - Bachelor's degree-Master's degree-Doctoral studies; - opening of doctoral studies in the direction of training "Biological and related sciences"; - realisation of external academic mobility of students; -realisation of double-diploma education; - visit of professors and teaching staff of the "Summer School"; - participation and holding of the Republican competition of scientific research work of students in "Biological and related sciences"; - high quality of education; - renewal of personnel potential with knowledge of English; - implementation of the "Bolashak" programme, internships of the teaching staff, training in master's and doctoral programmes; - gaining practical experience, including practical training and dual training in large production organisations, breeding companies, leading Republican and national research centres and laboratories.

2 Analytical substantiation of the EP development plan

Updated content of the EP; high quality of graduates' training; implementation of the OP with the addition of in-depth training, taking into account the cognitive ability and needs of students.

2.1 Information about the educational programme

"Biotechnology" is one of the most promising areas of education today, not only in the Republic of Kazakhstan, but also in the world. Creation of new food products, development of veterinary biopreparations, diagnosticums, enzymes, biologically active additives, feed additives for farm animals and birds, environmental protection, is one of the most urgent issues on a global scale, the solution of which is impossible without the use of knowledge and methods of biotechnology. Therefore, the profession of biotechnologist combines the following professions: microbiologist, virologist, immunologist, chemist, pharmacist-analyst, food technologist, breeder-bioengineer. Specialists of this professional level are considered valuable employees. They are needed in the pharmaceutical, food, veterinary and processing industries.

This educational programme "Biotechnology" is developed in accordance with the National Qualifications Framework, based on the guidelines of the European Credit Transfer and Accumulation System (ECTS) in accordance with the European Qualifications Framework, agreed and discussed with representatives of production, specialists of research centres.

The uniqueness of the programme is the mastering of bachelors' skills in laboratory equipment, sampling of biological material, cultivation of microorganisms and analysis of microbiological data, conducting research in the field of diagnostics (ELISA, PCR, etc.), study of gene functions and DNA analysis, creation of molecular genetic constructs, obtaining biotechnological products, molecular biological research, work with bacteriophage transformation.

Each course of study provides for the acquisition of practical experience, including practical training and dual training in large production organisations, in pharmaceutical, processing companies, and breeding companies, in leading Republican, national research centres and laboratories. At the same time, they analyse the basic composition of biologics; determine the main components of raw materials and finished products; develop and implement new technological processes, study the problems of source material for the selection of plants, animals and microorganisms; study and understand the relationship between genes and individual components of the environment to achieve maximum productivity of microorganisms, animals; study the features of selection of microorganisms, animals, plants; make regulatory documentation for raw materials and microorganisms.

The stakeholders of the educational programme 6B05102-"Biotechnology" are: RSE "Republican collection of microorganisms" of the MH RK, RSE "National Centre of Biotechnology" of the MH RK, Scientific and Production Enterprise "Antigen" LLP, Department of expert forensics and molecular biology of the Ministry of Internal Affairs of the RK, industrial processing enterprises NPA "Atameken", RSE "Asyl tulik", research institutes and centres of the Republic of Kazakhstan, medical diagnostic centres, laboratories, district and regional breeding stations, plant protection stations, enterprises of microbiological, biochemical, food industry (bakeries, milk and meat processing plants, breweries, confectionery factories, etc.). II).

The implementation of educational programmes of "Biological and related sciences" is aimed at the formation of professional competence of future graduates, corresponding to the qualification framework of Bachelor and Master, meeting the needs of the labour market. The educational programme is designed on the basis of a point system of studying disciplines, theoretical training in the volume for Bachelor's degree is 240 credits and for Master's degree -120 credits. Through the educational programmes the goals of the State Educational Standards and the mission of the Faculty are realised.

The content of educational programmes is developed on the basis of the State General Educational Standard of Higher Education of the Republic of Kazakhstan "Order of the Ministry of Education and Science of the Republic of Kazakhstan from July 20, 2022 № 2". Registered in the Ministry of Justice of the Republic of Kazakhstan on 27 July 2022 № 28916, the classifier of directions of training of personnel with higher and postgraduate education from 13 October 2018 № 569 and opinions and suggestions of employers, stakeholders and students.

The EP is designed as a set and sequence of training modules for the whole period of study and is aimed at mastering the competences necessary for awarding the academic degree of Bachelor of Science in the relevant educational programmes.

The aim of the educational trajectory is "Training of competitive on the labour market specialists of new formation, in the field of biotechnology and nanotechnology, with broad fundamental knowledge and practical experience, able to adapt to the changing requirements of the labour market and technologies, meeting the requirements of employers.

Map of the direction of training in the educational programme	
Code and classification of the field of education	6B05-Science, Mathematics and Statistics
Code and classification of training areas	6B051-Biological and Allied Sciences
Name of educational programme	6B05102-«Biotechnology»
Qualification characteristic of the graduate	
Bachelor's degree awarded	Bachelor of Science in the educational programme "Biotechnology" Bachelor of Science in the educational programme "Agricultural Biotechnology"
List of specialist positions	Bachelor can occupy the following positions: specialist (laboratory assistant) in research institutes and universities; biotechnologist in production laboratories; specialist-biotechnologist in biotechnological production; specialist in agricultural biotechnology; specialist in food and pharmaceutical production; biotechnologist-breeder; specialist in environmental services and organisations.
Area of professional activity	The field of professional activity of the bachelor of the educational program is the mastery of bachelor's skills in laboratory equipment in a biological laboratory, sampling of biological material, cultivation of microorganisms and analysis of microbiological data, conducting research in the field of diagnostics (ELISA, IHA, PCR, etc.), studying the functions of genes and DNA analysis, creating molecular genetic structures, developing and obtaining new biotechnological products and processes, molecular biological research, selection of microorganisms, plants, animals.
Object of professional activity	<ul style="list-style-type: none"> - The objects of professional activity of graduates are: - research institutes and universities of biotechnological, biological, medical, agricultural profile; - production enterprises and laboratories of food and industrial processing, microbiological, pharmaceutical industries; - enterprises of microbiological, biochemical, food industry (bakeries, milk and meat processing plants, breweries, confectionery factories, etc.). - agricultural enterprises; - botanical gardens and zoological parks; - станции защиты растений; - district and regional breeding stations; - fish farms and fur farms; - universities, secondary schools, gymnasiums, colleges; - ecological services and organisations;

	<ul style="list-style-type: none"> - laboratories for quality and safety control of agricultural products. - departments of expert forensics and molecular biology of the Ministry of Internal Affairs of the RK;
Functions of professional activity	<p>Graduates of EP 6B05102-Biotechnology shall be prepared to fulfil the following functions:</p> <ul style="list-style-type: none"> - realisation of production of biotechnological products; - quality control of biotechnological products; - creation of necessary conditions for cultivation and biological realisation of biotechnology objects; - organisation of individual stages of biotechnological production.
Types of professional activities	<p>Know and understand</p> <ul style="list-style-type: none"> - the basics of legislation of RK in the field of biotechnology and biosafety; <ul style="list-style-type: none"> - basic objects, methods and principles of productions used in veterinary biotechnology, biotechnology of plants, microorganisms, animals; - complex of special profile disciplines for solving applied problems of veterinary biotechnology; - peculiarities of requirements to biotechnological products; - current state, problems and prospects of veterinary biotechnology development; - research directions of plant cell biotechnology and the main criteria of biotechnology application in production, methods of cell and tissue cultivation and cell culture basics - application of cell biotechnology in genetic engineering, in bionanotechnology; - principle of operation and requirements for equipment used in biotechnology, biotechnology of microorganisms, animals, plants. <p>Should be able to</p> <ul style="list-style-type: none"> - apply the acquired knowledge to solve specific scientific, practical, information-seeking, methodological and educational tasks; - analyse and forecast changes in demand and supply of biotechnological products; - have sufficient theoretical training to analyse the economic situation in the field of agricultural, food, processing, medical, veterinary, pharmaceutical and environmental biotechnology; - realise professional potential; - to have skills of using modern instruments and equipment; - organise labour activity on a scientific basis - analyse and interpret research-based results obtained by integrating knowledge of fundamental or applied areas of biotechnology <p>Acquire practical skills in:</p> <ul style="list-style-type: none"> - identifying society's need for biotechnological products; - realising professional potential;

	<ul style="list-style-type: none"> - utilising biotechnological equipment for research; - mastering methods and techniques of studying biotechnological technologies in the field of molecular biology and genetics of plants and animals; - formation of knowledge in the field of molecular biology and genetics, biotechnology of plants and animals; - independently organise and conduct scientific research using modern methods of analysis at the molecular, cellular, organismal and population level; - work with scientific literature and evaluate modern achievements in the field of plant cell technology and modern biotechnology worldwide.
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2.2 Analysis of the contingent of students. Currently, the educational programme "6B05102-Biotechnology" is training bachelors full-time. Education is conducted in the state and Russian languages.

The contingent of Bachelor's degree students is 191 students, of them in the state language -118; on the state grant are trained - 95.

Student contingent plan (Bachelor's degree)

№	Indicators	2024	2025	2026	2027
	Student contingent	195	205	215	220
	Number of students studying on state grants	145	140	150	180
	Number of students studying on a paid basis	50	65	65	40

2.3 Analysing the internal environment of the EP

The necessary material and technical support is available for the implementation of the EP development plan. In order to maintain the high quality of staff training and scientific research, significant resources are allocated annually to modernise the infrastructure. Considerable attention is paid to the creation of comfortable conditions for the creative and sports development of students, own information network, student polyclinic, social shop, pharmacy and other facilities are functioning.

For the development and implementation of the EP development plan at the department in the educational process are used educational and methodical literature, documentary films and videos on various biotechnological processes, slides with illustrative materials. For carrying out of LPZ there are NIP "Agricultural biotechnology", educational and scientific laboratories equipped with special equipment and materials (phytocamera, fermenter, electron microscopes, drying cabinets, thermostats, centrifuges, homogenisers, refrigerators and freezers, pharmaceutical refrigerators, in all classrooms laminar - boxes, etc.). There is also access to information and analytical resources for students. Practical field classes

are held in various laboratories of RSE on PCV KVINC MEW RK "Republican Veterinary Laboratory", RSE on PCV KVINC MEW RK "National Veterinary Reference Centre", LLP "National Centre of Biotechnology" MH RK, as well as LLP "Republican Collection of Microorganisms" MZRC.

Multimedia rooms with interactive whiteboards are used in the educational process, which significantly expand the visualisation possibilities and the quality of lecture material presentation.

The auditorium and laboratory and training fund corresponds to the contingent of students and the content of OP training. Each auditorium has: passport, safety log, first aid kit, fire extinguishing equipment (fire extinguisher and centralised fire extinguishing system).

All laboratories meet the sanitary and hygienic state regulatory requirements for this category of facilities (SNIП Approved by the Government of the Republic of Kazakhstan from 10.01.12g. № 13), including the training area, according to the requirements for premises for training laboratories GOCO 5.03.014g.-2005g. Each laboratory has a passport, fire extinguishing means, individual and collective means of protection for the staff.

All teachers have access to personal computers and free access to the Internet.

EP provides students with the opportunity to undergo all types of professional practice, provided by the state obligatory standards of education.

In order to improve the quality of classes in the disciplines of the faculty and all types of practices, the department has concluded co-operation agreements with more than 30 practice bases (research institutes, research centres, enterprises of the industrial processing industry)

The department has the necessary educational and methodical materials developed in accordance with the normative documents: academic calendars, working curricula, catalogues of elective disciplines, UMKD, individual work plans of undergraduates, as well as working programs of research and development of undergraduates on scientific topics.

Research work of the department is carried out on budget-funded projects under the Ministry of Agriculture and Ministry of Education and Science of the Republic of Kazakhstan, is a multidisciplinary programme. For 2022-2023 years, the department conducted research on the most promising areas of development of the agro-industrial complex of the RK, on grant and programme-targeted financing of scientific research.

- PCF MES RK for 2021-2023 № BR10764944 "Development of methods of analytical control and monitoring of food safety" (Bulashev A.K.) 540 000 000 000 tenge;

- Grant financing of MES RK 2022-2024 "Development of immunoenzyme test system based on recombinant antigen of Trichinella spp (Akibekov O.S.) 78 000 000 000 tenge;

- Grant funding of young scientists of the Ministry of Education and Science of the Republic of Kazakhstan 2021-2023 "Express - test for diagnostics of trichinellosis" (Akibekov O.S.) 54 000 000 tenge;

- Grant funding of MES RK for 2021-2023. Priority: "Life and Health Science" "Development of rapid test for diagnosis of salmonellosis abortion of horses based on monoclonal antibodies" (Borovikov S.N.) 64,000,000 tenge;

- PCF MFA RK 2020-2023 "Development of ICA for rapid detection of campylobacteriosis pathogen in biological material and livestock products" (Borovikov S.N.) 28 000 000;

- Grant financing of MNIVO RK for 2023-2025 "Development of RNGA-set on the basis of recombinant proteins for diagnostics of brucellosis" (Bulashev A.K.) 89 000 000 000tenge.

The amount of financing of scientific projects at the department is 280 000, 00 thousand tenge for 2023, and per 1 teacher is 10 000,00 thousand tenge.

The following teaching staff actively participate in the implementation of these projects: Bulashev A.K., Borovikov S.N., Akibekov O.S., Kuhar E.V., Suranshiev J.A., Begenova A.B., Omarova A.B., Kulmagambetov T.I., Baibolin J.K., Akanova J.J., Muranets A.P., Otepova G.M. Abdrakhmanova G.K., and others.

The annual and prospective plans of scientific research are developed at the department, which cover a wide range of problems relevant to the region and the Republic of Kazakhstan: creation of productive forms of animal lines, enrichment of the gene pool by combining methods of biotechnology and breeding, improvement of methods of assessment of veterinary and sanitary quality of livestock products, phenotypic and molecular-genetic characterisation of dermatophyte pathogens, creation of a test system for their diagnosis, development of ELISA, ICA-test, development of a modern method of diagnostics of infectious diseases, development of a modern method of diagnostics of infectious diseases.

Strengths:	Weaknesses:
<ol style="list-style-type: none"> 1. Compliance of the content of educational programmes of the State Educational Standards, modern requirements of science and consumers, as well as their regular updating, due to constant changes in the needs for graduate competence, processes and economic integration. 2. Step-by-step planning of the process of mastering educational programmes, according to the trajectory chosen by students in accordance with the rules of the credit system of education. 3. Combination in educational programmes of theoretical and practical training, independent work, as well as the presence of compulsory disciplines of the university component and elective disciplines that include components for preparation for professional activity, development of intellectual skills, creative abilities and personality of the learner. 4. Development and introduction into the educational process of innovative forms, methods of mastering educational programmes, multimedia tools, providing training of highly qualified specialists. 5. Improvement of the intra-university quality management system, availability of structures to control and monitor the effectiveness of students' mastering of educational programmes; 6. Entry into the European educational space; 7. Academic mobility of students; 8. Interdisciplinary connection. 9. Provision of computers and Internet access, updating of the library fund 10. Realisation of double-diploma education with leading universities of RK and abroad 	<p>There are no joint educational student exchange programs No multilingual education groups</p>

2.4 Analysis of the external environment of the programme

The department determines the practice base for the students of the educational programme, concludes memorandums, agreements and tripartite contracts with enterprises, research institutes and centres for training, industrial, pre-diploma, research practice and master's theses. Currently, more than 40 practice agreements have been signed for the programme

1. RSE "Republican collection of microorganisms" of the Ministry of Education and Science of the Republic of Kazakhstan;
2. "National Centre of Biotechnology" KN MES RK;
3. LLP Scientific and Production Enterprise "Antigen";
4. "ProfDezGarant" LLP Mangistau region, Aktau city.
5. JSC "RCPW" "Asyl tulik" of the Ministry of Agriculture of the Republic of Kazakhstan;
6. District and regional breeding stations;
7. Colleges of biological direction;
8. LLP "Zerenda breeding farm";
9. Millina Food Production LTD LLP Mangistau oblast;
10. Branch of RSE on PCV "National Centre of Expertise" in Atyrau oblast;
11. "Ais" LLP Aktobe oblast;
12. "Scientific-Innovative Centre of Veterinary and Livestock Breeding" LLP
13. KGP on PCV "Pavlodar Regional Cardiology Centre";
14. KGP "Central Hospital of Karazhal city";
15. Atyrau Oil Refinery LLP.
16. NIP "Agricultural biotechnology".
17. Dairy plant "Stolichny" LLP
18. Ayan M JSC Dairy plant
19. JSC "Astana Onim" Akmola Oblasy
20. Ministry of Internal Affairs of the RK Operative and Forensic Department Molecular Genetic Laboratory
21. LLP "Gormolzavod" Kokshetau city
22. Desalination Plant "Caspiy" LLP RK Mangistau region, Aktau city
23. JSC "National Centre of Expertise and Certification" Astana city
24. "Kazakh Academy of Nutrition" Almaty city
25. Kokshetau Branch of RSE on PCVNCE of COOH MH RK in Akmola oblast

Every year, representatives from production, specialists from research institutes and centers, scientists from universities and research institutes of near and far abroad are involved in giving review lectures. In order to develop academic mobility, students are sent to partner universities.

Opportunities for graduates of the specialty, as well as emerging threats.

<p>Opportunities:</p> <ul style="list-style-type: none"> - after completing undergraduate educational programs, graduates have the opportunity to continue their education in postgraduate educational programs. - high demand for graduates in the labor market; - expanding cooperation and increasing the number of contracts with specialized enterprises and organizations; - wide opportunities for student participation in academic mobility programs; <p>attracting foreign scientists to give lectures.</p> <ul style="list-style-type: none"> - resource provision of the EP: a sufficient number of specialized laboratories equipped with modern instruments and equipment; - participation of employers in the development of the content of the EP; - provision of students with practice bases based on agreements with enterprises and organizations in the field of training; - 100% staffing with highly qualified teaching staff, ensuring the implementation of the educational program; - high scientific potential of teaching staff: an increase in the number of publications in peer-reviewed journals, participation of teaching staff in the implementation of funded projects; - free access to international databases; providing students with electronic and other information resources at the university's JIC; - organized paid internship at the international level 	<p>Threats:</p> <ol style="list-style-type: none"> 1. High competition in attracting applicants to participate in the competition for educational grants. 2. Obsolescence of human resources
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2.5 Analysis of teaching staff implementing the educational program

The participation of teachers in improving the EP 6B05101-Biotechnology is carried out through updating the EP taking into account the requirements of the labor market and advanced scientific achievements; planning the volume of credits for studying elective disciplines; determining course policy; planning a schedule for passing test assignments; organization of control of students' knowledge; adjustment of forms and methods of teaching disciplines taking into account the results of quality monitoring; updating the topics of master's theses; attracting stakeholders, updating databases of research practices, etc. Currently, the EP 6B05101-Biotechnology is provided with highly qualified teaching staff of the department who have a basic education that meets the qualification requirements of the educational program. This requirement is mandatory and is strictly observed during the competitive selection of teaching staff, since it is included in the list of criteria for licensing

educational activities of the Ministry of Education and Science of the Republic of Kazakhstan. Personal information about teachers participating in the implementation of EP 6B05101-Biotechnology is posted on the university portal at <https://kazatu.edu.kz/ru/facultets>, which indicates contact information, area of scientific interests, main merits, availability of developments, information about advanced training. This information is available to everyone. Teaching staff meets the qualification requirements for licensing educational activities. Basic education in the field of training for 94.4% of teachers. OP 6B05101-Biotechnology is served by 19 teachers, of which 4 doctors of science, 9 candidates of science, 5 PhD, 1 master, senior teacher. Along with full-time teachers, employees from among the employer-stakeholders are involved in the educational process, which makes up 20% of the total staff. Every year, the level of education of the department increases due to the implementation of a personnel policy to increase the share of advanced teaching staff, due to graduates of PhD-doctoral studies. Leading classes in the educational program of teaching staff undergo advanced training in the taught discipline every 3 years. Professional development of teachers is carried out through courses, seminars, individual internships, trainings, and master classes. Advanced training programs take into account modern trends in the development of education and science, promote teachers' mastery of innovative teaching technologies and their implementation in the educational process. Some EP teaching staff took courses: in the Department of Materials Engineering of Auburn University (Alabama, USA), Department of Biological and Medical Engineering of the University of California at Davis (USA), University of Giessen. Justus Liebig (Giessen, Germany), University of Genova (Italy), Food Institute at the Marmara Research Center (Gebze, Turkey), Bohemian Central University (Prague, Czech Republic), M.D. Anderson Cancer Center of the University of Texas (Texas, USA), University of Adelaide, Australian Center for Plant Functional Genomics (Adelaide, Australia), Federal Research Center of the Institute of Cytology and Genetics of the Siberian Branch of the Russian Academy of Sciences, Harbin Veterinary Research Institute (Harbin, China), English Language School (Kuala Lumpur, Malaysia), summer school in Tbilisi, (Georgia), at the Moscow State Academy of Veterinary Medicine and Biotechnology named after K.I. Skryabin Moscow Russian Federation, Federal State Budgetary Educational Institution of Higher Education "Russian State Agrarian University - Moscow Agricultural Academy named after K.A. Timiryazev", Federal State Budgetary Educational Institution of Higher Education Altai State University, Kazan State Academy of Veterinary Medicine named after N.E. Bauman. Every year, university teachers participate in the Republican competition of the Ministry of Education and Science of the Republic of Kazakhstan for the title "Best University Teacher". The holders of the state grant were 12 teaching staff who serve EP 6B05102-Biotechnology. Of no small importance in the development and implementation of OP 7M05102-Plant Biotechnology is the research activity of teaching staff and research and development work; scientists serving OP 7M05102-Plant Biotechnology from 2019-2024 completed funded projects (grant financing and PCF) for a total amount of 923,100,000 (project managers Doctor of Historical Sciences, Professor Bulashev A.K., Candidate of Biological Sciences, Acting Professor Borovikov S.N., Candidate of Historical Sciences, Acting Professor Akibekov O.S.). The following laboratories are involved in the implementation of scientific research and the educational process: the accredited "Joint Kazakh-Chinese Laboratory for Biological Safety" (part of the Department of Microbiology and Biotechnology), 6 modern educational and scientific laboratories: "Microbiology", "Virology", "Biotechnology of Microorganisms" ", "Cellular biotechnology", "Veterinary biotechnology", "Plant biotechnology", "Animal biotechnology". The department conducts research work, which is carried out in the "Research and Production Platform of Agricultural Biotechnology". Since 2021, program-targeted financing (PTF) program has been implemented

2.6 Analysis of the achievements of the EP. Personnel training of OP 6B05101-Biotechnology, at S.Seifullin KazATRU is carried out in accordance with the State license for educational activities in the field of higher and postgraduate education No.KZ25LAA00035932 dated

11/30/2023 (07/02/2008) and appendices to the license in the areas of educational activity (<https://kazatu.edu.kz/ru/pages/obucenie/licenzia-na-obrazovatelnuu-deatelnost>).

According to the results of the National rating of educational programs of NCE RK "Atameken" -2023 in groups of bachelor's degree programs 6B050 – "Biological and related sciences" (Biotechnology) took 1st place among 18 universities, the employment rate was 96%. https://atameken.kz/ru/university_ratings?page=2&year=2023&ut=&epg=&speciality=22®ion=&sort=epg_asc&profile=.

In the Independent ranking of the demand for universities of the Republic of Kazakhstan – 2023 conducted by NU "NAAR" in the direction of the GOP master's degree M082-Biotechnology took -1 place, GOP B050-Biological and related sciences -3rd place. <https://kazatu.edu.kz/ru/pages/universitet/o-nas/dostizenia-universiteta-v-rejtingah>

In 2022-2023, more than EP 6B05102-Biotechnology successfully passed post-accreditation monitoring. Every year, students of this EP participate in the Republican subject Olympiad. In 2024, the Olympiad was held at Toraigyrov University in Pavlodar and took 2nd place out of 8 participating universities in Kazakhstan. The Olympiad is held at KazNPU named after Al-Farabi.

Many graduates after graduation work in the field of Biotechnology. Graduates of this EP do not have problems with employment. Of the 73 graduates in 2023, 70.5% are employed; 24 people are enrolled in the master's program in the first year, 9, and 15 undergraduates in the second year.

3. Analysis of the problems that the EP development plan is aimed at solving, justification of the need to solve them.

There are not enough biotechnological enterprises in the Republic of Kazakhstan, which makes it difficult to select enterprises to undergo professional and research practices. In this regard, it is advisable to conclude contracts with foreign enterprises and organizations of a biotechnological profile. To conduct dual training in production conditions, access to these institutions and organizations is limited, many organizations require payment for practice and dual training, therefore it is necessary to include payment for the provision of dual training and professional practices in Public procurement. The number of undergraduate students decreases annually, this is due to a decrease in the number of students passing the UNT in the core subject of biology and chemistry.

4 The main goals and objectives of the EP development plan with indications of the terms and stages of its implementation

The development plan of the EP corresponds to the Development Strategy of the NAO "Kazakh Agrotechnical Research University named after S.Seifullin", meets the requirements of the State Higher and Postgraduate Education (Order of the Minister of Science and Higher Education and Science of the Republic of Kazakhstan dated 07/20/2022 No. 2 of 2023), meet the goals and objectives of the university and meet the needs of students in high-quality education in their chosen field of study and obtaining relevant qualifications and competencies, aimed at training graduates of biotechnologists, scientific personnel who possess theoretical and practical knowledge, methods and tools in the field of biotechnology, who are able to apply the acquired knowledge, to evaluate and analyze the current state of biotechnology development, capable of formulating and making effective solutions to production-related problems, possessing fundamental and applied knowledge, capable of carrying out their professional activities, as well as developing sound approaches to solving problems in the field of biotechnology; preparation of bachelors with the abilities and skills of logical solution of tasks, a culture of mutual communication in a scientific society, able to work in a team and set goals in terms of the development of the chosen professional direction.

When developing the Educational Program Development Plan, the following were taken into account: The Law of the Republic of Kazakhstan "On Education" dated 07/27/2007 No. 319-III ZRK, with amendments and additions dated 03/27/2023 No. 216-VII; standard rules for the activities of organizations of higher and (or) postgraduate education (Order of the Minister of Education and Science of the Republic of Kazakhstan dated 10/30/2018 No. 595, with amendments and additions dated 01/20/2023 No. 23); state mandatory standards of higher and postgraduate education (SES) (Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated 20.07.2022 No. 2, with amendments and additions dated 02/20/2023 No. 66); rules for the organization of the educational process on credit technology of education in organizations of higher and (or) postgraduate education (Order of the Minister of Education and Science of the Republic of Kazakhstan dated 04/20/2011 No. 152, with amendments and additions dated 04/05/2023 No. 145); qualification handbook positions of managers, specialists and other employees approved by the Order of the Minister of Labor and Social Protection of the Republic of Kazakhstan dated 12/30/2020 No. 553, with amendments and additions dated 08/12/2022 No. 309; Atlas of new professions and competencies of Kazakhstan (No. 03. Agriculture, 2020). Confirmation of the dynamism of the program's goals is the coordination of its content with employers.

The effectiveness of the goals of the EP is systematically assessed through planned consideration at meetings of the department, the Academic Council of the University of issues on student academic performance, on the results of work practice, on the level of residual knowledge, on the quality of defense of diploma projects and passing state exams, on the degree of student satisfaction with the quality of education. In addition, an important indicator of the effectiveness of the implementation of the goals of the educational program is the number of employed graduates.

The assessment of the level of achievement of the goals of the educational program is reflected in the relevant documentation of the educational process – the results of the examination session; minutes of meetings of the SAC for the protection of diploma projects, as well as passing state exams; minutes of meetings of the Academic Council and the Quality Assurance Committee; annual reports on the activities of departments, including all sections of educational, methodological, scientific and educational work. Indicators of the effectiveness of achieving the goals of the educational program are the results of external and internal monitoring: a high degree of demand for graduates of the program in the labor market: the employment rate for 2023 was 96% (Atameken Rating). The accessibility and openness of the quality policy in JSC "S.Seifullin KATRU" of teaching staff, employees, students, as well as all interested parties will be confirmed by publication on the university's website and on the university's stands, placement on the electronic resources of the university. Основными задачами программы является следующее:

№	Name of the task	Terms of development	Stages of development
1	Creating conditions for obtaining a full-fledged, high-quality professional education	The entire period of study	Providing educational services for the development of professional skills
2	Formation of the main professional competencies of future specialists in hunting and animal husbandry	The entire period of study	Acquisition of professional competencies in the livestock industry
3	Creating prerequisites for independent search and research activities of the student within the framework of the experiment at all its stages	The entire period of study	Conducting search, research and experimental work in farms of various forms of ownership with which contracts have been concluded
4	The ability to work with scientific and technical information, use domestic and foreign experience in professional	The entire period of study	Analysis and processing of the results obtained in the conditions of the department

	activities, systematize and summarize the information received		
5	Consultations of employers and scientists of the Research Institute in the selection of relevant and practically significant topics of theses	Completion of undergraduate studies	Proposals from employers, interested parties and consultations of the heads of theses

5 Measures to reduce the impact of risks for EP: The following measures are used in the implementation of educational programs to reduce risks:

Possible risk	Risk minimization measures	Responsible persons and deadlines for implementation
External risks		
Refusal of heads of enterprises to conclude contracts for practical training of students	Development of an educational trajectory for a potential employer	The heads of the EP
High degree of competition in the educational services market	Increasing the attractiveness of educational programs in accordance with the requirements of the regional economy; - - improving customer feedback to increase the employment rate of graduates; - - creation of conditions for professional and career growth of the teaching staff of the EP; - involvement of the teaching staff with practical work experience.	The heads of the EP
Internal risks		
The outflow of personnel from the education and science system caused by insufficient wages in the industry	Combining teaching activities of teaching staff with participation in social, creative and scientific projects	Teaching staff - annually
Reducing the number of teaching staff who publish in international scientific journals	Motivation of teaching staff to publish articles in rating scientific publications : - allocation of a creative day for scientific work; - financial assistance for the publication of articles in prestigious rating publications	University management - annually
Lack of academic mobility of teaching staff	Cooperation of agricultural universities of the Republic of Kazakhstan in training specialists, exchange of experience in improving the	Teaching staff - annually

	effectiveness of educational programs. Learning English and attracting staff with knowledge of English	
Annual decrease in the number of students in the educational program	Activation of career guidance work among students of secondary education. Implementation of career guidance through well-known social networks	Teaching staff - annually
Insufficient provision of new educational and methodological literature in specialized disciplines.	To plan the annual release of scientific and educational literature by scientists and teaching staff of the department according to the working curriculum of students and their acquisition from outside.	Teaching staff - annually
Staffing of classrooms and laboratories with modern equipment	Creation of specialized classrooms and research laboratories.	Teaching staff - annually
Rejuvenation of teaching and scientific staff	Training of highly qualified scientific personnel through master's and doctoral studies (PhD) at the level of modern requirements.	Teaching staff - annually

6 Action plan for the development of the educational program.

The development plan of the educational institution and measures for the development of the educational institution were developed in accordance with the "Development Strategy of the Kazakh Agrotechnical Research University named after Saken Seifullin", meet the goals and objectives of the university and meet the needs of students in high-quality education in their chosen field of study and obtaining relevant qualifications and competencies.

Name of the target indicator	Performance indicator (unit of measurement)	Terms of implementation				Expected results
		2024	2025	2026	2027	
1. Improving academic performance						
1.1 Increase in the number of full-time students, including postgraduate education programs	Person	35 10	60 12	75 15	85 20	Analysis
1.2 Accreditation of EP in international agencies, including Kazakhstani (NAAR)	The number of EP	-	2 EP	2 EP	-	Certificate
1.3 Membership in international organizations	Unit	-	-	1	1	Certificates
1.4 NAAR Rating Results - Bachelor's degree	The place is not lower	3	1	1	1	Rating list

- Master's degree		1	1	1	1	
1.5 Results of the Atameken (Bachelor's Degree) rating	The place is not lower	3	2	1	1	Rating list
1.6 The proportion of students enrolled in various types of grants	% of the total number of students	90	90	95	95	Certificates, contracts
1.7 Implementation of double-degree education	Unit, year	+	-	+	+	Contract
1.8 The share of settled teaching staff from the total number of full-time teachers	%	71	73	73	74	Reference
1.9 Updating the databases of practices, conclusion of contracts for the passage of professional practice of students	Unit	29	35	40	45	The Agreement
1.10 % increase in graduate employment	%	85	90	95	95	«Atameken results»
2. Development of scientific and research potential						
2.1 Percentage of teaching staff publishing research results in CCSON journals	% from a full-time teaching staff	30	50	60	73	List of teaching staff
2.2 The share of teaching staff publishing in foreign, cited publications (Q1, Q2,Q3).		20	25	30	35	List of teaching staff
2.3 Participation in competitions for grant financing of scientific projects of the Ministry of Education and Science of the Republic of Kazakhstan, Ministry of Agriculture of the Republic of Kazakhstan	projects	3	5	7	9	The Agreement
2.4 Increase in the share of commercialized scientific developments from the total number of applied scientific research funded from the budget	projects	-	1	1	1	Commercialization agreements
2.5 Participation in competitions of young scientists from the total number of scientists and researchers engaged in research and development.	projects	1	1	2	1	The Agreement

2.6 The number of R&D and scientific and technical services financed from the funds of economic entities	Quantity	-	1	1	1	The Agreement
2.3 Number of valid patents of the Republic of Kazakhstan	Unit	1	2	3	3	List of patents
3. Improvement of infrastructure and material and technical base						
3.1 Preventive maintenance of the 5th floor of the 8th building, insulation of classrooms, replacement of window rubbers, renovation of the stand on the floor	%	-	+	-	-	Acts
3.2 Repair of the Anatomical Museum in the biotechnological building	%	-	+	-	-	Acts
4. International cooperation and internationalization						
4.1 Increase in the number of foreign scientists involved who have a high h-index;	Unit	-	1	1	2	Personnel orders
4.2 The proportion of international students studying in the EP at our university	%	-	-	1	2	Enrollment orders
4.3 Increase in the number of students and undergraduates studying within the framework of academic mobility (external mobility)	human	-	-	1	+	Orders
4.4 Increase in the number of teaching staff who have completed advanced training/internships abroad over the past 5 years	human	2	2	2	3	Certificates
4.5 The number of teaching staff in English, out of the total number of teaching staff;	human	3	3	4	5	Working curriculum
4.6 Share of the teaching staff participating in joint international projects	%	-	-	1	2	The Agreement

4.7 Ensuring internal mobility of students	%	1	2	2	2	Orders
4.8 Ensuring external mobility of teaching staff	%	5	10	10	15	Orders
4.9 Ensuring external mobility of students	%	10	20	30	40	Orders
4.10 The number of scholarship holders of Bolashak programs and foreign educational foundations.	Чел.	10	20	30	40	3-party agreements
5. Educational activities, social development and marketing.						
5.1 Percentage of students receiving social support	%	-	5	5	5	List
5.2 Percentage of students involved in sports sections	%	40	42	50	53	List of sections
5.3 Increase in the proportion of students engaged in volunteer activities from the total number of students enrolled in bachelor's degree programs	%	10	30	35	40	List
5.4 Percentage of students involved in the activities of student organizations, student clubs, youth affairs committees out of the total number of university students	Person	9	15	20	24	List

7. The mechanism of implementation of the EP development plan. The development of an EP development plan provides an integrated approach to the implementation of activities aimed at achieving the set goal through solving formulated specific tasks, and contributes to the full implementation of planned activities.

Monitoring of the implementation of the Development Plan is carried out by analyzing and summarizing information on the implementation of development indicators in the following areas. Based on the results of the monitoring of the Plan, we present a report on the implementation of the Development Plan. The report is compiled in any form, sent to the Dean of the Faculty and is the basis for compiling the annual report of the faculty within the framework of strategic indicators and results for evaluating the Development Strategy of the university as a whole.

When compiling the report, the following information will be reflected: 1) analysis and generalization of the information provided in the EP Development Plan; 2) on the degree of achievement of planned performance indicators (if there are deviations of actual results from planned ones, the reasons and factors that influenced the final results should be disclosed) and the activities carried out / planned to achieve key performance indicators 3) in case of revision of individual goals, objectives, activities, reallocation of resources, and the development of new approaches to

solving problems, information on them; 4) to improve the effectiveness of the implementation of the EP plan and proposals for making changes to the development plan; 5) the degree of influence on the implementation of the goals and objectives of the EP by external stakeholders.

The processes of formation, monitoring and implementation of the EP development plan are based on the principles of openness and transparency. The RP development plan should be posted on the official website of the university. Any interested persons have the right to familiarize themselves with the development plan and its interim results. The development plan of the educational institution and the progress of its implementation are discussed at meetings of departments, meetings of collegial bodies of the faculty, meetings with employers, open seminars, meetings with active students and other events.

The mechanism for implementing the development plan of the educational institution will be aimed at purposeful work to increase the number of students, increase the number of grants for bachelor's and master's degrees in the field of Biological and related Sciences. To implement the plan for the development of the educational program, the staff of the department will develop catalogs of elective disciplines with the direct participation of teachers, educational programs and disciplines of the university and elective components will be reviewed annually. Dual training will be implemented in research institutes, research institutes, organizations, higher educational institutions of the near and far abroad, leading scientists from the near and far abroad will be invited to conduct lectures and practical classes. The practice bases (production and research) will be expanded. During the organization of the Graduate Fair, employers from all spheres of various forms of economic entities and educational institutions from other regions of the Republic of Kazakhstan will be invited.

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