**KAZAKH NATIONAL AGRARIAN RESEARCH UNIVERSITY**

**EDUCATIONAL PROGRAM DEVELOPMENT PLAN**

**BIOTECHNOLOGY**

**FOR 2024-2028**

**Almaty, 2024**

**CONTENT**

|  |  |  |
| --- | --- | --- |
| No | . Name of component | Page |
| 1 | Passport of the educational program Development plan (EP) | 3 |
| 2 | Analytical justification of the program | 3 |
| 3 | Characteristics of the problems that the EP development plan aims to solve | 6 |
| 4 | Main goals and objectives of the EP development plan | 7 |
| 5 | Expected final results of the implementation of the EP development plan | 8 |
| 6 | Measures to reduce the impact of risks for the EP | 9 |
| 7 | List of activities of the OP implementation plan | 10 |
| 8 | Mechanism for implementing the OP development plan | 10 |
| 9 | Assessment of socio-economic efficiency of implementing  the OP development plan | 11 |
| 10 | SWOTanalysis | 12 |
| 11 | Graduate model | 12 |

1. **PASSPORT OF THE EDUCATIONAL PROGRAM DEVELOPMENT PLAN**

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| --- | --- | --- |
| 1 | Grounds for development of the OP development plan The | strategy and subject matter of the OP development plan was created on the basis of a request from employers in accordanceи with the educational policy of the Republic of Kazakhstan, the strategic development plan of the Department "Technology and Food Safety" withtheией developmentstrategy of the NAO "Kazakhийstrategy of the Kazakh Nationalый аграрнAgrarian Research Universityий Agrarian Research University NAO 2020-2024. |
| 2 | Main developers of the OP development Plan | Head of the department, PhD, Professor Kulataev B.T.,  M.Sc., senior lecturer Valieva G. A.  *Employers:*  General Director of RSE na PHV "Institute of Biology and Biotechnology of Plants" KN MNVO RK K. Zhambakin  General Director of RSE na PHV "Institute of Biology and Biotechnology of Plants" KN M NVO RK K. Zhambakin General Director of RSE na PHV "Institute of Biology and Biotechnology of Plants" KN M NVO RKdirector of Kun-Nury LLP D. N. Sharifkanov  Student Bektenova Ayazhan  Master's student Kujieva Zhanat  Graduate Ayazbay Lyazzat |
| 3 | Terms of implementation of the development plan of the OP | 2020 - 2024years. |
| 4 | Scope and sources of financing | State budget and contractual basis. |
| 5 | Expected final results of the implementation of the development plan of the OP | - ptraining of highly qualified biotechnologists with professional skills in developing a methodology for obtaining drugs and products for the agro-industrial complex;  - improving the quality of education;  - promoting employmentamong graduates. |

1. ****ANALYTICAL JUSTIFICATION OF THE PROGRAM****

***2.1 Information about the educational program***

The content of the educational program is established by the following documents:

License for conducting educational activities

* KZ42LAA00006720 25 March 2016 years.Appendix No. 009, dated 27.03.2019 (Bachelor's degree), Appendix No. 010, dated 05.07.2019 (Master's degree); KZ89LAA00031870 dated 05.08.2021 (No. 006 26.01.2022), ACQUIN 27.09.2021-30.09.2028 w.
* State mandatory standard of education for all levels of education. (Order of the Minister of Education and Science of the Republic of Kazakhstan No. 604 dated October 31, 2018. Registered with the Ministry of Justice of the Republic of Kazakhstan No. 17669 on November 1, 2018)

Undergraduate educational образовательнtrajectory траектория: No. 1 "Biotechnology"

In the master's program (scientific and pedagogical and specialized areasе) educational trajectory No. 1 "Biotechnology"

***2.2 Information about students***

The student body is shown in table 1.

Table 1-The number of students enrolled in the OP

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Academic  year | 6B05102-  Biotechnology | | | | | 7M05102-  Biotechnology | | | | |
| total | including | | | | total | including | | | |
| kaz | English /Russian | grant | agreement. | kaz | rus | grant | agreement. |
| 2017-2018 | 147 | 130 | 17 | 85 | 62 | 19 | 15 | 4 | 19 | 0 |
| 2018-2019 | 123 | 102 | 21 | 119 | 4 | 15 | 15 | 0 | 15 | 0 |
| 2019-2020 | 185 | 164 | 21 | 143 | 42 | 35 | 35 | 0 | 35 | 0 |
| 2020-2021 | 144 | 118 | 26 | 113 | 31 | 14 | 14 | 0 | 14 | 0 |
| 2021-2022 | 133 | 113 | 20 | 115 | 18 | 10 | 7 | 0 | 7 | 3 |
| 2022-2023 | 107 | 93 | 14 | 81 | 26 | 16 | 14 | 0 | 14 | 2 |
| 2023-2024 | 86 | 85 | 0 | 80 | 3 | 7 | 7 | 0 | 7 | 0 |

***2.3 Internal conditions for OP development***

For the preparation of bachelor's and master's students, the department has modern teaching and laboratory rooms, technical training facilities, visual and demonstration materials.

The Department has equipped with 4 training laboratories and 1 teaching and research laboratories, lecture halls equipped with modern TSO: pH-meter pH-150МИ, anemometer with heated wire PCE-423 analyzers ScalarSAN++ and Primax, TSdigital microscope Motic DM111, prebar for determination of somatic cells in milk Somatos Mini, Rrefraktometr, doscillator, Rtatiany evaporator pRibar Soxhlet, prebar for distillation, Centrifuge the laboratory, bAnya water RE, psudomoina machine, bAnya water GIZY, termostat the air, øcaf metal double, withtol chemical with a shelf, withuchylny wardrobe, intainoi wardrobewithtol instrument, withtol title, xolodilnik, withtol sink, executor, mupalny oven Systec DB -23-1, withspectrophotometer, Centrifuge the milkinESY analytical, mmikroskop, Refractometer IRF-454 B2M, laboratory scales, withspectrophotometer Jenway, drying Cabinet, inibrational shaker tubes a field spectrophotometer, pH meter, ionAnd ometry-160, calorimetry COKE, wardrobe metal wardrobe, as well as other devices and equipment, fromacademic labs are equipped with exhaust hoods.

The sanitary condition of the classroom, laboratories, and classrooms complies with the required regulatory documents. A passport is drawn up for each audience, indicatingм the number of seats, the number of inventory items, and the occupied area.

For persons with disabilities, access to traffic routes is provided, stairs are duplicated with ramps and a lifting device, and toilet cabins are provided. Special attention isя paid to computer typhlotechnologies.

Provision of educational programs with educational and methodical complexes of disciplines is 100%.

The teaching staff of the department has personal computers and free Internet access.

One of the tasks of the Department " Zooengineering and biotechnology " is to develop a joint educational program with leading universities, the implementation of which is aimed at integration into the international science-based space through academic exchange of teachers and students. The implementation of academic mobility is carried out with such universities as: University of Malaysia Pahang, Moscowм Stateм Universityof Food Production (ФRF). Foreign scientistsетare developing an educational and methodical complex of disciplines in English (Waginingen).

Mobilise practitioners to the learning process, integrate theory with practice, and help graduates quickly adapt to the professional environment.

2.4 Characteristics of the surrounding society

The priority direction in the development of the educational program is training focused on the student's personality, revealing his individual abilities, forming the student into an active and interested participant in the educational process.

The basis of the educational environment is its social component, in relation to the OP, the traditions and image of KazNAU, mutual responsibility, moral and emotional climate; social support for students, extracurricular activities (creative teams, sports sections, scientific communities, etc.). One of the key components is also the intellectual and developmental environment: modern technologies of developing learning (interactive teaching methods), a system of electives (business games, excursions), a system of elective courses in various areas of educational programs for acquiring knowledge on a particular topic, a system of intellectual competitions of various levels (subject and inter-subject Olympiads, competitions, tournaments, intellectual marathons, games, etc.), a support system for gifted students.

All components of the structure of the educational environment are open, there is an opportunity to realize oneself, which leads to an increase in motivation for learning activities, develops communication skills.

2.5 Information about the teaching staff implementing the OP

Currently, 16 teachers work at the department: 4 doctors of Sciences, 7 candidates of Sciences, 2 PhD doctors and 3 masters. The settlement rate is 80%. Currently, 16 teachers work at the department: 4 doctors of Sciences, 7 candidates of Sciences, 2 PhD doctors and 3 masters. The settlement rate is 80%.

Employees of the department have the opportunity to improve their skills in leading research centers of the Republic of Kazakhstan and abroad. In recent years, teachers have completed internships in foreign universities: Professor Kaimbaeva L. A.. "Federal Research Center for Food Systems named after V. M. Gorbatov" of the Russian Academy of Sciences(Russia), ass.professor Kozykan S Agrotechnical University (China).

At the department, the teachers of the Department "safety of food products", "safety of human health" M. K. Kozhakhmetov "innovative technologies of khlebobular, pasta and confectionery products" L. A. Mamaeva, G. K. Iskakova; "fundamentals of Agronomy (part I, Part II), "Agriculture (part I, II" myrzabek K. M. "methods of examination of food products", "food products:quality and safety" "metrological supervision", "International Standardization and certification", duisenbekova O. O.; Учebnoe Posobie "accreditation of SZ and SRO in the field of application".

The faculty publishes scientific articles not only in industry journals of the Republic of Kazakhstan, but also in journals with an impact factor входincluded in the WebofScience and Scopus databases.

***2.6 Characteristics of the OP's achievements***

The achievements of the educational program include training targeted specialists, scientific and pedagogical personnel and conducting scientific research on the basis of concluded contracts with specialized research institutes and LLP. These are such organizations as KazNII of the Food Processing Industry LLP, RSE na PHV "Institute of Plant Biology and Biotechnology".

Completed the following research projects:

1. "Modernization of production processes of functional products based on cow's milk" - competition for grant financing of projects for commercialization of the results of scientific and (or) scientific and technical activities in JSC "Science Foundation" of the Science Committee Implementation of project 0337-17-GC. No. 11 dated 03.12.17-GC. (supervisor: A. D. Serikbayeva)

2. "Development of technologies using new strains of beneficial microorganisms, enzymes, nutrients, etc. components in the production of special dietary food productsи (head Serikbayeva A.D., Ministry ofAgriculture of the Republic of Kazakhstan, PCF).

3. Development of technologies for processing agricultural rawmaterials using Halal standards (head: Serikbayeva A.D., Ministry ofAgriculture of the Republic of Kazakhstan, PCF)

4. "Justification of organizational and economic conditions of production and formation of an export-oriented organic market" (program manager Serikbayeva A.D., Ministry ofAgriculture of the Republic of Kazakhstan, PCF).

5. "Scientific bases of medicinal properties of mare's milk and koumiss" (head Serikbayeva A.D., Ministry ofAgriculture of the Republic of Kazakhstan, PCF).

6. "Increasing the conversion of nutrients and the productive effect of feed in dairy cattle breeding with the addition of dietary supplements based on buckthorn buckthorn" (head Mamaeva L..A., Ministry of Agriculture of the Republic of Kazakhstan, PCF).

7. " Development of technology of meat gerodietic products enriched with biologically active ingredients from secondary meat raw materials "(head Kaimbaeva L. A., Ministry of Agriculture of the Republic of Kazakhstan, PCF).

**3.CHARACTERISTICS OF THE PROBLEMS THAT THE OP DEVELOPMENT PLAN IS AIMED AT SOLVING, AND JUSTIFICATION FOR THE NEED TO SOLVE THEM**

The difference and uniqueness of this OP is that there is a good material and technical base that meets modern requirements. These are the availability of specialized laboratories, the availability of highly qualified scientific and pedagogical staff (the staff retention rate is 51 %, the availability of joint educational programs (double degree programs); the possibility of obtaining an international diploma, the presenceof representatives of production in the teaching staff, affordable training costs, and the availability of training paths that are in demand on the labor market.

|  |  |  |
| --- | --- | --- |
| **Criteria** | **Problem** | **Analysis of the causes of** |
| education content | Low proportion of teachers who implement specialized disciplines in foreign languages | -strengthening the language training of teaching staff by mandatory attendance of foreign language courses created both at the university and outside it. |
| Organization of the educational-process and technology of training | -a low proportion ofonline courses in the disciplines of higher and postgraduate education curricula | Creating an innovative educational environment by involvingteachers in the development of online courses. |
| Low proportion of international students. | Development of partnership relations with universities of far and near abroad, advertising of educational programs through social networks. |
| Content, planning and conducting research | Low number of publications of university scientists in journals included inrating foreign journals | Involvement of students, undergraduates, doctoral students and young scientists in researchactivitieswith subsequent publication of research results in foreign scientific publications with a non-zero impact factor; |
| Advanced training of teaching | staff Low proportion of teachers who have completed international internships | * planning of internships for undergraduates and doctoralstudents in leading foreign universities; * training of doctoral and master students in partnership with leading foreign universities. |

**4. MAIN GOALS AND OBJECTIVES OF THE DEVELOPMENT PLAN WITH INDICATION OF TERMS AND STAGES OF ITS DEVELOPMENT**

The development plan of the educational program "Biotechnology "was developed in accordance with the Development Program of the NAO" Kazakh National Agrarian Research University".

The goals and objectives of the educational program are formulated taking into account the requirements and requests of potential consumers, and based on the assessment of the demand for the educational program, which are determined by the interests of potential employers, applicants, the potential of the university, the requirements of the state and society as a whole. The educational program "Biotechnology" is focused on training competitive specialists in the food industry, public catering, educational institutions and scientific organizations based on the integration of education, research and production.

***Main goals and objectives***

|  |  |  |
| --- | --- | --- |
| 1. | Training of highly sought-after personnel with higher and postgraduate education who meet the needs of the domestic and foreign labor market | Planning the work of the department in accordance with the criteria and requirements for assessing the quality of education of state and international accreditation centers (NCAOKO, NAAR, ACQUIN,RPA) |
| 2. | Interaction of the university with employers to assess the competencies of university graduates, satisfaction with the quality of graduate training | - involvement of employers in the development and implementation of the educational program;  - conclusion of contracts for conducting practical classes on the basis of leading food enterprises;  - increase in the share of dual training system (up to 3-4 disciplines up23 to 2023 years) at the leading enterprises of the food industry. |
| 3. | Graduationof competitiveспособных specialists with proficiency in a professional foreign language | - an increase in the proportion of students studying for at least one semester in foreign universities in a foreign language (from 5 to 10 to 202.33 years);  - study of a foreign language by teaching staff of the department;  - participation in international competitions for language internships of teaching staff abroad. |
| 4. | Increase of research potential | : - active participation of scientists in state competitions for grant funding of research projects;  - involvement of students in research activities with subsequent publication of research results in foreign scientific publications with a non-zero impact factor |

**5EXPECTED FINAL RESULTS OF THE IMPLEMENTATION OF THE DEVELOPMENT PLAN OF THE OP**

- improving the quality of educational programs and improving the content and technologies of training and education;

- updated content of the OP, taking into account the proposals of employers and the demand of the domestic and global labor market;

- involvement of students in jointresearchprojects of the university, department;

- пtraining graduates with deep theoretical knowledge and practical skills in their professional activities;

- positive assessment of the content of the OP by employers and students.

- high demand for graduates of the specialty in the labor market, employment.

***Quantitative and qualitative expression of expected results***

***развития OP development***

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **n /** | **a Target**  **indicators** | **Units of change** | **Current plan,**  **2019** | **As planned** | | | | |
| **2020** | **2021** | **2022** | **2023** | **2024** |
| 1 | Average annual number of bachelor's degree students | ed | 123 | 130 | 150 | 160 | 200 | 250 |
| 2 | Average Annual number of Master's degree students | ed | 35 | 40 | 45 | 50 | 55 | 60 |
| 3 | Number of graduates of KazNAAndU who continued their studies  - in the master  's program-in the doctoral program PhD | ed | -  12  2 | 2 | 3 | 1 | 2-4 | - |
| 4 | High-quality academic performance of students (the share of students studying for "good and excellent")  - bachelor  's degree - master  's degree-doctoral program PhD | % | Bachelor's degree:  85%  Master's Degree program:  86% | 100% | 9  5 | 17  4 | 4  2 | 14  5 |
| 5 | Percentage of employed graduates in the first year after graduation:  - Bachelor  's degree - Master  's degree - Doctoral program PhD | % | 2019-2020 -50% | 100% | 100% | 100% | 100% | 100% |
| 6 | Percentage of full-time teaching staff with academic degrees and titles | % | 51% | 100% | 100% | 100% | 100% | 100% |
| 7 | Number of attracted teaching staff from abroad | people | 1.Rui Costa | 1 | 1 | 2 | 2 | 3 |
| 8 | Proportion of teachers who completed advanced training | % | 100% | 100% | 100% | 100% | 100% | 100% |
| 9 | The number of joint educational programs developed with the participation of foreign universities:  - Bachelor  's degree - Master  's degree - doctoral | degree PhD | .- | - | - | - | - | - |
| 10 | Number of basic and profiler programs disciplines in English  -bachelor  's degree-master | 's degree ed | 19 | 20 | 21 | 22 | 22 | 25 |
| 11 | Share of undergraduates and doctoral students who have completed scientific training in foreign universities and research institutes | ed | - | 1 | 2 | 3 | 3 | 4 |
| 12 | Percentage of students who have studied abroad for at least one academic period for the entire period of study  -Bachelor  's degree - Master  's degree-doctoral degree PhD | % | 0.6% | 0.7 | 0.8 | 2 | 2 | 3 |

**6MEASURES TO REDUCE THE IMPACT OF RISKS FOR THE OP**

The successful implementation of an educational program may be affected by various types of risks, and as a result, preventive measures have been developed toreduce them:

* Create favorable conditions for teaching staff to work. Release the teaching staff from additional workloads.
* Development of a comprehensive career guidance plan for schools and colleges in Almaty and other regions. Active work in social networks. Organization of joint scientific and educational work with students, including conducting masterclasses in schools and colleges;
* attracting a contingent of students on a fee-based contractual basis;
* step up the work of teaching staff to develop e-learning publications in the state language and introduce them into the educational process;
* step up efforts to improve the skills of teaching staff in research institutes and Universities of non-CIS countries for the implementation of academic mobility;
* take an active part of the teaching staff in competitions announced by the Ministries of the Republic of Kazakhstan and international organizations for receiving grants for funded research projects;
* timely scheduled purchase of modern equipment and constant replenishment of the fleet of devices and tools;
* Conclusion of contracts with leading enterprises of the industry for internships/internships and further employment (with prologation).

**7 LIST OF ACTIONS OF THE OP IMPLEMENTATION PLAN**

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| --- | --- | --- |
| # | Activities | Deadlines  Implementation timeline |
|  | Improvement of bachelor's and master's degree programs, taking into account the opinion of potential employers | 2024-2028 |
|  | Drawing up a plan for publishing textbooks, manuals and methodological recommendations for educational programs | 2024-2028 |
|  | Active implementation of academic mobility of students and PPFrom | 2024-2028 |
|  | Expanding scientific cooperation and partnerships with leading foreign universities and research centers, attracting leading foreign scientists to conduct research and give lectures for students | 2024-2028 |
|  | Equipping classrooms with modern equipment | 2024-2028 |
|  | Submitting applications for a competition on scientific projects of the Ministry of Agriculture, Ministry of Education and Science of the Republic of Kazakhstan, etc. | 2024-2028 |
|  | Publication of scientific articles in journals included in the WebofScience and Scopus databasesthe WebofScience and Scopus databases, in scientific journals with an impact factor | 2024-2028 |
|  | Passing independent national specialized accreditation for OP 6B05102, 7M05102-Biotechnology | 2025 |
|  | Participation in the national rating of OP among the universities of the Republic of Kazakhstan | students annually |
|  | prepare and participate in the Republican subject Olympiads on OP 6B05102-Biotechnology | 2024-2028 |
|  | Conclude contracts with specialized enterprises to complete industrial and research internships for students | 2024-2028 |
|  | Update the material and technical base of laboratories | 2024-2028 |
|  | Step up cooperation with foreign educational organizations to harmonize modules and to the development and implementation of joint educational programs | 2024-2028 |
|  | ПContinuous monitorPermanent monitor ing employment of graduates | 2024-2028 |

**8 MECHANISM FOR IMPLEMENTING THE DEVELOPMENT PLAN OF THE OP**

Carry out targeted work to increase the number of state educational grants, grants from local executive bodies, grants from employers under the educational program based on career guidance among school and college graduates.

Ensuring a high proportion of employed graduates by organizing and holding an annual "Graduate Fair", employers ' participation in the defense of the thesis, organizing professional practice with subsequent employment.

Strengthening the language training of teaching staff by compulsory attendance of foreign language courses created both at the university and outside it. A plan has been drawn up for improving language competence, as well as a step-by-step transition to multilingual education.

Implementation of innovative and investment projects with research centers and institutes, representatives of business structures, increasing the number of patents received.

Increase in the number of research projects implemented with funds received from the state budget, research funds, grants, contracts with external customers.

Teaching staff and students must participate in the international educational program of the President of the Republic of Kazakhstan "Bolashak", participate in a competition for grants for a trip to participate in a scientific conference (seminar, congress, congress), a scientific internship from the funds of the First President of the Republic of Kazakhstan, in the international program Erasmus+. in the DAAD scholarship program.

Optimization and expansion of the range of bachelor's, master's and doctoral degrees, increasing the number of magistrates in specialized, scientific and pedagogical areas in accordance with the requirements of the labor market.

Preparation ofstudents for participation in scientific conferences of intra-university and extra-university scale.

**9 ASSESSMENT OF THE SOCIO-ECONOMIC EFFICIENCY OF THE IMPLEMENTATION OF THE DEVELOPMENT PLAN OF THE OP**

The tasks set reflect the main directions of development of higher education in the Republic of Kazakhstan and allow us to maintain a decent level of image of our university.

The implementation of the Program will help to improve the quality of education and ensure access to quality education. Professional competencies will be formed within the framework of educational programs developed in accordancewith the requirements of employers.

As a result of theimplementationand development plan, the OP has a socio-economic effect:

- preventing the outflow of promising teaching staff to other industries;

-improving the quality of professional education and, as a result, the competitiveness of specialists;

- training of graduates who meet the needs of potential employers;

- updating of the educational and material base (educational and laboratory, computer and technological base that meetsmodern requirements and standards);

- the demand for graduates through the new infrastructure of real interaction withemployers – boards of trustees, andthe association of graduates;

- increasing the role of employers in the training of professional personnel;

- discussion of problems of employment of graduates, creation of bases of practices, branches of departments at enterprises, advanced training of teaching staff, lectures for students and teaching staff by leading specialists, organization of excursions to enterprises;

- timely identification and targeted supervision of the most active, talented, creatively thinking young people among 1-2-year students;

-internship and training of teaching staff in leading scientific centers of Kazakhstan, near and far abroad;

- реализовыватьсяthe main directions of state programs for the development of higher education will be implemented.

**10 SWOT analysis**

|  |  |
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| **S (strength) – strengths**  - qualitative composition of teaching staff, with a 51% retention rate;  - performance of research work by employees under the budget program;  - participation of students, undergraduates anddoctoralstudents in research work;  - conducting laboratory research on a free basis; | **W (weakness – - weaknesses**  -high academic workload of teaching staff;  - weak communication with foreign universities oninternships;  - insufficient level of knowledge of the English language of students and teachingstaff. |
| **O (opportunity) – favorable opportunities**  - a noticeable increase in the number of students at all levels;  - availability of contracts with research-institutes for-training and production practices of studentsand undergraduates; | **T (threat – - threats**  -competition in attracting teachers and students;  - aboutthe flow of young people and school leavers abroad. |

**GRADUATE MODEL**

|  |  |  |
| --- | --- | --- |
|  | 6В05102-"Biotechnology" | 7М05102-"Biotechnology" |
| be able to: | - memorize the structural organization and functions of cells of living organisms: microorgasma (bacteria, viruses, yeast, etc.), plants, animals (domestic and wild) and humans.  - to compare the main types of biotechnological products and the principles of their production, methods of developing measures to improve the economic and production indicators of the biotechnological process, ways to ensure the economic efficiency of production and obtain a product of the desired quality;  - to solve theoretical and practical modules of molecular biology, microbiology, biochemistry, genetics, and virology, the student must evaluate the regularity and correctly apply in yeast production, the composition of microflora and the features of the production of biotechnological processes; | - to collect information from various agricultural facilities, process the received primary information by implementing analytical and communication skills;  - design and develop various components of information systems;  - design and administration of databases of information systems;  - to support information, software, technical, organizational and legal support of information systems and their elements;  - to develop requirements and specifications of individual components of professional activities based on the analysis of user requests, domain models and capabilities of technical means;  - have the ability to search, critically analyze, generalize and systematize scientific information, to set research goals and choose the best ways and methods to achieve them. |
| To know and understand: | - - methods of isolation and study of production-valuable microorganisms used in biotechnological production; - to assess the level of digital technology in various industries and in the agro-industrial complex as a whole; - to evaluate material and human resources, as well as reasonable forecasting of the development of digital technology in the agro-industrial complex using best practices; - objectively assess the situation of food production in the agro-industrial complex and identify relevant areas of development; - skills in using modern computer control systems for technological process in food production; - skills in the management of food production technology, as well as the operation of equipment based on information technology; - to analyze technical and economic indicators and marketing activities. | - objectively assess the level of digital technology in various industries and in the agro-industrial complex as a whole;  - to evaluate material and personnel support, as well as reasonable forecasting of the development of digital technology in the agro-industrial complex using best practices;  - objectively assess the situation of food production in the agro-industrial complex and identify relevant areas of development;  -analyze and evaluate promising areas of digital technology development for agricultural enterprises; - skills in using modern computer process control systems in food production;  - skills in managing food production technology, as well as equipment operation, based on information technology;  - to analyze technical and economic indicators and marketing activities;  - skills in working with ISO documents, HACCP. |
| Be competent in matters of: | be able to form general cultural, general professional and professional competencies;  - be competent in all matters related to modern biotechnological processes: production of biotechnological products, selection of microorganisms, plants and animals to solve various production and technological tasks | -in matters of labor legislation, norms and rules of labor protection and environmental safety, industrial sanitation and fire protection, the use of legislative and regulatory acts of the Republic of Kazakhstan in force in the food industry; to know the normative documents regulating the safety of food products;  - apply specialized research methods in the professional field and present them to the scientific community for consideration and further discussion at conferences. |