«KAZAKH NATIONAL AGRARIAN RESEARCH UNIVERSITY»
Non-commercial joint-stock company

EDUCATIONAL PROGRAM DEVELOPMENT PLAN
6B05103 - BIOENGINEERING

2024-2028

Recommended by the Academic Committee
of the Faculty of Agrobiology
Protocol №10 dated 24.05.2024
Rewiewed at the extended meeting of the
Department of Agronomy, breeding and
biotechnology
Protocol №11 dated 10.06.2024

Almaty, 2024

CONTENT

1. Passport development plan for the educational program «6B05103 - Bioengineering» on 2024-2028

1	Reasons for developing a development plan for the EP	Strategy and themes of the development plan of the EP created based on the request of employers in accordance with the educational policy of the Republic of Kazakhstan, the Development Strategy of the Kazakh National Agrarian Research University for 2024-2028 development of the Kazakh National Agrarian Research University 2024-2028
2	The main developers of the development plan of the EP	Urazaliev K.R. k.b.s., assoc. professor Bayadilova G. Associate Professor Baiseitova G.A. PhD, senior lecturer Employer: General Director «Institute of Plant Biology and Biotechnology» of the Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan K.Zh. Zhambakin
3	Deadlines for the implementation of the development plan of the EP	2024 – 2028
4	Volume and sources of the development plan of the EP	State budget and contractual basis of financing
5	Expected final results of the implementation of the development plan of the EP	To prepare undergraduate bioinformaticians with skills in using information technology in their professional activities in biological sciences, annotating genomic sequences, conducting genome analysis, assessing biodiversity and the basics of computational biology.
6	The number of appendix to the licenses for the training direction	KZ89LAA00031870 on August 05, 2021, with changes and updates KZ69LAM00001188 04 March 2025
7	Accreditation of EP The name of the accreditation body The period of accreditation validity	

2. Analytical justification programs

2.1. Information about the educational program.

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

Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 №2;

Classifier of training programs for personnel with higher and post-graduate education. Order of the Minister of Education and Science of the Republic of Kazakhstan of October 13, 2018 № 569;

Standard Rules for the activities of educational organizations implementing educational programs of higher and (or) postgraduate education. Order of the Minister of Education and Science of the Republic of Kazakhstan of October 30, 2018 № 595;

Rules of the organization of the educational process on credit technology of training. Order of the Minister of Education and Science of the Republic of Kazakhstan dated 12.10.2018 № 563;

Algorithm of inclusion and exclusion of educational programs in the Register of educational programs of higher and postgraduate education. Order of the Minister of Education and Science of the Republic of Kazakhstan № 665 dated December 4, 2018;

Order № 106 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated October 12, 2022. Rules for keeping the register of educational programs, implemented by the organizations of higher and (or) postgraduate education, as well as the grounds for inclusion in the register of educational programs and exclusion from it

Professional Standard: http://atameken.kz/

1. Professional standard «Yeast production» Appendix № 44 to the order of the Deputy Chairman of the Board of the National chamber of entrepreneurs of Kazakhstan «Atameken» from 26.12.2019 №263.

Atlas of new professions:

1. Biotechnologist in the field of synthetic biology
https://www.enbek.kz/atlas/profession/226
2. Technologist of innovative biopreparations
https://www.enbek.kz/atlas/profession/213
3. Biotechnologist-microbiologist of aquatic systems
https://www.enbek.kz/atlas/profession/210

The goal of the educational program «6B05103 – Bioengineering» - educating of competitive, qualified bioengineers and biotechnologists for biological and related branches of science and production. Formation of students' understanding of the possibilities of using biological systems and technologies for economic, medical and other purposes. Training of a specialist who is ready to solve his professional tasks in the field of bioengineering and biotechnology, based on knowledge of the basic structures of biomacromolecules, bioengineered structures and biotechnological processes.

It is intended for the implementation of bachelor's education under the educational program «6B05103-Bioengineering» in the NPJSC «Kazakh National Agrarian Research University»

2.2. Information about students.

Currently, 10 students from Turkmenistan are studying under the educational program "6B05103 – Bioengineering" in the second year (on a fee basis) and 6 students in the first year.

2.3. Internal conditions for the development of the EP.

To achieve the above-mentioned goal of the educational program, the faculty has the appropriate material and technical resources;

- lecture halls equipped with computers with installed software and a projector for demonstrating presentations;
- classrooms for practical classes, which include computer labs with installed software and access to the Internet for disciplines conducted in computer labs;
- multimedia classrooms for conducting foreign language classes;
- for students to complete independent study work - access to electronic teaching aids, methodological recommendations for writing term papers and theses;
- for students to conduct research work, the graduation department has all the necessary equipment and reagents;
- The financial resources of the educational program are provided by the university budget, as well as by research and international scientific and educational projects;
- information resources are at the disposal of the educational institution and are represented by a library (including electronic publications), access for all students and the educational institution to the Internet, computer software, etc.;
- the staff is fully staffed, in accordance with the development plan of the EP;
- the material and technical base meets the requirements of the State Standard.

Educational and methodological documents for the specialty have been developed in accordance with existing regulatory documents such as state compulsory educational standards, standard curricula for the specialty, working curricula, academic calendars, catalogs of elective disciplines, and teaching and methodological complexes for all areas of study have been developed.

The direction of preparation of diploma theses corresponds to the subject of scientific research of the department (initiative topics of scientific research). Particular attention is paid to such issues as increasing the degree level of the teaching staff, their completion of advanced training courses in domestic universities, in universities of the near and far abroad, and research institutions.

2.4. Characteristics of the surrounding society

The University has created conditions for the implementation of practical training: programs have been developed, the content of which corresponds to the goals and objectives of training specialists; long-term and short-term contracts for conducting practical training have been concluded; during the practical training, the managers from the University and the practice base provide ongoing consultation to the student, guide, and help to conduct professional activities; upon completion, the students' reporting documentation is collected and analyzed; work is carried out to summarize the results of the practical training together with the approved composition of the commission; the students pass the test based on the results of the practical training in accordance with the established procedure. The final assessment for the practical training is determined as the assessment of the practical training manager from the enterprise 100% and the assessment of the practical training manager from the department upon the defense of the report.

The result of satisfaction of students, faculty and employers with places, conditions and content of practices, as well as the level of students and teachers is the opinion and feedback of organizations providing bases for undergoing practices. After completing a certain type of practice, a survey of students is conducted with the chain of identifying the assessment of students' satisfaction with places and organization of undergoing practice, and a survey of the heads of practice bases is also conducted in order to assess satisfaction with the level of training of students.

Monitoring of the internship and tracking of its organization quality is carried out by the Department of Agronomy, Selection and Biotechnology and the Department of Internship and Employment. As a result of monitoring, the Department of Internship and Employment and the Department formulate recommendations for improving the organization of the internship.

The practice bases for the educational program «6B05103 - Bioengineering» are: «Institute of Plant Biology and Biotechnology», JSC «Kazakh Research Institute of Agriculture and Plant Growing», «Kazakh Research Institute of Animal Husbandry and Forage Production».

2.5 . Information about the teaching staff implementing the educational program.

The implementation of the bachelor's degree program in the direction is provided by scientific and pedagogical staff in accordance with the requirements of the State Educational Standard of the Republic of Kazakhstan. The list of scientific and pedagogical workers involved in the implementation of this program is presented in the certificate on the staffing of the educational process and staffing.

Qualitative and quantitative composition of the department's teachers:

For the current academic year 2025-2026, the Department of Agronomy, Breeding and Biotechnology employs 23 teaching staff, the percentage of settling down is 82.2%, of which: doctors of sciences – 2 people, candidates of Sciences – 13, PhD – 4, masters – 4.

The teaching staff takes refresher courses every year, which affects the quality of the educational content.

Employment of graduates of "6B05103 - Bioengineering " - these are the first recruitments according to the УР, in connection with this, there has not been a graduation yet.

The department's teaching staff works towards developing academic mobility, attracting the best foreign teachers, and conducting joint research in the implementation of the EP «6B05103 - Bioengineering»

All professional information regarding the PPS is available and posted on the KazNARU website at the following address:
https://www.kaznaru.edu.kz/en/department/81

2.6 Characteristics of the achievements of the EP

The educational program "6B05103 – Bioengineering" is implemented in accordance with modern labor market requirements, trends in the development of science and technology, as well as the strategic goals of the university to ensure the quality of training of competitive specialists.

1. Scientific research activities. The department conducts scientific research on initiative and applied topics reflecting current trends in the development of bioengineering. Students are actively involved in scientific projects, which contributes to the formation of their research competencies and practical skills in conducting experiments, analyzing data and processing scientific results. The topics of student's term papers, theses, and research projects are consistent with the priorities of the cathedral's research, including biotechnology, cellular engineering, genetic methods, and environmental safety. The results of students' scientific papers are presented at student conferences, competitions, and also published in scientific collections and journals.

2. Improving the content of the educational program. Taking into account the analysis of the requirements of the labor market and at the suggestion of employers, new disciplines are regularly introduced into work curricula and catalogs of elective subjects aimed at developing the practice-oriented and research competencies of students. This flexibility and adaptability of the program ensures its relevance and compliance with modern professional standards.

3. Interaction with employers. Employers take an active part in shaping the content of the educational program, conducting production practices, as well as evaluating the final competencies of graduates. Joint work with biotechnological enterprises helps to strengthen the practical component of training and increase the level of employment of graduates.

4. Achievements of the teaching staff. The faculty of the department is actively engaged in research and methodological activities, publishes teaching manuals and monographs, participates in grant projects and international conferences. Teachers are introducing modern learning technologies, including elements of dual and mixed formats, as well as digital educational resources.

5. Development of academic mobility and international cooperation. The program implements activities for academic mobility of students and teachers, organizes scientific internships and experience exchange with foreign partners. The involvement of foreign scientists in lectures and master classes contributes to the improvement of the academic level of the program and the expansion of international relations.

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

Today the department faces the following problems:

Insufficient proficiency of students and teaching staff in professional English.

Insufficient mobility and motivation of teaching staff to use innovative teaching methods.

4. The main goals and objectives of the development plan of the EP.

The main goal of the educational program development plan is to improve it in accordance with the vision, mission and strategies of the university aimed at developing competitive bioengineering personnel in demand in the bioengineering industries and fields of Kazakhstan and in the global scientific and educational space, as well as for the development of a socially oriented, highly cultured and competent personality.

To achieve the goal, it is necessary to solve the following tasks:

No.	Task name	Event
1	Improving and improving the conditions for obtaining a full-fledged, high-quality professional education	Development of measures to improve educational services for the formation of professional competencies and skills
2	Involvement in the process of improving the educational program, determining the professional competencies of the graduate, preparing educational and methodological support for the disciplines proposed by the employer	When updating the content of the EP, include disciplines that meet the needs of the labor market, recommended by employers
3	Establishing strong ties with foreign partners for the purpose of implementing joint scientific and publishing educational and methodological literature	Implementation of joint scientific research and publication of educational and methodological literature
4	Providing conditions for independent research activities of the student within the framework of conducting research work throughout the entire training process	Inclusion of research work in the EP for the purpose of its development and improvement
5	Organization of consultations for employers and scientists of research institutes in choosing relevant and practically significant topics for diploma theses, conducting student research in the leading research institutes of the republic	Creation of a list of relevant and practically significant topics taking into account proposals from employers and scientists of the research institutes

To achieve the goal, it is necessary to solve the following tasks:

a. Creation of an innovative educational environment;
b. Expansion of the educational space;
c. Attracting talented young people to scientific work;
d. Development of multilingual education with the aim of expanding the range of languages studied;
e. Development of human resources;
f. Development of a system for improving the qualifications of teaching staff;
g. Expansion of international cooperation between the university and universities in neighboring and distant countries within the framework of scientific projects and academic mobility of students and teaching staff;
h. Ensuring that graduates are in demand in the labour market;
i. It is necessary to update and improve the content of the educational program, modernize the material base of educational laboratories, update the content of lecture materials and laboratory practical training taking into account the latest scientific achievements;
j. With the improvement of the system of interaction with employers;

k. Improving the qualifications of teaching staff in the field of innovative teaching technologies at the national and international levels.

To further increase the number of faculty members with degrees, the university needs to strengthen its efforts to attract young teachers and doctoral students to scientific research and their subsequent doctoral studies.

Taking into account the further development of the educational program, it is necessary to carry out work to increase the share of teaching staff with an academic degree; plan to take courses to improve professional qualifications at the international level; increase the number of teaching staff who speak a foreign language to form multilingual education groups; increase the number of scientific papers published in journals with a high citation index; participate in the development and implementation of scientific projects under international grants.

5. Expected final results of the implementation of the development plan of the EP.

As a result of the implementation of the measures of the educational program development plan "6B05103 – Bioengineering", the following final results are expected to be achieved:

1. The quality of specialist training

Training of highly qualified bioengineering specialists with deep theoretical knowledge and practical competencies in the fields of molecular biology, genetics, biotechnology and engineered biosystems.

Formation of graduates' ability for research, production and innovation activities in modern conditions of development of bioengineering and related fields.

Development of critical thinking skills, design and analytical approach to solving professional problems.

2. Development of scientific and research potential

Active involvement of students in research activities, participation in competitions, grants and conferences of various levels.

Creation of conditions for conducting student research in the leading research institutes of the Republic of Kazakhstan and on joint bases with foreign partners.

The growth of the publication activity of faculty and students in peer-reviewed journals.

3. Integration of education, science and production

Strengthening cooperation with employers and relevant enterprises to enhance the practice-oriented educational process.

The introduction and development of dual forms of education, providing practical skills in the workplace.

Increasing the level of employment of graduates and employers' satisfaction with the quality of their training.

4. International cooperation and mobility

Expansion of academic mobility of students and teaching staff, participation in international programs (Erasmus+, Mevlana, DAAD, etc.).

Involvement of professors from foreign universities in teaching and research activities at KazNARU.

Improving the international competitiveness of the educational program and preparing for international accreditation.

5. Development of the digital educational environment

Expanding the possibilities of using the university's educational portal for online registration of disciplines, selection of teachers, application for dormitories and access to digital educational materials.

Active use of international online educational platforms (Coursera, Aisana, Astana Hub, HUAWEI, etc.) to individualize learning and enhance the digital competencies of students and teachers.

6. Improvement of educational, methodological and personnel support

Publication and updating of educational and methodical literature by the faculty of the department.

Acquisition of modern teaching materials and laboratory materials for all levels of training.

Advanced training of teaching staff, internships in scientific and industrial organizations, including abroad.

The implementation of the educational program development plan will ensure:

- improving the quality and attractiveness of the Bioengineering program at the national and international levels;
- formation of competitive, mobile and responsible specialists capable of working in the field of science, education and biotechnological production;
- strengthening the image of KazNARU as a leading university implementing innovative and internationally oriented educational programs.

6. Measures to reduce the impact of risks for the EP.

In order to minimize possible risks affecting the implementation and sustainable development of the educational program "6B05103 – Bioengineering", the following activities are planned:

№	Measures	Expected result	Responsible
1	Increasing the number of students through increased career guidance in schools and colleges, and the development of international recruitment (including from CIS countries).	An increase in the number of students, an increase in the financial stability of the program.	Department, admission committee.
2	Full provision of educational and methodical literature for students (publication of the department's teaching staff, updating of library collections, acquisition of modern literature and electronic resources).	Improving the quality of the educational process and the availability of educational resources.	Department, Library, University
3	Conclusion of contracts with business entities for the	Improving the practice-oriented learning and the	Department, Department of

	organization of industrial and postgraduate internships, as well as assistance in the employment of graduates.	level of employment of graduates.	Practice and Employment
4	Timely scheduled updating and purchase of modern laboratory equipment, consumables and reagents.	Modern material and technical base that meets the requirements of the educational process and scientific research.	Department, Procurement Department
5	Professional development and human resource development of teaching staff through internships, courses and participation in research projects.	Improving the professional level of teachers and the quality of educational services.	Department, Department of Advanced Training
6	Intensification of international cooperation and academic mobility of students and teaching staff.	Expanding academic opportunities, increasing the international status of the EP.	Department, International Department
7	Development of the digital infrastructure of the educational process (updating the university's portal, introducing digital monitoring and feedback tools).	Reducing administrative risks, increasing transparency and manageability of the educational process.	Department, IT Department, DAV

7. List of activities of the development plan of the EP

№	The direction of work	Measures	Participants	Due date	Expected result
1	Improving the content of the educational program	1. To analyze the compliance of the EP with the requirements of the State Educational Standard of the Republic of Kazakhstan and professional standards. 2. Update the learning outcomes, taking into account the demands of the labor market and the competencies of graduates.	Department, employers, UMO	Annually, I quarter	Updated EP that meets the requirements of the MSHE
2	Employers' participation in the implementation of the EP	1. Conclude cooperation agreements with relevant enterprises. 2. Involve employers in the development and evaluation of the EP, in conducting practices and final certification.	Employers, Department	Constantly	Improving the practice-oriented training
3	Development of dual and practical training	1. To develop and implement elements of dual education. 2. Expand the base of production and scientific practices.	Department, employers, students	2025-2026 academic year	Improving students' practical competencies
4	Development of students' research activities	1. To organize the research of students in the leading research institutes of the Republic of Kazakhstan and joint companies with foreign partners. 2. Develop scientific circles and startup projects.	Students, department, research institutes, foreign partners	Constantly	Increasing the scientific activity of students
5	Working with graduates	1. Create an association of graduates of the EP. 2. To conduct annual monitoring of employment and a survey of graduates.	Department, graduates	Annually	Improving the EP based on alumni feedback
6	Publication and updating of educational and methodological support	1. Publication of the teaching and methodological literature of the teaching staff of the department. 2. Acquisition of EML (educational and methodical literature) for students of the EP.	Faculty of the department, library	Annually	Provision of a modern educational and methodological fund
7	International cooperation and academic mobility	1. Involvement of professors from foreign universities in teaching and research activities at KazNARU. 2. Ensuring academic mobility of students and teaching staff on an ongoing basis.	International Department, Department	Constantly	Improving the international competitiveness of the program

8	Internal and external quality assurance	1. Conducting a survey of students, graduates and employers. 2. Preparation of the EP for international accreditation.	Quality Commission, Department	2025-2027	Program accreditation and training quality improvement
9	Professional development of teachers	1. Passing advanced training courses in modern biotechnologies, pedagogical and digital technologies for teaching staff. 2. Internships for teachers in research centers and industrial organizations.	Teaching staff of the department	Annually	The growth of professional competence of teachers

8. Justification of resource provision of the plan

- information resources;
- library collection of electronic educational materials and other accessible educational and methodological support;
- personnel;
- qualified teaching staff;
- material and technical base

9. Mechanism for implementing the development plan of the EP.

For the effective implementation of the educational program development plan "6B05103 – Bioengineering", a phased implementation of measures aimed at improving the quality of specialist training and strengthening the competitiveness of the program is envisaged.

1. Development of the student body. Purposeful work is being carried out to increase the number of educational grants, attract foreign citizens and implement a set of career guidance measures among school and college graduates. Special attention is paid to the promotion of the educational program on international educational platforms and participation in exhibitions, forums, career guidance meetings.

2. Improving the content and structure of the educational program. The staff of the department develops and annually updates catalogs of elective subjects with the participation of employers, which ensures that educational results meet modern labor market requirements and professional standards. Interdisciplinary approaches and elements of dual education are being actively introduced.

3. Development of practice-oriented learning. It is planned to organize trips for students to basic farms, leading research institutes, biotechnological and agricultural enterprises, as well as to higher educational institutions in the near and far abroad. This will expand the professional competencies of students and ensure their integration into the real production environment.

4. Involvement of external experts and international cooperation. Leading scientists and specialists from near and far abroad will be invited to conduct lectures and practical classes, master classes and scientific consultations. Academic mobility of students and faculty is developing, and joint educational and research projects with foreign partners are being implemented.

5. Information and digital support of the educational process. The university's educational portal provides students with the opportunity to register online for disciplines, select teachers, apply for dormitories, participate in events, and gain access to teaching materials. This helps to increase the transparency and effectiveness of the educational process.

6. Monitoring and evaluation of the effectiveness of the implementation of the plan. On an ongoing basis, key indicators of the effectiveness of the implementation of the EP are monitored: employment of graduates, employer satisfaction, academic performance and the level of scientific activity of students and teaching staff. The results of the analysis are used to further adjust the development plan and update the educational program.

10. SWOT analysis

S (strength) – strengths	W(weakness) – weak points
- compliance of the educational program with the requirements of the State Educational Standard of the Republic of Kazakhstan and professional standards; - qualified teaching staff with scientific and practical experience. - The availability of a modern laboratory facility that enables the conduct of practical and laboratory classes in molecular biology, biotechnology, and plant genetics based on the plant micropropagation laboratories of KazNARU. - the presence of elements of dual training with the participation of specialized enterprises; - free access for students to study on international online platforms (Coursera, Aisana, Astana Hub, HUAWEI, etc.); - the university's educational portal is functioning, providing online registration for disciplines and teachers, application for dormitories and access to educational materials. - active participation of students in research activities and competitions of the MSHE of the Republic of Kazakhstan. - the presence of foreign students (including from Turkmenistan), contributing to the internationalization of the program.	- Insufficient participation of foreign faculty in program implementation. - Low level of faculty publication activity in international databases (Scopus, WoS). - Uneven levels of foreign language proficiency among students. - Insufficient systematic participation of employers in assessing educational outcomes.
O (opportunity) – favorable opportunities	**T (thread) – threats and risks**
- expanding international cooperation with foreign universities and research centers (Germany, Poland, Turkey, Korea, etc.); - participation in international programs such as Erasmus+, Mevlana, and others; - development of dual education and practice-oriented modules; - attracting foreign professors to teaching and research; - publishing modern educational and methodological literature for the department; - preparing the program for international accreditation;	- High competition to attract talented students and young faculty; - Low likelihood of raising salaries above the university average; - Rapid obsolescence of technology and laboratory equipment; - Lack of bioinformatics specialists in the country.

- participation of students and faculty in international grants and conferences; - acquisition of advanced equipment as part of the State Program for Innovative Research.	

11 . Model of a graduate of this EP.

6B05103 - Bioengineering	
Be able to:	-To design, model and optimize biotechnological installations and production lines, including bioreactors and purification systems, for large-scale cultivation and processing of biological objects; -Develop and implement engineering solutions for genome editing and synthetic biology, including the creation of genetic constructs with specified properties; -Use specialized software for bioengineering modeling (for example, systems biology, process kinetics) and apply artificial intelligence to process and interpret large-scale biological and technological data (including GWAS and QTL mapping); -Conduct laboratory and field studies using automated systems and metrologically ensure the reliability of experimental data and technological processes; -Perform engineering calculations of economic, environmental and technical risks in the design and scaling of bioengineering projects; -To carry out project management, innovative implementation (Extension services) and maintenance of biotechnological equipment in agricultural production; -To formalize the results of research and development in the form of technical reports, project documentation, patents and scientific publications; to communicate effectively and work in an interdisciplinary team.
Know and understand:	-Fundamental laws and principles of systems biology, biotechnological kinetics and thermodynamics of biological processes; -Principles of modeling and control of biological systems, as well as the basics of robotics and automation in biotechnological production; -Modern methods of genetic and cellular engineering, including CRISPR-Cas and methods of delivering genetic material (vector systems); -Fundamentals of mathematical modeling, statistics and bioinformatics as engineering tools for the analysis and design of biological objects; -Engineering standards, technical regulations and requirements for biological, environmental and industrial safety of bioengineering activities, including bioethical and legal aspects; -Economic and market mechanisms of commercialization and transfer of bioengineering technologies to the agricultural and other sectors.
Be competent in the following matters:	-Design and development of new or optimization of existing biotechnological processes and products for the agricultural sector using approaches of systemic and synthetic biology; -Integration of engineering, biological and information technologies to create "smart" biotechnological complexes and precision farming systems; -Feasibility studies, life cycle management (from idea to implementation) and quality assurance of bioengineering developments; -Development of strategies for genetic and bioengineering optimization of crops and animals to increase productivity, sustainability and nutritional value; -Ensuring biological and environmental safety (biological protection) when working with genetically modified organisms and scaling biotechnological industries; -Technology transfer and commercialization of scientific developments, taking into account the requirements of the market and legislation.

As a result of training, the graduate must:

Codes	Learning outcomes of the program "6B05104 - Bioinformatics"
LO1	Know the constitution of the country and its basic laws and use this knowledge in your professional activities. Plan and analyze the business activity of the enterprise, business plans, investment projects and offer rational solutions used in investment design, business planning, project management. Know the genres of academic writing for use in their activities and understand the importance of the principles and culture of academic integrity.
LO2	Demonstrate fundamental natural knowledge in physics, mathematics, chemistry, apply graphic programs to solve problems in the field of bioinformatics and bioengineering. The ability to use specialized knowledge of fundamental branches of mathematics, physics, chemistry and biology to conduct research in the field of bioinformatics and related disciplines. Know the norms of labor protection and the environment, the rules of moral development.
LO3	Hold of methods of observation, description of identification and scientific classification of biological objects (prokaryotes, fungi, plants and animals). Possession of knowledge in the field of biology, in particular, knowledge of the structure, functions, growth, development, origin, evolution, distribution of living organisms. Knowledge and understanding of the processes occurring in biological objects at various levels of organization, from the population level to the cellular and molecular levels.
LO4	Apply theoretical and practical knowledge to improve agricultural technologies, as well as in research activities, the ability to operate with basic knowledge of agrobiology in agronomy, the ability to implement the acquired knowledge in practical work.
LO5	To collect and use the information accumulated in databases on the structure of genomes, proteins and other biological information, possession of the main bioinformatics means of analyzing genomic, structural and other biological information.
LO6	Apply modern ideas about the basics of biotechnological and bioengineering technologies, genetic engineering, nanobiotechnology, molecular modeling.
LO7	Apply knowledge and understanding of modern apparatus and equipment for performing research field and laboratory biological work.
LO8	Have the ability to generate new ideas, learning skills for independent continuation of further education in the field of natural sciences, mathematics and statistics, to identify fundamental problems, to formulate tasks related to the implementation of professional functions, use the methods of the studied sciences to solve them.

	field of bioengineering, biotechnology and related disciplines, as well as formalize it in writing, present it orally and participate in various forms of discussions.

Head of the department
«Agronomy, breeding and biotechnology» Y.Zhanbyrbaev

Dean of the Faculty of «Agrobiology» E.Abildaev

DEVELOPMENT PLAN FOR THE BACHELOR'S DEGREE PROGRAM 6B05103-BIOENGINEERING

Task 1. Integration of scientific and scientific-technical activities and the educational process at all levels of higher and postgraduate education

№	Indicators	Unit meas.	2024	2025	2026	2027	2028
1.	Contingent of students in the EP	person	10	6	20	30	50
2.	The share of foreign students in the total number of students in the EP	%	100	17	20	25	25
3.	The share of students participating in academic mobility programs from the total number of students in the EP	%	0	0	2	2	3
4.	Compliance of the teaching staff of the EP with the qualification requirements for the degree	%	45	47	50	55	60
5.	The share of foreign experts involved in teaching activities	%	-	-	1	2	2
6.	The number of research institute scientists on the staff of the university's teaching staff on a part-time basis and/or on an hourly basis	person	-	-	-	-	1
7.	The share of teaching staff teaching in English out of the total number of teaching staff	%	15	16	17	17	18
8.	The number of educational and methodological publications developed by teaching staff on the specifics of the EP	quantity	6	6	8	10	12
9.	Updating the EP to meet labor market requirements	+/-	+	+	+	+	+
10.	Analysis of the EP for compliance with the university's strategic development plan	+/-	+	+	+	+	+
11.	Implementation of dual education	+/-	+	+	+	+	+
12.	Application of digital technologies in the disciplines of the EP	+/-	+	+	+	+	+
13.	Conducting round tables on the implementation of competencies in the educational process	+/-	+	+	+	+	+
14.	Participation of representatives of potential stakeholders as experts of the EP	quantity	1	1	2	3	3
15.	Participation of stakeholders in the development of EP and assessment of the quality of training of specialists (students, employers, graduates)	+/-	+	+	+	+	+
16.	Implementation of the program within the framework of double-degree	+/-	-	-	-	-	+

	education/joint programs with partner universities						
17.	The position of the Public Chamber in national rankings (IAAR, IQAA, Atameken, etc.)	place	-	-	1	1	1
18.	Availability of accreditation of the EP	-	-	+	+	+	+
19.	The share of disciplines that use online courses from Coursera, edX, etc.	%	90	90	50	40	25
20.	Number of students who completed at least one Coursera certified course on the topic of the EP	person	9	5	10	12	15
21.	Number of teaching staff involved in the implementation of fundamental and applied research	units	5	6	8	8	10
22.	The number of research projects carried out within the framework of international cooperation	units	-	-	-	1	1
23.	Number of publications of students in publications recommended by the Committee for Control of Education and Science	units	-	-	-	1	1
24.	The number of students participating in scientific research and competitions	units	-	-	-	1	1

Task 2. Creating an effective corporate governance model and strengthening the intellectual potential of the university

№	Indicators	Unit meas	2024	2025	2026	2027	2028
1.	The share of young scientists in the total number of scientists and researchers carrying out IQAA	%	-	1	1	2	2
2.	The share of teaching staff who have completed advanced training and internships abroad	%	4	4	4	5	5
3.	Participation of the teaching staff in annual competitions for awarding the "Best Researcher" and "Best University Teacher" prizes, state prizes, and scholarships to outstanding scientists for their achievements in the field of science	quantity	-	-	1	1	1
4.	Participation of the EP faculty in Silver University programs to ensure high-quality education for everyone at any age.	+/-	-	-	-	+	+
5	The proportion of students of the EP involved in organized social activities, including through student government and debate, and the volunteer movement with the aim of raising the level of citizenship and patriotism	%	1	2	10	15	15

Task 3. Activities on commercialization of the results of scientific and scientific-technical activities and implementation of scientific developments and technologies in production.

№	Indicators	Unit meas	2024	2025	2026	2027	2028
1.	Participation of students in startup projects	person	0	0	0	1	1

Task 4. Development of scientific and educational infrastructure and digital architecture of the university

№	Indicators	Unit meas	2024	2025	2026	2027	2028
1.	Share of updated laboratory equipment	%	0,35	0,40	1	1	1
2.	Providing students with dormitory accommodation	+/-	+	+	+	+	+