



AUEZOV
UNIVERSITY
1943



EDUCATIONAL PROGRAM

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THE MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF
KAZAKHSTAN

Non-profit Limited Company M.Auezov South Kazakhstan
University

Chairman of the Board - Rector
d.h.s., academician Kozhamzharova D.P.



2021y.

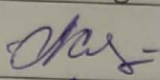
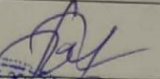
EDUCATION PROGRAMME

7M05123-«Biotechnology»

| | |
|---|---|
| Registration number | |
| Code and classification of the field of education | 7M05 Natural sciences, mathematics and statistics |
| Code and classification of training areas | 7M051 Biological and related sciences |
| Group of educational programs | M082 Biotechnology |
| Type of EP | acting |
| ISCE level | 7 |
| NQF level | 7 |
| SQF of education level | 7 |
| Language of learning | English |
| Typical duration of study | 2 years |
| Training direction | Scientific and pedagogical |
| The complexity of the EP, not less | 120 credits |
| Distinctive features of EP | - |
| University Partner (JEP) | - |
| University Partner (TDEP) | - |
| Social Partner (DE) | - |

Shymkent, 2021

Drafters:

| Name | Position | Sign |
|------------------|---|---|
| Saparbekova A.A. | Ph. D., associate Professor of the Department of "Biotechnology" of M. Auezov SKU |  |
| Abildaeva R.A. | Ph. D., associate Professor of the Department of "Biotechnology" of M. Auezov SKU |  |
| Sherova G. | MXT 20-3nra | |
| Ermakhanov M.N. | Head of division LLP «South - West scientific research institute of livestock and plant production» | |



EP was Considered by the Committee on Innovative Learning Technologies and Methodological Support of higher school «Chemical engineering and biotechnology», Protocol

№ _____ from _____ 2021

Chairman of MC (Committee) _____


Sign

Aitkulova R.

Considered and recommended for approval at the meeting of Educational and Methodical Council of M. Auezov SKSU.

protocol № 7 from «21» 02 2021

Approved by the decision of the Academic Council of the University

protocol № _____ from «22» 02 2021

The educational program was developed with the participation of the partner university - Dnipro State Agrarian and Economic University

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1. PROGRAM CONCEPT

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| Mission of the University | Generation of new competencies, training of a leader who translates research and entrepreneurial thinking and culture |
| University Values | <ul style="list-style-type: none"> • Openness—open to change, innovation and cooperation. • Creativity – generates ideas, develops them and turns them into values. • Academic freedom – free to choose, develop and act. • Partnership – creates trust and support in a relationship where everyone wins. • Social responsibility – ready to fulfill obligations, make decisions and be responsible for their results. |
| Graduate Model | <ul style="list-style-type: none"> • Deep subject knowledge, their application and continuous expansion in professional activity. <ul style="list-style-type: none"> • Information and digital literacy and mobility in rapidly changing conditions. • Research skills, creativity and emotional intelligence. • Entrepreneurship, independence and responsibility for their activities and well-being. • Global and national citizenship, tolerance to cultures and languages. |
| Uniqueness | <ul style="list-style-type: none"> • Deep subject knowledge, their application and continuous expansion in professional activity. • Information and digital literacy and mobility in rapidly changing conditions. • Research skills, creativity and emotional intelligence. • Entrepreneurship, independence and responsibility for their activities and well-being. • Global and national citizenship, tolerance to cultures and languages. |
| Academic Integrity and Ethics Policy | <ul style="list-style-type: none"> • In universities, measures are enforced to maintain academic integrity and academic freedom, protecting against the loving view of intolerance and discrimination: <ul style="list-style-type: none"> • Rules of Academic Integrity (Protocol No. 3 of 30.10.2018); • Anti-corruption standard (type No. 373 n/A dated 12/27/2019). • Code of Ethics (Protocol No. 8 of 31.01.2020). |
| Regulatory framework for the | 1. The Law of the Republic of Kazakhstan "On Education"; |

| | |
|--|--|
| development of OP | <p>2. Standard rules of activity of educational organizations implementing educational programs of higher and (or) postgraduate education, approved by the Order of the Ministry of Education and Science of the Republic of Kazakhstan dated October 30, 2018 No. 595;</p> <p>3. State mandatory standards of higher and postgraduate education, approved by the Order of the Ministry of Education and Science of the Republic of Kazakhstan dated October 31, 2018 No. 604;</p> <p>4. Rules for the organization of the educational process on credit technology of training, approved by the Order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152;</p> <p>5. Qualification directory of positions of managers, specialists and other employees, approved by the Order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan on December 30, 2020 No. 553.</p> <p>6. Guidelines for the use of ECTS.</p> <p>7. Guidelines for the development of educational programs of higher and postgraduate education, Appendix 1 to the order of the Director of the Central Research Institute No. 45 o/d dated June 30, 2021.</p> |
| Organization of the educational process | <ul style="list-style-type: none"> • Implementation of the principles of the Bologna Process • Student-centered learning • Availability • Inclusivity |
| Quality assurance of OP | <ul style="list-style-type: none"> • Internal quality assurance system • Involvement of stakeholders in the development of the OP and its evaluation • Systematic monitoring • Updating the content (updating) |
| Requirements for applicants | <p>They are established according to the Standard Rules for admission to training in educational organizations implementing educational programs of higher and postgraduate education Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 600 dated 31.10.2018</p> |

1. PASSPORT EP

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|--|--|
| Purpose of the OP | Training of highly qualified scientific and pedagogical personnel, fluent in three languages, able to plan and carry out scientific and pedagogical, production activities in the field of biotechnology and able to develop strategic solutions to research tasks in various branches of biotechnological production. |
| OP tasks | <ul style="list-style-type: none">- providing lifelong learning skills and abilities that will enable them to successfully adapt to changing conditions throughout their professional career;- providing conditions for acquiring a high general intellectual level of development, mastering competent and developed speech, culture of thinking and skills of scientific organization of labor in various branches of biotechnological production;- training of highly qualified specialists with in-depth scientific knowledge, able to plan and carry out scientific and industrial activities of a professional biotechnologist, developing strategic approaches to solving research tasks in environmental and agricultural biotechnology;- training of highly qualified specialists capable of analyzing scientific and technical information in the field of environmental and agricultural biotechnology for the purpose of scientific, patent and marketing support of fundamental research and technological developments;- formation of competitiveness of graduates in various branches of biotechnological production, to ensure the possibility of their fastest possible employment in the specialty or continuing education at the next stages of training. |
| Harmonization of OP | <ul style="list-style-type: none">• 7th level of the National Qualifications Framework of the Republic of Kazakhstan;• Dublin descriptors of the 6th level of qualification;• 1 cycle of the Qualification Framework of the European Higher Education Area (A Framework for Qualification of the European Higher Education Area);• Level 7 of the European Qualification Framework for Lifelong Learning (The European Qualification Framework for Lifelong Learning). |
| Connection of the OP with the professional sphere | <ul style="list-style-type: none">• Professional standard "Teacher" (Appendix to the order of the Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" No. 133 dated June 8, 2017).• Professional standard: "Selection activity (breeding) in animal husbandry" (Appendix No. 25k to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated December 26, |

2019263)

• Professional standard: "Feed production for farm animals" Appendix No. 18 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated 26.12.2019 No. 263

• Professional standard: "Production of milk and dairy products" Appendix No. 34 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated 26.12.2019 No. 263

List of qualifications and positions

The graduate of the educational program 7M05123 - "Biotechnology" is awarded the degree of "Master of Natural Sciences".

Masters of OP 7M05123 - "Biotechnology" can hold the position of the head of the department corresponding to the specialization in the enterprise; a specialist, senior specialist, head of the department of state bodies in this field, a researcher in design and survey, research institutes, a teacher in secondary professional and higher educational institutions, in (research institutions, design and design organizations) without presenting work experience requirements in accordance with the qualification requirements of the "Qualification Handbook positions of managers, specialists and other employees", approved by the Order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan dated May 21, 2012 No. 201-o-M.

Field of professional activity

The sphere of professional activity is the field of production of biotechnological products for various purposes, scientific developments in the field of biotechnological processes, the field of education

Objects of professional activity

The objects of professional activity of graduates are higher and secondary vocational educational institutions, research institutes and design organizations.

Subjects of professional activity

The subjects of professional activity of a master's student in the specialty "Biotechnology" are:

- biotechnological processes and devices;
- biological objects of microbial plant and animal origin;
- improvement of technological processes and equipment;
- modernization of existing production facilities;
- analysis and solution of problematic production situations;
- management and regulation of the production process;
- quality control of raw materials and products;
- assessment of environmental safety of chemical production;
- teaching of specialized disciplines in biology.

Undergraduates of OP 7M05123 - "Biotechnology" can perform

Types of

professional activity

the following types of professional activity:

- production and technological;
- settlement and design;
- scientific research;
- pedagogical.

Learning outcomes

LO1 Able to demonstrate of history and philosophy of natural and technical sciences, fundamental scientific and professional training, solve modern scientific and practical problems, plan and conduct research and experimental research activities;

LO2 Apply new methodologies of psychological and pedagogical sciences, biotechnological studies of phenomena and processes, the concept of biotechnological formations giving an idea of the impact of pollution on the environment;

LO3 Create and improve biological objects for biotechnological productions, independently combine methods of biotechnologies to obtain modern biological products.

LO4 To be able to competently design and implement energy-saving, low-waste, environmentally friendly technologies that ensure high quality of finished products, technological processes for processing raw materials of plant and animal origin,

LO5 Apply the complex acquired knowledge and skills in the management of biotechnological science. Analyze and apply modern technological methods to solve complex engineering problems in processing raw materials of plant and animal origin, Create intensive environment in the agro-industrial complex by applying various biotechnological methods.

LO6 Have high motivation to perform professional activities; possess the technology of independent learning and self-education, the ability to improve and develop their intellectual and professional level. Solve engineering, analytical and managerial tasks using the basic principles of devices, processes and technologies for the creation of new functional products, as well as the regulation of the reproduction of agricultural animals

LO7 Use research, entrepreneurial skills and skills of work in the face of uncertainty. Effectively work individually and conclusions on problems, to defend your point of view correctly, to correct your actions and use various methods, to be qualified and intelligible with a loving auditor, to understand your ideas and conclusions about problems in the field of biotechnology.

COMPETENCES OF THE GRADUATE OF EP

SOFT SKILLS (Behavioral skills and personality qualities)

- | | |
|---|---|
| SS 1. Competence in managing one's own literacy | SS1.1. Strive for professional and personal growth throughout life. SS 1.2. Constantly update own knowledge within the chosen trajectory and in an interdisciplinary environment, carry out further learning with a high degree of independence and self-regulation. SS 1.3. To be capable of reflection, an objective assessment of one's achievements, an awareness of the need to form new competencies and continue education in doctoral studies. |
| SS 2. Language competence | SS2.1. The ability of possessing a sufficient level of communication in the professional field in the state, Russian and foreign languages for negotiating and business correspondence. SS 2.2. The ability of mastering the skills of mediation and intercultural understanding. |
| SS 3. Mathematical Competence and Competence in the field of Science | SS3.1. The ability to interpret the methods of mathematical analysis and modeling for solving applied problems in the field of study. SS3.2. The ability to plan the setting of scientific experiments, integrate and implement the results of scientific research in the professional field. SS 3.3. The ability to analyze and comprehend modern methods of pedagogical and psychological science and apply them in pedagogical activity. |
| SS 4. Digital competence, technological literacy | SS 4.1. The ability to confidently use modern information and digital technologies, artificial intelligence systems for work, leisure and communications. SS 4.2. Proficiency in the use, recovery, evaluation, storage, production, presentation and exchange of information in a wide range of digital devices. SS 4.3. Ability to confidently use global information resources and apply technological literacy in research and computational and analytical activities. |
| SS 5. Personal, social and academic competencies | SS 5.1. Possession of the norms of business ethics, social and ethical values and focus on them in professional activities. SS 5.2. Formation of a personality capable of mobility in the modern world, critical thinking and physical self-improvement. SS 5.3. Ability to work in a team, correctly, clearly and reasonably defend one's position during discussions and make decisions of a professional nature. SS 5.4. Ability to adequately navigate in various social |

spheres of activity and in conditions of uncertainty.

SS 6.
Entrepreneurial
competence

SS 5.5. Ability to find compromises, correlate own opinion with the opinion of the team.

SS 6.1. The manifestation of leadership qualities and the ability to have a positive impact on others, to lead a team.

SS 6.2. The ability to create conditions for the development of creative and entrepreneurial skills of the team.

SS 6.3. The ability to work in a mode of uncertainty and rapidly changing task conditions, make decisions, respond to changing working conditions, allocate resources and manage your time.

SS 6.4. Ability to work with consumer needs.

SS 7. Cultural
awareness and
ability to express
yourself

SS7.1. The ability to show worldview, civil and moral positions.

SS7.2. The ability to be tolerant of the traditions and culture of the peoples of the world, to have high spiritual qualities.

PROFESSIONAL COMPETENCIES (HARD SKILLS)

Theoretical
knowledge,
practical skills
and abilities
specific to this
field

PC 1. The ability to carry out the technological process in accordance with the regulations to use technical means to measure the main parameters of biotechnological processes, properties of raw materials and products; the ability to create and manage biotechnological processes; the willingness to evaluate technical means and technologies with account of the ecological consequences of their application; the ability to ensure compliance with the rules of safety technology, industrial sanitation, fire safety and labor protection.

PC2. Ability to work with scientific and technical information, to use Russian and international experience in professional activities; possession of basic methods and techniques for conducting experimental studies in their professional area; ability to conduct standard certification tests of raw materials, finished products and technological processes; possession of experiment planning, processing and presentation of the results obtained; readiness to use modern information technologies in your professional field, including databases and software packages.

PC 3. Ability to participate in the development of technological projects as part of the team of authors; readiness to use modern systems of automated design. willingness to use their knowledge and achievements in solving problems and problems of biotechnology

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

| | LO 1 | LO2 | LO3 | LO4 | LO5 | LO6 | LO7 |
|-----|------|-----|-----|-----|-----|-----|-----|
| GC1 | | + | | | + | + | + |
| GC2 | + | + | | + | | + | + |
| GC3 | + | + | | | | | + |
| GC4 | + | + | + | | + | | |
| GC5 | | | | + | + | + | |
| GC6 | | | | | + | + | + |
| GC7 | | | | | + | + | + |
| PC1 | | + | + | + | + | + | |
| PC2 | + | + | + | + | | + | |
| PC3 | | + | | + | | + | + |

| | | | | | | | | | | | | | | | | | |
|----|----------------------------------|----|----|--|--|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | | PD | EC | Biotechnology of Biomass Production and Processing | <p>prospects of biotechnology in medicine and agriculture, achievements and prospects of environmental biotechnology.</p> <p>Characterizes main methods of obtaining biotechnology products from renewable raw materials (biomass), methods of preparing biomass for its processing using enzymatic processes and methods of raw materials pre-processing, as well as methods of raw materials bioconversion using various biotechnological agents and cultivation methods. Justifies the choice of methods and technologies for processing plant raw materials, technological control of biotechnological products and analyzing the quality and safety indicators of raw materials and processed products.</p> | 4 | v | v | v | v | v | v | v | v | v | v | v |
| 14 | Applied aspects of biotechnology | PD | EC | Progressive Course of Genetic Engineering | <p>Forms theoretical foundations of genetic engineering and applied aspects of its application, ability to present and critically analyze information about achievements and prospects for introducing methods of genetic engineering into the practice of creating new forms of plants, animals and microorganisms. Deepens knowledge in the field of genetic engineering and main methods of genetic engineering, problems of using genetically modified products and transgenic plants, animals for the purposes of</p> | | v | | v | v | v | v | v | v | v | v | v |

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| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 18 | Biotechnological development in the agro-industrial complex | PD | EC | Technology of production and storage of the biotechnological industries products | issues of using sulfate-reducing bacteria in deposition of metals, conditions of their functioning, use of microorganisms for biosorption of metals, biological processing of industrial wastes of various industries, use of microorganisms – destructor of hydrocarbons for cleaning wastewaters from oil refineries and soils polluted with oil. | 6 | v | v | v |
| 19 | Achievements of Genetic Engineering in the Agro-Industrial Complex | PD | EC | Considers questions of organization of biotechnological productions in agriculture and biotechnology for storage and processing of crop and livestock products. Characterizes modern methods of biotechnology in production and processing of agricultural products and microorganisms used in biotechnology for storage and processing of agricultural products. Substantiates the use of micromycetes in the production of products of plant origin and bacteria in the production of feed. | Considers problems and prospects of obtaining new varieties of plants resistant to stress factors, problems and prospects of applying methods of genetic engineering, basics of molecular bioengineering, cellular and tissue biotechnology in plant breeding, problems and prospects of obtaining new breeds of animals resistant to diseases using genetic engineering methods. Characterizes methods of selection of a recipient | | v | v | v |

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

| Course of Study | Semester | The number of mastered modules | The number of studied disciplines | | Number of credits | | | | | Total hours | Total credits HSC | The number of | |
|-----------------|----------|--------------------------------|-----------------------------------|----|----------------------|----------------------|-------------------|------|---------------------|-------------|-------------------|---------------|----------------------|
| | | | HSC | EC | Theoretical training | Educational practice | Research practice | MF3Ж | Final certification | | | EC | Theoretical training |
| | | | | | | | | | | | | | |
| 1 | 1 | 4 | 5 | 3 | 29 | | | 1 | | 900 | 30 | 5 | 1 |
| | 2 | 3 | | 4 | 23 | 4 | | 3 | | 900 | 30 | 4 | 1 |
| 2 | 3 | 3 | | 4 | 21 | | 7 | 2 | | 900 | 30 | 5 | 1 |
| | 4 | | | | | | | 18 | 12 | 900 | 30 | | |
| Барлығы | | 10 | 5 | 11 | 73 | 4 | 7 | 24 | 12 | 3600 | 120 | 14 | 3 |

6 LEARNING STRATEGIES AND METHODS, MONITORING AND EVALUATION

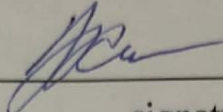
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|--|--|
| Learning strategies | <p>Student-centered learning: the student is a center of teaching/learning and an active participant in the learning and decision-making process.</p> <p>Practice-oriented training: orientation to the development of practical skills.</p> |
| Teaching methods | <p>Conducting lectures, seminars, various types of practices with:</p> <ul style="list-style-type: none"> • the use of innovative technologies; • problem-based learning; • case study; • work in a group and creative groups; • discussions and dialogues, intellectual games, olympiads, quizzes; • reflection methods, projects, benchmarking; • Bloom's taxonomies; • presentations; • rational and creative use of information sources: • multimedia training programs; • electronic textbooks; • digital resources. <p>Organization of independent work of students, individual consultations.</p> |
| Monitoring and evaluation of the achievability of learning outcomes | <p>Current control on each topic of the discipline, control of knowledge in classroom and extracurricular classes (according to syllabus). Assessment forms:</p> <ul style="list-style-type: none"> • survey in the classroom; • testing on the topics of the academic discipline; • control works; • protection of independent creative works; • discussions; • trainings; • colloquiums; • essays, etc. <p>Boundary control at least twice during one academic period within the framework of one academic discipline.</p> <p>Intermediate certification is carried out in accordance with the working curriculum, academic calendar.</p> <p>Forms of holding:</p> <ul style="list-style-type: none"> • exam in the form of testing; • oral examination; • written exam; • combined exam; • project defense; • protection of practice reports. <p>Final state certification.</p> |

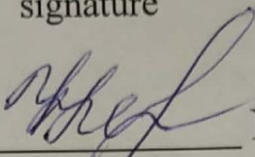
EDUCATIONAL AND RESOURCE SUPPORT OF THE OP

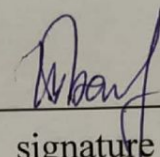
| | |
|------------------------------------|--|
| <p>Information Resource Center</p> | <p>The structure of the JRC has 6 subscriptions, 16 reading rooms, 2 electronic resource centers (IRC). The basis of the network infrastructure of the OIC consists of 180 computers with Internet access, 110 automated workstations, 6 interactive whiteboards, 2 video doubles, 1 videoconferencing system, 3 scanners of A-4 format, 3. The software of the OIC – AIBS "IRBIS-64" for MSWindows (a basic set of 6 modules), an autonomous server for uninterrupted operation in the IRBIS system.</p> <p>The library fund is reflected in the electronic catalog available to users on the website http://lib.ukgu.kz is on-line 24 hours 7 days a week.</p> <p>Thematic databases of their own generation have been created: "Almamater", "Works of scientists of SKSU", "Electronic Archive". Online access from any device 24/7 via an external link http://articles.ukgu.kz/ru/pps.</p> <p>Working with catalogs in electronic form. The EC consists of 9 databases: "Books", "Articles", "Periodicals", "Works of the teaching staff of SKSU", "Rare books", "Electronic Fund", "SKSU in print", "Readers" of "SKU".</p> <p>The JIC provides its users with 3 options for accessing its own electronic information resources: from the Electronic Catalog terminals in the catalog hall and divisions of the JIC; through the university's information network for faculties and departments; remotely on the library's website http://lib.ukgu.kz. Access to international and republican resources is open: "SpringerLink", "Envoy", "Web of Science", "EVSSO", "Epigraph", to electronic versions of scientific journals in open access, "Zan", "RMEB", "Adebiet", Digital library "Akpigress", "Smart-kitar", "Kitar.kz", etc.</p> <p>For people with special needs and disabilities, the library's website has been adapted to the work of visually impaired users in the JRC</p> |
| <p>Material and technical base</p> | <p>Research Laboratory of undergraduates and doctoral students Laboratory "Biochemistry and Microbiology" BOX "Biotechnology of microorganisms" Laboratory "Biotechnology BASES" Autoclave Laboratory "Biotechnology of animals and plants" The room of teachers The room of the head of the department The room of teachers The lecture hall "Food biotechnology" The room of the Erasmus preparator and the office for shooting video lectures The laboratory "agricultural biotechnology"</p> |

AGREEMENT SHEET

by Education Program code 7M05123- «Biotechnology»

Director of the IPE  Konarbayeva Z.K.
signature

Director of the DAN  Nazarbek U.B.
signature

Director of the DK and P  Bazhirov T.S.
signature