"Kazakh University of Technology and Business" named after K.Kulazhanova" JSC

# EDUCATIONAL PROGRAM

## 6B07223 Food Processing Technologies (by Industry)

**Level:** *Bachelor's*

Approved
by the Board of Directors of JSC
«K.Kulazhanov KazUTB»
"18" 05 2026 protocol № 9

Recommended
by the Academic Council of JSC
«K.Kulazhanov KazUTB»
"22" 01 2026 protocol № 7

**Astana, 2026**

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## Preface

The educational program «6B07223 Food Processing Technologies (by Industry)» was developed in accordance with the State Compulsory Standard of Higher Education / Postgraduate Education, approved by the order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022.№2, as well as on the basis of professional standards approved by the order of the Minister of Agriculture of the Republic of Kazakhstan dated December 19, 2025 №477: «Production of bakery and flour confectionery products» and « Manufacture of macaroni», the Atlas of New Professions and Competencies of the Republic of Kazakhstan for the profession "Product Traceability Systems Engineer," as well as the Regional Standard for "Recycling Technologist" (Akmola Region) and "Digital Manufacturing Engineer" (Shymkent).

The educational program «6B07223 Food Processing Technologies (by Industry)» was approved at the meeting of the Council on Academic Quality on « 22 » 01 2026, protocol № 3
Chairman Askarbekov E.B. _____

The educational program «6B07223 Food Processing Technologies (by Industry)» was approved at the meeting of the Commission on Academic Quality of the Faculty on « 19 » 12 2025, protocol № 3
Chairman Safuani Zh.E. _____

The educational program «6B07223 Food Processing Technologies (by Industry)» was developed and discussed at the meeting of the department «Technology and Standartization» dated « 19 » 12 2025, protocol № 5
Head of the department Baitukenova S.B. _____

## Approval sheet

Educational program 6B07223 Food Processing Technologies (by Industry)

**AGREED:**

| | | | |
|---|---|---|---|
| Vice-Rector for Administrative Affairs | | E. Askarbekov | "22" 07 2025 year |
| Head of Educational Programs Department | PP | B.Bayadilova | "22" 07 2025 year |
| Chairman of the Board «Kazakh Research Institute of Processing and Food Industry» LLP | PP | J. Urazbaev | "19" 12 2025 year |
| Chairman of the Association of Halal Industry of Kazakhstan | PP | M. Sarsenbayev | "19" 12 2025 year |
| Director «Capital Managment» LLP | PP | D. Bakhtiyarova | "19" 12 2025 year |
| Director of Scientific and Production Center of Ecological and Industrial Biotechnology LLP | PP | A. Usenova | "19" 12 2025 year |
| Deputy Director of «NARLI LTD» LLP | PP | D. Sydykov | "19" 12 2025 year |
| Student of the FPT-251 group | | D. Murat | "19" 12 2025 year |

## 1 Passport of the educational program

| | |
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| International Standard Classification of Education (ISCED) level | 6 |
| National Qualification Framework (NQF) level | 6 |
| Sectoral Qualifications Framework (SQF) level | 6 |
| Code and name of the field of education | 6B07 Engineering, manufacturing and construction industries |
| Direction of training | 6B072 Industrial and manufacturing branches |
| Number and name of the group of educational programs | B068 Food production |
| Code and name of the educational program (EP | 6B07223 Food Processing Technologies (by Industry) |
| Educational program profile | Higher engineering education |
| Goal of the educational program | Training of highly qualified personnel for food and processing industries with professional competencies that contribute to their social mobility and sustainability in the labor market. |
| Completion criterion of an educational program | 240 academic credits |
| Language of instruction of the educational program | Russian, kazakh |
| Distinctive features of the educational program | No |
| Partner University | No |

## 2 Qualification characteristics of a graduate of an educational program

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|---|---|
| Degree awarded | Bachelor of engineering and technology in the educational program «6B07223 Food Processing Technologies (by Industry)» |
| Field of professional activity | - organizational and managerial<br>- production and technological<br>- scientific research<br>- project information |
| Types of professional activities | Production and technological<br>- organization and improvement of technological processes for the production of bakery, confectionery and pasta products, as well as the production of flour and cereals; analysis of the technical equipment and production activities of processing enterprises, taking into account the requirements of environmental safety, labor protection, fire, explosion safety and industrial sanitation; analysis of technical and economic indicators of enterprises and marketing activities; standardization work and certification of processed food products;<br>Organizational and managerial<br>- organization of work of labor collectives, making managerial decisions;<br>Project information<br>- development and design of technological schemes of processing industry enterprises; reconstruction of existing enterprises; |

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| | Scientific research<br>- study and analysis of scientific and technical information, domestic and foreign experience in the food and processing industries;<br>- work in the field of education. |
| Object of professional activity | production (technology, organization, management and control) for the production of raw materials and foodstuffs (bakery, confectionery, pasta, cereals, etc.), machinery and equipment of elevators, mills, grain mills, pasta and confectionery factories |
| Functions of professional activity | - organization and control of technological processes for the production of bakery and flour confectionery, pasta, as well as the production of flour and cereals;<br>-management of technological processes in food processing in bakeries, pasta and confectionery factories, flour mills and cereal factories;<br>-control of compliance with the existing technology of product processing;<br>-control over the correctness of packaging, labeling and storage conditions of products;<br>-monitoring compliance with the correct operation of technological equipment;<br>- ensuring the introduction of new machinery and technologies at processing plants;<br>-development of technical control methods;<br>-organization of quality control and safety control of raw materials, semi-finished products, finished products;<br>-drawing up plans to improve the technical and economic efficiency of production;<br>-development of technological documentation;<br>-development of technologies for new types of products in accordance with the state policy of the Republic of Kazakhstan in the field of healthy nutrition of the population;<br>-ensuring the necessary level of technical preparation of production and its continuous growth;<br>- interaction with business units, design and research organizations, and customer representatives on issues within its competence;<br>-management of project work aimed at improving production;<br>-providing microbiological control of basic and auxiliary materials, containers, equipment and premises, and conducting microbiological operations;<br>-analysis of problematic production situations;<br>- team management;<br>-compliance with the rules and regulations of occupational safety, industrial sanitation and fire protection;<br>-monitoring compliance with occupational safety regulations;<br>-management of the company's technical services, monitoring the results of their work, the state of labor and industrial discipline in subordinate units;<br>-ensuring control over compliance with the environmental cleanliness of production processes;<br>-preparation of documentation on product certification. |

## 3 Requirements for the content of the educational program

| Name of cycles and disciplines | Workload in academic credits |
|---|---|
| **Cycle of general education disciplines (GED)** | **56** |
| Required component | 51 |
| University component | 5 |
| **Cycle of basic disciplines (BD)** | **94** |
| University component | 44 |
| Component of choice | 45 |
| Professional practice | 5 |
| **Cycle of major disciplines (MD)** | **82** |
| University component | 15 |
| Component of choice | 55 |
| Professional practice | 12 |
| **Final certification** | **8** |
| **Total** | **240** |

## 4 Additional educational programs (minor)

4.1 Minor «Modern aspects of the application of artificial intelligence»

| Name of disciplines | Workload in academic credits |
|---|---|
| Introduction to Artificial Intelligence | 5 |
| Development of Artificial Neural Networks | 5 |
| Artificial Intelligence in the Management of Object | 5 |
| Total | 15 |

## 5 Competency map of the educational program «6B07223 Food Processing Technologies (by Industry)»

| Competence map of the educational program | Learning outcome code | Learning Outcome (according to Bloom's Taxonomy) |
|---|---|---|
| Behavioral skills and personality traits (Softskills) | $LO_{GED1}$ | Forms a system of general competencies that ensure the socio-cultural development of the future specialist's personality, based on the formation of their worldview, civic, and moral stance, oriented towards a healthy lifestyle. |
| | $LO_{GED2}$ | Capable of communication in both oral and written forms in Kazakh, Russian, and foreign languages to solve tasks related to interpersonal, intercultural, and professional communication |
| | $LO_1$ | Develops competencies in the field of economics, law, the basics of anti-corruption culture, as well as entrepreneurship skills and financial literacy in professional activities. |
| | $LO_2$ | Uses methods of mathematical analysis, basic laws of physics, mechanics, heat engineering, techniques for working with modern computer programs and equipment when solving engineering problems in |

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| | | professional activities. |
| | LO 3 | Uses modern physical-chemical, microbiological and biochemical methods of analysis to study the composition, properties of raw materials and finished products of processing industries. |
| | LO 4 | Solves the tasks of designing, reconstructing and effectively managing production lines using innovative equipment, sensor systems, digital platforms, artificial intelligence and elements of digital modeling. |
| | LO 5 | Applies technological methods of processing raw materials and semi-finished products to improve the quality of storage of finished products at processing plants. |
| | LO 6 | Assesses the quality and properties of raw materials and finished products, taking into account the optimization of technological production processes. |
| Digital competencies (Digital skills) | $LO_{GED3}$ | Promotes the development of information literacy through the mastery and use of modern in-formation and communication technologies in all areas of activ-ity. |
| Professional skills (Hardskills) | LO 7 | Ensures the improvement of manufacturing technology for grain processing products, as well as the introduction of the latest achievements in science and technology in the field of developing new functional food products. |
| | LO 8 | Apply professional engineering solutions in the design of processing industries, taking into account the management of work on the organization of new production workshops and sections. |
| | LO 9 | Organizes comprehensive analysis, digital control and ensuring the safety of raw materials and finished products using standards, sanitary and hygienic standards, quality management systems and traceability tools. |
| | LO 10 | Develops technologies for complex processing of plant and secondary raw materials based on the principles of resource conservation, waste-free production and efficient use of by-products. |

## 6 Learning outcomes of the educational program and modules

| Key competencies | Learning Outcomes (LO) for the educational program | Name of module | Learning outcomes for the module | Name of disciplines that form learning outcomes |
|---|---|---|---|---|
| Behavioral skills and personality traits (Softskills) | $LO_{GED1}$ Forms a system of general competencies that ensure the socio-cultural development of the future specialist's personality, based on the formation of their worldview, civic, and moral stance, oriented towards a healthy lifestyle. | Man and Society – the foundation of worldview and socio-political knowledge | Applies the fundamental laws of Kazakhstan's history, philosophy, and socio-political knowledge for effective socialization and adaptation in changing socio-cultural conditions, shaping a personality capable of mobility in the modern world, critical thinking, and physical self-improvement. | History of Kazakhstan<br>Philosophy<br>Physical Culture<br>Module of Socio-Political Knowledge (Political Science, Sociology, Cultural Studies, Psychology) |
| | $LO_{GED2}$ Capable of communication in both oral and written forms in Kazakh, Russian, and foreign languages to solve tasks related to interpersonal, intercultural, and professional communication | Information and Communication Module | Capable of interpersonal social and professional communication in Kazakh, Russian, and foreign languages. | Foreign Language<br>Kazakh (Russian) Language |
| | $LO_{GED3}$ Promotes the development of information literacy through the mastery and use of modern in-formation and communication technologies in all areas of activity. | | Possesses various types of information and communication technologies for searching, storing, processing, protecting, and disseminating information. | Information and Communication Technologies |
| | LO1<br>Develops competencies in the field of economics, law, the basics of anti-corruption culture, as well as entrepreneurship skills and financial literacy in professional activities. | Man and Society – the foundation of worldview and socio-political knowledge | He applies knowledge of economics and law, as well as business and financial literacy skills in his professional activities. | Module of Economics, Entrepreneurship, Law and Financial Literacy (Fundamentals of Economics and Entrepreneurship, Fundamentals of Law and Anti-corruption Culture, Fundamentals of Financial Literacy) |
| | LO 2<br>Uses methods of mathematical analysis, basic laws of physics, mechanics, heat engineering, techniques for working | Naturally scientific | Uses knowledge of physical and mathematical laws to solve problems and applies the rules of execution of drawing and design documentation in professional activities. | Higher Mathematics<br>Physics<br>Engineering and Computer Graphics |

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| | with modern computer programs and equipment when solving engineering problems in professional activities. | | Applies the laws of mechanics to successfully study the relevant disciplines. | Theoretical and Applied Mechanics/ Heat Engineering |
| | LO 3<br>Uses modern physical-chemical, microbiological and biochemical methods of analysis to study the composition, properties of raw materials and finished products of processing industries. | | Demonstrates knowledge of the theoretical foundations of inorganic, organic, analytical and physico-colloidal, food chemistry, their basic concepts and laws, also applies the laws of physics and chemistry, processes, phenomena, theories and complex dependencies between them in food production enterprises | General Chemistry/<br>Analytical and Physicochemical Colloid Chemistry. |
| | | | | Food Chemistry |
| | | | | Биохимические основы хлебопекарных процессов/<br>Биохимия зерна и продуктов его переработки |
| | | | Evaluates the technical criteria for the safety of raw materials, semi-finished products and finished products. Applies knowledge about microbiological processes occurring in processed raw materials and finished products. | Technical Microbiology /<br>Microbiology in the Processing Industry |
| | | | Demonstrates knowledge of the fundamentals of scientific research. Uses genres of academic writing to present various practical information. | Basics of Research |
| | LO 4<br>Solves the tasks of designing, reconstructing and effectively managing production lines using innovative equipment, sensor systems, digital platforms, artificial intelligence and elements of digital modeling. | Engineering | Applies knowledge of the basic technological processes of food production from raw materials to finished products. Possesses independent work skills for further improvement of professional knowledge | Production Practice 1 |
| | | | Demonstrates knowledge of the principles of operation and operation of technological equipment of processing plants, as well as the basics of using artificial intelligence technologies to control technological processes. | Processes and Vehicles of Food Productions |
| | | | | Introduction to Artificial Intelligence (Minor) |
| | | | | Technological Equipment of Bakery Enterprises /<br>Technological Equipment of Grain Processing Enterprises /<br>Development of Artificial Neural Networks (Minor) |
| | | | | Technological Equipment of Confectionery Enterprises /<br>Technological Equipment of Flour Milling Industries |
| | | | | Artificial Intelligence in Object Management |

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| | | | | (Minor) |
| | | | | Food Combinatorics Using Artificial Intelligence Methods |
| | | | | Organization of Work of Enterprises Producing Bakery, Confectionery and Pasta Products / Organization of Work of Enterprises Producing Grain and Its Processed Products |
| | | | Evaluates automation processes in the production of bakery and confectionery products, as well as grain drying modes, taking into account quality | Automation of Technological Processes in the Production of Bakery and Confectionery Products / Grain Drying |
| | LO 5<br>Applies technological methods of processing raw materials and semi-finished products to improve the quality of storage of finished products at processing plants. | Technological | Evaluates the effect of food additives, justifies the storage methods of crop production, and explores fermentation processes to produce high-quality food products. | Food Additives Technologies for Bakery, Pasta, and Confectionery Production / Processing and Storage of Crop Production |
| | | | It applies the physical, technological, and chemical properties of processing products, as well as the main technological operations in its production activities, and develops technologies and technological schemes for processing industries | General Technology of Processing Industries |
| | LO 6<br>Assesses the quality and properties of raw materials and finished products, taking into account the optimization of technological production processes. | Technological | Characterizes the properties of food products, their changes during the movement of goods | Commodity Science of Bakery and Confectionery Products/ Commodity Science of Grain and Its Processed Products |
| | | Engineering | Evaluates the influence of grain properties and rheological parameters on the efficiency of processing and the quality of final products | Food Rheology / Grain Science with Fundamentals of Plant Production |
| Professional skills (Hardskills) | LO 7<br>Ensures the improvement of manufacturing technology for grain processing products, as well as the introduction of the latest achievements in science and technology in the field of developing new functional food products. | Technological | It applies various technologies for deep processing of raw materials, as well as uses technological schemes and processes of its processing in the production of finished products in processing plants. | Functional Food Technology / Technology of the Elevator Industry |
| | | | | Bakery Production Technology / Technology of Grain Processing Industries |
| | | | | Pasta Production Technology / Flour Milling Technology |
| | | | | Confectionery Technology / Technology of Cereal Production |

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| | | | | Food Combinatorics Using Artificial Intelligence Methods |
| | | | Applies knowledge of the organization and management of technological processes of various branches of the food industry in professional activities | Production Practice 2 |
| | LO 8<br>Apply professional engineering solutions in the design of processing industries, taking into account the management of work on the organization of new production workshops and sections. | Economy and production | Evaluates the economic efficiency of enterprises, taking into account the principles of sustainable development, environmental safety and labor protection. | Economics and Planning at the Enterprise |
| | | | | Sustainable Development, Ecology, and Life Safety |
| | | | Demonstrates knowledge in the field of design, reconstruction and equipment of processing enterprises | Design of Enterprises of the Bakery and Confectionery Industry / Design of Grain Processing Enterprises |
| | | | Demonstrates and applies acquired skills and knowledge at a professional level; knows the basics of technology and technological processes of processing industries; solves problems of improving quality and developing competitive products | Pre-Graduation Practice / Production Practice |
| | LO 9<br>Organizes comprehensive analysis, digital control and ensuring the safety of raw materials and finished products using standards, sanitary and hygienic standards, quality management systems and traceability tools. | Security, standardization and control | Applies theoretical and practical knowledge on control, assessment, expertise, quality and safety testing of raw materials and products in accordance with the requirements of enterprise standards and other regulatory documentation | Examination of Bakery and Confectionery Products / Examination of Grain and Its Processed Products |
| | | | | Standardization and Confirmation of Conformity |
| | | | | Food Safety |
| | | | Demonstrates knowledge and practical skills in the field of modern quality management systems based on international standards | Quality Management System in Processing/ Industries Quality Management in Processing Industries |
| | LO 10<br>Develops technologies for complex processing of plant and secondary raw materials based on the principles of resource conservation, waste-free production and efficient use of by-products. | Technological | Evaluates technologies for the storage, processing and use of vegetable raw materials and secondary resources; selects methods for the production of food concentrates and vegetable fats, taking into account the preservation of quality and nutritional value. | Technology of Food Concentrates / Technology for Processing Secondary Raw Materials of Crop Production |

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| | LO11 Applies theoretical and practical learning skills to independently solve professional tasks at the exit and while continuing education at subsequent levels, as well as in professional activities in the food industry. | Final Certification | Understands the goals, methodology and methods of professional activity of a technologist, engineer and head of a food production and also applies scientific research in the field of improving food production technologies. Applies the acquired skills in preparation for continuing further education in the profile of the educational program being studied. | Final Certification |

**7 The relationship between the attainability of the formed learning outcomes according to the educational program and academic disciplines**

| № | Name of the discipline | Brief description of the discipline | Number of credits | Formed learning outcomes (codes) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | LO GED1 | LO GED2 | LO GED3 | LO 1 | LO 2 | LO 3 | LO 4 | LO 5 | LO 6 | LO 7 | LO 8 | LO 9 | LO 10 |
| Cycle of general education disciplines<br>Required component | | | | | | | | | | | | | | | | |
| 1 | History of Kazakhstan | The purpose of the discipline shall be to give objective knowledge about the main stages in the development of the history of Kazakhstan from ancient times to the present. The program consists of 5 thematic blocks: Ancient people and the formation of a nomadic civilization, Turkic civilization and the Great Steppe, Kazakhstan in a new era (XVIII-early XX centuries), Kazakhstan in the Soviet period, and Independent Kazakhstan. Upon completion of the discipline, student applies skills of analytical, axiological, critical analysis in the study of historical processes for an objective understanding of the modern Kazakh model of development. | 5 | + | | | | | | | | | | | | |
| 2 | Philosophy | The purpose of the program is to develop students' holistic understanding of philosophy as a special form of knowledge of the world, its main branches, problems, and methods of their study in the context of future professional activity. The discipline covers the key directions in | 5 | + | | | | | | | | | | | | |

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| | | the emergence and development of philosophy, the foundations of the philosophical understanding of the world, the philosophy of the human being, and the world of values. Upon completion of the discipline, student argue their own moral position regarding relevant issues of contemporary global society. | | | | | | | | | | | | | | | |
| 3 | Foreign Language | The goal of the curriculum shall be the formation of intercultural communicative competence of students in the process of foreign language education at a sufficient level (A2, common European framework) and the level of basic sufficiency (B1, common European framework). The course content entails a sequential study of language proficiency levels by integrating social, socio-cultural, and academic-professional communication spheres. Upon completion of the discipline, student will be able to articulate potential solutions to contemporary issues in a foreign language, utilizing evidence-based information and reasoned arguments. | 10 | | + | | | | | | | | | | | | |
| 4 | Kazakh (Russian) Language | The purpose of the program - to teach the Kazakh (Russian) language in accordance with international standards for teaching languages, to increase the importance of the Kazakh language as the state language and the Russian language as a medium for intercultural and professional communication, developing competence in the use of the | 10 | | + | | | | | | | | | | | | |

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| | | Kazakh (Russian) language by a future specialist as a means of communication in scientific, socio-cultural, political, professional spheres of public life. Upon completion of the curriculum, the student shall show competence in conditions of personal, social and professional communication in accordance with the peculiarities of the language, culture, communication situation. | | | | | | | | | | | | | | | |
| 5 | Information and Communication Technologies | The purpose of the program is to develop the ability to critically evaluate and analyze processes, methods of searching, storing and processing information, and methods of collecting and transmitting information through digital technologies. Studies the fundamentals of working with information, digital technologies, and computer systems; the application of software, internet services, and ICT in professional and research activities; information security; and artificial intelligence technologies. Upon completion of the discipline, student will be able to utilize digital technologies to develop data analysis and management tools for various fields of activity. | 5 | | | + | | | | | | | | | | | |
| 6 | Module of Socio-Political Knowledge (Political Science, Sociology, Cultural Studies, | The objective of the discipline is to form the socio-humanitarian worldview of learners in the context of addressing the tasks of modernizing public consciousness, encompassing the interdisciplinary study of sociology, | 8 | + | | | | | | | | | | | | | |

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| | Psychology) | political science, cultural studies, and psychology while integrating principles of inclusion and the «Adal Azamat» (Honest Citizen) value orientations as fundamental pillars for the development of modern society. Upon completion of the discipline, the student interprets socio-humanitarian knowledge and ethical values based on scientific methods of social analysis, participates in conflict resolution, and provides reasoned advocacy for positions regarding the modernization of Kazakhstan. | | | | | | | | | | | | | | | |
| 7 | Physical Culture | The goal of the curriculum shall be the formation of socio-personal competences of students and the ability to purposefully use the means and methods of physical culture for conservation, promotion of health to prepare for professional activities; to take physical stress, mental stress and adverse factors in their future activities. Upon completion of the curriculum, the student shall to use a variety of forms and types of physical activities for healthy life, active recreation and leisure. | 8 | + | | | | | | | | | | | | | |
| Cycle of general education disciplines<br>University component | | | | | | | | | | | | | | | | | |
| 8 | Module of Economics, Entrepreneurship, Law and Financial Literacy (Fundamentals of | The discipline is aimed at developing entrepreneurial thinking, financial responsibility, legal literacy, fostering an anti-corruption culture, and commitment to the principles of law and order in a market economy. Its | 5 | | | | + | | | | | | | | | | |

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| | Economics and Entrepreneurship, Fundamentals of Law and Anti-corruption Culture, Fundamentals of Financial Literacy) | content includes the fundamentals of economics, entrepreneurship, financial literacy, law, anti-corruption culture. As a result of studying the discipline, the student has the skills to make effective economic decisions, ensure legal protection, apply financial literacy, and adhere to anti-corruption practices. | | | | | | | | | | | | | | | |
| Cycle of basic disciplines<br>University component | | | | | | | | | | | | | | | | | |
| 9 | Higher Mathematics | The discipline is aimed at forming knowledge of the fundamentals of higher mathematics and familiarization with mathematical methods for solving standard problems and their application in practice. The content of the discipline covers theoretical and practical problems related to elements of linear and vector algebra, mathematical analysis, and probability theory. As a result of studying the discipline, the student solves applied problems by constructing mathematical models. | 5 | | | | | + | | | | | | | | | |
| 10 | Engineering and Computer Graphics | The discipline is studied in order to form basic knowledge related to the creation and processing of graphic images used in engineering and technical fields. The content of the discipline covers the study of the main components of graphics systems, hardware and software for working with graphics. As a result of mastering the discipline, the student learns the theoretical knowledge and practical skills necessary to work with graphical | 6 | | | | | + | | | | | | | | | |

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| | | systems in the mode of solving engineering problems. | | | | | | | | | | | | | | | |
| 11 | General Technology of Processing Industries | The discipline is aimed at developing knowledge about the basic technologies of processing industries and the principles of processing raw materials. The content includes methods of grain processing, production of flour, cereals, animal feed, bread, pasta and confectionery, technological schemes and product storage. As a result of studying the discipline, he develops technological schemes using control methods to ensure the quality of raw materials and finished products. | 5 | | | | | | | | + | | | | | | |
| 12 | Basics of Research | This discipline is aimed at developing knowledge of the methodological foundations of scientific knowledge and the principles of organizing scientific research. The content covers methods of theoretical, empirical, and metatheoretical research, elements of theory, methodologies of scientific and technical creativity, choosing a research direction, and the stages of research. As a result, the study organizes scientific research in the field of technology of food products. | 5 | | | | | | + | | | | | | | | |
| 13 | Food Chemistry | This discipline is aimed at developing knowledge and skills in nutrition science, including the study of nutrients, their consumption, absorption, metabolism, and role in energy metabolism. The discipline covers the physiological and social aspects of nutrition, factors influencing | 5 | | | | | | + | | | | | | | | |

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| | | food choices, as well as the fundamentals of nutritional epidemiology and the relationship between diet and health. As a result of mastering, conduct research aimed at studying the chemical composition of raw materials, semi-finished products, culinary products and dishes. | | | | | | | | | | | | | | |
| 14 | Processes and Vehicles of Food Productions | This discipline is designed to develop knowledge about the rational design, calculation, and operation of machinery and equipment for food processing. The content covers the fundamental processes of food technology, the design of machinery and equipment, and the principles of efficient industrial operation. Mastering this discipline helps students develop skills in the design and use of process equipment to ensure high productivity and product quality. As a result of the study, students design machines and devices for food production. | 5 | | | | | | | + | | | | | | |
| 15 | Sustainable Development, Ecology, and Life Safety | This discipline is designed to cultivate a systemic understanding of the principles of balancing economic development, social well-being, environmental preservation, and the protection of human life and health. It covers key issues in ecology, environmental protection, life safety, and sustainable development. Upon completion of the course, students will be able to apply the principles of sustainable development, environmental safety, and occupational | 5 | | | | | | | | | | | + | | |

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| | | health and safety to manage energy and waste within a circular economy framework. | | | | | | | | | | | | | | | | |
| 16 | Physics | The discipline is aimed at forming fundamental knowledge of physical laws and developing skills in their application in technology. The content of the discipline covers mechanics, molecular physics, thermodynamics, electromagnetism, optics, the basics of atomic and quantum physics, as well as methods of experimental measurements. As a result of studying the discipline, the student applies the laws of physics for the computational analysis of processes, processing of experimental data, determination of equipment parameters, and substantiation of professional decisions. | 5 | | | | | + | | | | | | | | | | |
| 17 | Economics and Planning at the Enterprise | The discipline is aimed at forming knowledge about the principles of enterprise functioning and the planning of its economic activities. The content covers the economic foundations of enterprise operations, the planning of production and financial indicators, the use of fixed assets and working capital, labor resource planning, cost formation, and the evaluation of enterprise performance efficiency. As a result of studying the discipline, the student substantiates planning decisions on the basis of economic calculations. | 3 | | | | | | | | | | | | + | | | |
| Cycle of basic disciplines<br>Component of choice | | | | | | | | | | | | | | | | | | |

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| 18 | Automation of Technological Processes in the Production of Bakery and Confectionery Products | The discipline is aimed at developing knowledge about the principles of automation of technological processes in bakery and confectionery production, and the operation of automated systems. The content includes automation methods, equipment programming, system configuration, process control, and parameter control. As a result of mastering the discipline, it manages technological processes using automated systems to ensure product stability and quality. | 5 | | | | | | | + | | | | | | |
| 19 | Analytical and Physicochemical Colloid Chemistry. | The discipline is aimed at the study of methods for the qualitative and quantitative analysis of substances, as well as the physicochemical properties of solutions and colloidal systems. The content includes methods of analytical analysis, determination of the composition of substances, properties of solutions, colloidal systems, adsorption, and surface phenomena. As a result of studying the discipline, the student interprets physicochemical processes using the methods of analytical and physicochemical colloid chemistry. | 5 | | | | | | + | | | | | | | | |
| 20 | Introduction to Artificial Intelligence (Minor) | The discipline is aimed at forming fundamental knowledge about the principles and methods of artificial intelligence and the application of intelligent technologies in solving professional tasks. The content covers the stages of the development of artificial intelligence, the fundamentals | 5 | | | | | | | + | | | | | | | |

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| | | of machine learning, elements of neural networks, data processing methods, intelligent systems, and the areas of application of artificial intelligence technologies. As a result of studying the discipline, the student applies artificial intelligence technologies in various fields of professional activity. | | | | | | | | | | | | | | | |
| 21 | Grain Science with Fundamentals of Plant Production | The discipline is aimed at developing knowledge about the biological characteristics of grain and leguminous crops, the technological properties of raw materials and the basics of crop production. The content includes crop classification, raw material characteristics, sowing methods, crop care, plant protection, diseases and pests. As a result of mastering the discipline, it analyzes the characteristics of grain raw materials using agrotechnological parameters to select processing technologies. | 5 | | | | | | | | | | + | | | | |
| 22 | Grain Drying | The discipline is aimed at developing knowledge in the field of grain drying processes that ensure the preservation of quality and increase the efficiency of grain storage. The content of the discipline includes drying technologies and modes, the design and operation of grain drying equipment, energy efficiency indicators, quality control methods and safety requirements. As a result of mastering the discipline, the student optimizes grain drying modes using process parameters and quality indicators to ensure grain safety. | 5 | | | | | | | + | | | | | | | |

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| 23 | Microbiology in the Processing Industry | The discipline is aimed at developing knowledge about the role of microbiology in processing industries, the properties of microorganisms and the causes of food poisoning. The content includes microorganisms of raw materials and products, conditionally pathogenic forms, infectious agents and methods of microbiological research. As a result of mastering the discipline, microbiological indicators are analyzed using research methods to assess product safety. | 5 | | | | | | + | | | | | | | | |
| 24 | Processing and Storage of Crop Production | The discipline is aimed at developing knowledge about the processing and storage of crop production, ensuring the quality and safety of raw materials. The content includes the classification of products, properties of grain mass, modes and methods of storage, methods of increasing the durability and quality of products. As a result of mastering the discipline, it determines storage modes using product properties to ensure its safety. | 5 | | | | | | | | + | | | | | | |
| 25 | General Chemistry | The discipline is aimed at forming knowledge of the fundamentals of higher mathematics and familiarization with mathematical methods for solving standard problems and their application in practice. The content of the discipline covers theoretical and practical problems related to elements of linear and vector algebra, mathematical analysis, and probability theory. As a | 5 | | | | | | + | | | | | | | | |

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| | | result of studying the discipline, the student solves applied problems by constructing mathematical models. | | | | | | | | | | | | | | |
| 26 | Food Additives Technologies for Bakery, Pasta, and Confectionery Production | The discipline is aimed at developing knowledge about the use of food additives in bakery, pasta and confectionery production, and ensuring product quality. The content includes the classification of food additives, safety requirements, groups of additives, effects on the appearance, texture, taste, aroma and safety of products. As a result of mastering the discipline, he justifies the use of food additives using classification and safety requirements to ensure product quality.. | 5 | | | | | | | | + | | | | | |
| 27 | Development of Artificial Neural Networks (Minor) | The discipline is aimed at forming theoretical knowledge and practical skills in the development and application of artificial neural networks for intelligent information processing. The content covers the principles of construction and functioning of artificial neural networks, the main neural network architectures, training methods, data preparation and processing, and tools for developing neural network models. As a result of studying the discipline, the student develops neural networks to solve problems of data processing and intelligent systems. | 5 | | | | | | | + | | | | | | |
| 28 | Food Rheology | The discipline is aimed at developing knowledge about the rheological properties of food products and fluid systems in the processing of plant raw | 5 | | | | | | | | | + | | | | |

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| | | materials. The content includes fluidity, viscosity, elasticity, plasticity, laws of rheology, methods and instruments of research. As a result of mastering the discipline, rheological properties are determined using measurement methods to evaluate the structural and mechanical characteristics of products. | | | | | | | | | | | | | | |
| 29 | Theoretical and Applied Mechanics | The discipline is aimed at developing knowledge about the basic laws of mechanics, the laws of motion of material points and mechanical systems. The content includes the laws of mechanics, equilibrium conditions, the movement of systems, the construction of computational schemes and process modeling. As a result of mastering the discipline, the student analyzes mechanical systems using computational schemes to solve production problems. | 5 | | | | | + | | | | | | | | |
| 30 | Heat Engineering | The discipline is aimed at developing knowledge about the methods of obtaining, converting, transferring and using heat, and the principles of operation of thermal installations. The content includes heat exchange processes, thermal calculations, thermal machines and aggregates, steam generators, and design features of the equipment. As a result of mastering the discipline, the student calculates thermal processes using heat exchange methods to analyze the operation of thermal installations. | 5 | | | | | + | | | | | | | | |
| 31 | Technical | The discipline is aimed at developing | 5 | | | | | | + | | | | | | | |

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| | Microbiology | knowledge about the role of microorganisms in production processes, biochemical changes in raw materials and products, factors of microbiological safety and methods of ensuring it. The content includes microorganisms of food production, methods of cultivation and coloring, sanitary control and preventive measures. As a result of studying the discipline, the student evaluates microbiological processes using sanitary control methods to ensure product safety. | | | | | | | | | | | | | | | |
| 32 | Technological Equipment of Flour Milling Industries | The discipline is aimed at the formation of knowledge about the technological equipment of flour mills, the principles of its operation and the regulation of processes. The content includes machine designs, grain milling and milling processes, equipment coordination, automation and control of technological processes. As a result of studying the discipline, it analyzes the grinding processes using technological parameters to assess the effectiveness of flour production. | 5 | | | | | | | + | | | | | | | |
| 33 | Technological Equipment of Grain Processing Enterprises | The discipline is aimed at developing knowledge about the technological equipment of grain processing enterprises, the principles of its operation and operating conditions. The content includes equipment for elevators, warehouses, transshipment and production facilities, access roads, structural diagrams, grain storage and | 5 | | | | | | | + | | | | | | | |

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| | | processing processes. As a result of mastering the discipline, it analyzes the operation of equipment using technical parameters to assess the effectiveness of grain storage and processing processes. | | | | | | | | | | | | | | | |
| 34 | Technological Equipment of Confectionery Enterprises | The discipline is aimed at developing knowledge about the technological equipment of confectionery industries, production lines and the specifics of their operation. The content includes equipment for sugar and flour products, design features, complete set of machines, principles of operation and modern solutions. As a result of studying the discipline, it regulates the operating modes of equipment using technological parameters to ensure the efficiency of confectionery production. | 5 | | | | | | | + | | | | | | | |
| 35 | Technological Equipment of Bakery Enterprises | The discipline is aimed at the formation of knowledge about the technological equipment of bakery enterprises, the principles of its operation and operating conditions. The content includes equipment classification, device, operating principles, operating modes, operating rules and parameter control. As a result of studying the discipline, it regulates the operating modes of equipment using technological parameters to ensure the efficiency of bakery products production. | 5 | | | | | | | + | | | | | | | |
| 36 | Commodity Science of Grain and Its Processed Products | The discipline is aimed at developing knowledge about the classification of grain crops, quality indicators and commodity characteristics of grain and | 5 | | | | | | | | | + | | | | | |

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| | | its processed products. The content includes methods for assessing grain quality, product indicators, safety factors, commodity losses, and processing features. As a result of studying the discipline, it evaluates quality indicators using commodity science methods to determine the characteristics of grain and products. | | | | | | | | | | | | | | | | |
| 37 | Commodity Science of Bakery and Confectionery Products | The discipline is aimed at developing knowledge about the properties, composition, assortment and classification of bakery and confectionery products, nutritional value and peculiarities of their production. The content includes the chemical composition, physico-chemical and organoleptic properties of products, technological modes and processing methods. As a result of studying the discipline, it evaluates the composition and properties of products using commodity science methods to control product quality. | 5 | | | | | | | | | | + | | | | | |
| Cycle of major disciplines<br>University component | | | | | | | | | | | | | | | | | | |
| 38 | Food Safety | This discipline develops knowledge about the safety and quality of raw materials, supplies, and finished products of animal and plant origin, as well as the legislative framework for food safety. It describes regulatory requirements, product contamination risks, safety control methods at all stages of the technological process, and procedures for identifying and | 5 | | | | | | | | | | | | | | + | |

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| | | assessing factors affecting product quality and safety. As a result of the study, analyzes the indicators of food safety and quality. | | | | | | | | | | | | | | |
| 39 | Food Combinatorics Using Artificial Intelligence Methods | The discipline is studied in order to develop knowledge and skills in the development of multicomponent food formulations based on the principles of food combinatorics and artificial intelligence methods. The content of the discipline includes the biological foundations of creating products of complex composition, regulatory requirements for the quality and safety of food products, methods for modeling formulations using digital technologies and databases, as well as the use of artificial intelligence algorithms to analyze, predict and optimize the composition of products. As a result of studying the discipline, he models the recipes of multicomponent food products using artificial intelligence methods. | 5 | | | | | | | + | | | + | | | |
| 40 | Standardization and Confirmation of Conformity | The discipline is aimed at developing knowledge about the basics of the application of regulatory documents on standardization in industries that regulate the quality and safety of products. The content includes standardization methods, the application of technical regulations and standards, and product conformity assessment procedures. As a result of mastering the discipline, it ensures the quality and safety of products using | 5 | | | | | | | | | | | | + | |

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| | | regulatory documents and conformity assessment procedures to comply with established requirements in production processes. | | | | | | | | | | | | | | | | |
| Cycle of major disciplines<br>Component of choice | | | | | | | | | | | | | | | | | | |
| 41 | Biochemical Foundations of Baking Processes | The discipline is aimed at developing knowledge about the biochemical processes occurring in the production of bakery products and the role of enzymes, proteins and carbohydrates in shaping product quality. The content includes enzymatic reactions, fermentation processes, changes in dough components, the influence of raw materials and conditions on biochemical transformations. As a result of mastering the discipline, it analyzes biochemical processes using control methods to ensure the quality of bakery products. | 5 | | | | | | + | | | | | | | | |
| 42 | Biochemistry of Grain and Its Processed Products | The discipline is aimed at developing knowledge about the biochemical composition of grain and its processed products, changes in components during storage and processing. The content includes proteins, carbohydrates, lipids, grain enzymes, and biochemical processes during processing and storage of products. As a result of mastering the discipline, it analyzes biochemical changes using control methods to ensure the quality of grain and its processed products. | 5 | | | | | | + | | | | | | | | |
| 43 | Artificial Intelligence in | The discipline is aimed at forming knowledge and skills in the application | 5 | | | | | | | + | | | | | | | |

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| | Object Management (Minor) | of artificial intelligence methods for the analysis, modeling, and control of technical and information objects. The content covers methods and algorithms of artificial intelligence in control systems, intelligent decision-making methods, data processing and analysis, and the application of machine learning and intelligent systems. As a result of studying the discipline, the student applies artificial intelligence technologies in object control systems. | | | | | | | | | | | | | | |
| 44 | Organization of Work of Enterprises Producing Grain and Its Processed Products | The discipline is aimed at the formation of knowledge in the field of organization of enterprises for the production of grain and its processed products using digital technologies and elements of artificial intelligence. The discipline's content includes activity planning, resource management, quality control, and the use of AI to monitor technological processes. As a result of mastering the discipline, the student organizes production processes using digital technologies to increase the efficiency of the enterprise. | 6 | | | | | | | + | | | | | | |
| 45 | Organization of Work of Enterprises Producing Bakery, Confectionery and Pasta Products | The discipline is aimed at the formation of knowledge in the field of organization and management of enterprises for the production of bakery, confectionery and pasta. The content of the discipline includes the structure and organization of production units, planning and management of production processes, use of resources, labor organization, | 6 | | | | | | | + | | | | | | |

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| | | quality control and production efficiency. As a result of mastering the discipline, the student organizes production processes using planning and resource management methods to ensure the effective operation of the enterprise. | | | | | | | | | | | | | | |
| 46 | Design of Grain Processing Enterprises | The discipline is aimed at developing knowledge about the development of technological process schemes for grain acceptance, processing, processing and storage. The content includes the selection of types of granaries, calculation of the production capacity of grain mills, design of the master plan, calculation of equipment and constructive solutions of enterprises. As a result of mastering the discipline, he designs technological schemes using computational methods to ensure the efficiency of grain processing and storage. | 6 | | | | | | | | | | | + | | |
| 47 | Design of Enterprises of the Bakery and Confectionery Industry | The discipline is aimed at developing knowledge about the general design rules of the bakery and confectionery industry, calculation criteria and principles of planning. The content includes a feasibility study of projects, calculation methods, equipment selection and layout of premises for storing finished products. As a result of mastering the discipline, he designs production facilities using computational methods to justify technological and planning solutions. | 6 | | | | | | | | | | | + | | |
| 48 | Quality | The discipline is aimed at the formation | 5 | | | | | | | | | | | | + | |

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| | Management System in Processing Industries | of knowledge in the field of quality management system in processing plants. The content of the discipline includes QMS processes, international standards, control methods, results analysis and quality management at all stages of production. As a result of mastering the discipline, the student analyzes the processes of the quality management system, using the requirements of standards and control methods to ensure the quality and safety of products. | | | | | | | | | | | | | | |
| 49 | Technology of Grain Processing Industries | The discipline is aimed at the formation of knowledge about grain crops as objects of processing, their structure, classification and characteristics of the final products. The content includes an analysis of the technical processes of grain processing into flour, cereals, grain products and the production of mixed feeds. As a result of mastering the discipline, technological lines are created using process parameters for designing grain processing plants. | 6 | | | | | | | | | | + | | | |
| 50 | Confectionery Technology | The discipline is aimed at developing knowledge about the technology of confectionery products, the characteristics of raw materials and product quality requirements. The content includes the characteristics of raw materials, production processes, product formulations, quality requirements and types of equipment. As a result of mastering the discipline, he develops recipes using technological | 6 | | | | | | | | | | + | | | |

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| | | parameters to ensure the quality of confectionery products. | | | | | | | | | | | | | | |
| 51 | Technology of Cereal Production | The discipline is aimed at developing knowledge about the technology of cereal production and the preparation of raw materials. The content includes preparation of cereal raw materials, technological processes, cereal production equipment and analysis of production processes. As a result of mastering the discipline, it analyzes technological processes using production indicators to assess production efficiency. | 6 | | | | | | | | | | + | | | |
| 52 | Pasta Production Technology | The discipline is aimed at developing knowledge about pasta production technology, rational use of raw materials and increasing production efficiency. The content includes the characteristics of raw materials, technological processes of pasta production, recipes, equipment and product quality requirements. As a result of mastering the discipline, he develops technological processes using production parameters to ensure the quality of pasta. | 6 | | | | | | | | | | + | | | |
| 53 | Flour Milling Technology | The discipline is aimed at developing knowledge about flour milling technology, grain processing processes and product quality assurance. The content includes characteristics of grain raw materials, grain preparation and processing processes, technological schemes for flour production, equipment and product quality | 6 | | | | | | | | | | + | | | |

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| | | requirements. As a result of mastering the discipline, it analyzes technological processes using quality indicators to assess the effectiveness of flour milling. | | | | | | | | | | | | | | |
| 54 | Technology for Processing Secondary Raw Materials of Crop Production | The discipline is aimed at the formation of knowledge in the field of storage and processing of secondary raw materials of crop production. The content of the discipline includes the properties of secondary raw materials, storage modes, processing technologies, methods of reducing losses and principles of waste-free production. As a result of mastering the discipline, the student develops technologies for processing secondary raw materials, using its properties and storage modes to produce products with increased resource efficiency. | 5 | | | | | | | | | | | | | + |
| 55 | Technology of Food Concentrates | The discipline is aimed at developing knowledge in the field of food concentrate technology and improving their production. The content of the discipline includes the characteristics of raw materials, technological processes, calculation of formulations, consumption rates of raw materials, causes of defects and losses. As a result of mastering the discipline, the student develops the technology of food concentrates, using the properties of raw materials and process parameters to obtain products of a given quality. | 5 | | | | | | | | | | | | | + |
| 56 | Functional Food Technology | The discipline is aimed at the formation of knowledge about the technology of functional food products, their | 5 | | | | | | | | | | + | | | |

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| | | composition and importance in nutrition. The content includes the technology features of functional products, composition, technological processes and quality control of raw materials and products. As a result of mastering the discipline, it evaluates the composition of products using nutrition standards to determine their compliance with daily needs. | | | | | | | | | | | | | | | |
| 57 | Bakery Production Technology | The discipline is aimed at developing knowledge about the technology of bakery production, the properties of raw materials and the processes of manufacturing products. The content includes characteristics of raw materials, technological processes for the production of bakery products, formulations, equipment, and product quality requirements. As a result of mastering the discipline, he develops technological processes using production parameters to ensure the quality of bakery products. | 6 | | | | | | | | | | + | | | |
| 58 | Technology of the Elevator Industry | The discipline is aimed at developing knowledge about the technology of the elevator industry, the processes of grain acceptance, storage and movement. The content includes technological operations of elevators, equipment, grain storage modes, cleaning, drying, transportation and quality control processes. As a result of mastering the discipline, it analyzes technological processes using efficiency indicators to ensure the quality of grain storage. | 5 | | | | | | | | | | + | | | |

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| 59 | Quality Management in Processing Industries | The discipline is aimed at developing knowledge in the field of quality management in the food and processing industry. The content of the discipline includes the principles of universal quality management, methods of product control and evaluation, analysis of the causes of deviations and tools for improving process efficiency. As a result of mastering the discipline, the student manages product quality using control and evaluation methods to improve the efficiency of production processes. | 5 | | | | | | | | | | | | | + | |
| 60 | Examination of Grain and Its Processed Products | The discipline is aimed at the formation of knowledge in the field of expertise of grain and its processed products. The content of the discipline includes quality indicators of grain, cereals, flour, pasta and food concentrates, quality factors, assessment methods and requirements of regulatory documentation. As a result of mastering the discipline, the student conducts an examination of grain and its processed products using quality assessment methods to determine their compliance with established requirements. | 5 | | | | | | | | | | | | | + | |
| 61 | Examination of Bakery and Confectionery Products | The discipline is aimed at the formation of knowledge in the field of expertise of bakery and confectionery products, methods of research of raw materials, auxiliary materials and finished products. The content of the discipline includes the principles of expertise, methods of quality assessment, | 5 | | | | | | | | | | | | | + | |

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| | | identification of defects and deviations from the requirements of standards. As a result of mastering the discipline, the student determines the conformity of products with the requirements of regulatory documents, using examination methods to assess quality and safety. | | | | | | | | | | | | | | | |

## 8 Alignment of planned learning outcomes with assessment technologies and teaching methods within the module

| Learning Outcomes (LO) Number | Planned learning outcomes for the module | Assessment technologies (tools) | Methods of learning and teaching |
|---|---|---|---|
| $LO_{GED1}$ | Applies the fundamental laws of Kazakhstan's history, philosophy, and socio-political knowledge for effective socialization and adaptation in changing socio-cultural conditions, shaping a personality capable of mobility in the modern world, critical thinking, and physical self-improvement. | Abstract, report, creative work, testing, etc. | Interactive lecture, interactive seminar, etc. |
| $LO_{GED2}$ | Capable of interpersonal social and professional communication in Kazakh, Russian, and foreign languages. | Simulator, case task, creative task, abstract, report, testing, etc. | Interactive lecture, interactive seminar, etc. |
| $LO_{GED3}$ | Possesses various types of information and communication technologies for searching, storing, processing, protecting, and disseminating information. | Abstract, report, creative work, testing, control work, presentation, business game, etc. | The communicative-activity approach to language acquisition, the project method, etc. |
| LO 1 | He applies knowledge of economics and law, as well as business and financial literacy skills in his professional activities. | Business and/or role-playing, creative assignment, testing, educational and research project, etc. | Case study, interactive lecture, interactive seminar, etc. |
| LO 2 | Uses knowledge of physical and mathematical laws to solve problems and applies the rules of execution of drawing and design documentation in professional activities. | Laboratory work, colloquium, educational and research project, testing, etc. | Interactive lecture, interactive seminar, etc. |
| | Applies the laws of mechanics to successfully study the relevant disciplines. | | |
| LO 3 | Demonstrates knowledge of the theoretical foundations of inorganic, organic, analytical and physico-colloidal, food chemistry, their basic concepts and laws, also applies the laws of physics and chemistry, processes, phenomena, theories and complex dependencies between them in food production enterprises | Abstract, testing, colloquium, presentation, multi-level tasks and assignments, etc. | Technological process management and interactive lecture, interactive seminar, etc. |
| | Evaluates the technical criteria for the safety of raw materials, semi-finished products and finished products. Applies knowledge about microbiological processes occurring in processed raw materials and finished products. | | |
| | Demonstrates knowledge of the fundamentals of scientific research. Uses genres of academic writing to present various practical information. | | |
| LO 4 | Applies knowledge of the basic technological processes of food production from raw materials to finished products. Possesses independent work skills for further improvement of professional knowledge | Educational and research project, abstract, testing, colloquium, presentation, etc. | Interactive lecture, interactive seminar, etc. |
| | Demonstrates knowledge of the principles of operation and operation of technological equipment of processing plants, as well as the basics of using artificial intelligence technologies | | |

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| | to control technological processes. | | |
| | Evaluates automation processes in the production of bakery and confectionery products, as well as grain drying modes, taking into account quality | | |
| LO 5 | Evaluates the effect of food additives, justifies the storage methods of crop production, and explores fermentation processes to produce high-quality food products. | Calculation and graphic work, project, testing. Business and/or role-playing game, creative assignment, business project, testing, etc. | Interactive method, project method, etc. |
| | It applies the physical, technological, and chemical properties of processing products, as well as the main technological operations in its production activities, and develops technologies and technological schemes for processing industries | | |
| LO 6 | Characterizes the properties of food products, their changes during the movement of goods | Oral survey, abstract, problem solving, practical laboratory work, etc. | Blitz survey, interactive method, etc. |
| | Evaluates the influence of grain properties and rheological parameters on the efficiency of processing and the quality of final products | | |
| LO 7 | It applies various technologies for deep processing of raw materials, as well as uses technological schemes and processes of its processing in the production of finished products in processing plants. | Project, laboratory work with physical or virtual equipment, colloquium, tests, etc. | Project method, case analysis, etc. |
| | Applies knowledge of the organization and management of technological processes of various branches of the food industry in professional activities | | |
| LO 8 | Evaluates the economic efficiency of enterprises, taking into account the principles of sustainable development, environmental safety and labor protection. | Project, laboratory work with physical or virtual equipment, testing, etc. | Blitz survey, project method, case analysis, etc. |
| | Demonstrates knowledge in the field of design, reconstruction and equipment of processing enterprises | | |
| | Demonstrates and applies acquired skills and knowledge at a professional level; knows the basics of technology and technological processes of processing industries; solves problems of improving quality and developing competitive products | | |
| LO 9 | Applies theoretical and practical knowledge on control, assessment, expertise, quality and safety testing of raw materials and products in accordance with the requirements of enterprise standards and other regulatory documentation | Practical laboratory work, colloquium, testing, abstract, presentation, etc. | Demonstration, interactive lecture, interactive seminar, etc. |
| | Demonstrates knowledge and practical skills in the field of modern quality management systems based on international standards | | |
| LO 10 | Evaluates technologies for the storage, processing and use of vegetable raw materials and secondary resources; selects methods for the production of food concentrates and vegetable fats, taking into account the preservation of quality and nutritional value. | Practical laboratory work, colloquium, testing, abstract, presentation, etc. | Design method, lecture-explanatory method, practical method, laboratory method |
| LO 11 | Understands the goals, methodology and methods of professional activity of a technologist, engineer and head of a food production and also applies scientific research in the field of improving food production technologies. Applies the acquired skills in preparation for continuing further education in the profile of the educational program being studied. | Report, communication, educational and research project, creative work, research project, and others. | Case analysis, analytical review, testing. |

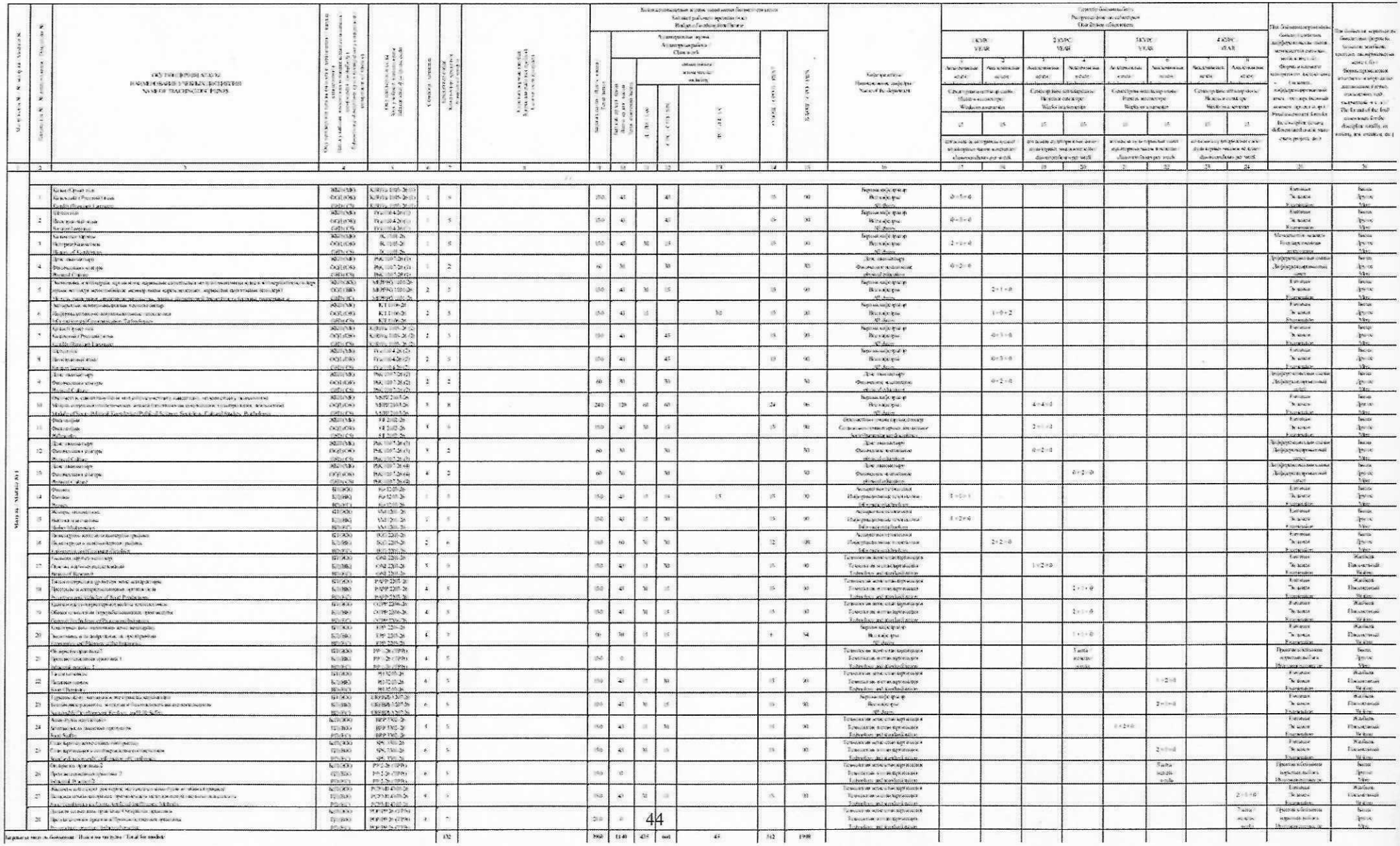
## 9 Correlation of learning outcomes of the educational program with the labor functions of professional standards

| Name of the professional standards used | Professions at level 6 and/or 7 of the SQF | Labor functions | Tasks | Learning outcomes for the educational program |
|---|---|---|---|---|
| Manufacture of macaroni (№477 19.12.2025 г.) | Food engineers and technologists | LF1. Organizational and technological support of production | Task 1: Ensuring the development and approval of process regulations for all stages of the production process | LO 7<br>Ensures the improvement of manufacturing technology for grain processing products, as well as the introduction of the latest achievements in science and technology in the field of developing new functional food products. |
| | | LF2. Operational production management | Task 1: Participation in the strategic management of production development | LO 4<br>Solves the tasks of designing, reconstructing and effectively managing production lines using innovative equipment, sensor systems, digital platforms, artificial intelligence and elements of digital modeling. |
| Production of bakery and flour confectionery products (№477 19.12.2025 г.) | Food engineers and technologists | LF1. Organizational and technological support of production | Task 1: Ensure quality and safety management of manufactured products | LO 7<br>Ensures the improvement of manufacturing technology for grain processing products, as well as the introduction of the latest achievements in science and technology in the field of developing new functional food products. |
| | | | | LO 9<br>Organizes comprehensive analysis, digital control and ensuring the safety of raw materials and finished products using standards, sanitary and hygienic standards, quality management systems and traceability tools. |
| | | LF1. Organizational and technological support of production | Task 1: Provide support for the introduction of new products, equipment, and technologies | LO 4<br>Solves the tasks of designing, reconstructing and effectively managing production lines using innovative equipment, sensor systems, digital platforms, artificial intelligence and elements of digital modeling. |
| | | | | LO 8<br>Apply professional engineering solutions in the design of processing industries, taking into account the management of work on the organization of new production workshops and sections. |

## 10 Graduate model

| GRADUATE MODEL | | | |
|---|---|---|---|
| Professional standard: Manufacture of macaroni; Production of bakery and flour confectionery products;<br>Atlas of New Professions and Competencies of the Republic of Kazakhstan: "Product Traceability Systems Engineer."<br>Regional Standard: "Recycling Technologist" (Akmola Region) and "Digital Manufacturing Engineer" (Shymkent). | Competencies (soft skills, digital skills) | | |
| | Attributes of a graduate | Knowledge | Skills |
| | Strives to introduce innovations and use modern technological solutions;<br>Demonstrates systematic and analytical thinking in solving production tasks;<br>He works effectively in a team and interacts with representatives of various professional fields.;<br>He is proficient in digital technologies necessary for the management and analysis of production processes;<br>Able to develop and optimize technological schemes of food production;<br>Owns the regulatory framework in the field of food production;<br>Conducts research according to a given methodology and analyzes the experimental data obtained; | Technologies and organization of technological processes of bakery and confectionery production.<br>Indicators of the efficiency of technological processes of bakery and confectionery production.<br>Quality requirements for the technological operations of bakery and confectionery production in accordance with the technological instructions.<br>Methods of planning, monitoring, and evaluating the quality of manufacturing operations in accordance with technological instructions.<br>Production facilities, technical characteristics, design features and operating modes of technological equipment, rules of its operation.<br>Rules of document management, accounting and reporting in the production of products.<br>Regulations, instructions and other guidance materials on the development of technological documentation.<br>Methods and means of collecting, processing, storing and transmitting information using basic system software products and application software packages. | Manage the activities of production, technological and microbiological laboratories, ensure the implementation of technochemical and microbiological quality control of basic and additional raw materials and finished products for compliance with the requirements of regulatory documentation.<br>Monitor the implementation of the process control plan on the lines, workshops and sites.<br>To make decisions on the implementation of corrective and preventive actions in cases of detection of inconsistencies or violations in the quality control of raw materials, finished products and processes.<br>To organize trial production baking in order to clarify the yield rates of finished products, indicators of the technological process of production when production conditions change, and the quality of raw materials. Ensure that established changes are made to the technological documentation with subsequent approval.<br>Monitor the sanitary and hygienic condition of production, develop recommendations.<br>Monitor compliance with safety and fire safety regulations in the company's laboratories. |
| | Professional skills (Hardskills) | | |
| | Organizes and coordinates the technological processes of food and processing industries, ensuring the rational use of equipment, resources and personnel in accordance with regulatory requirements and the production plan.<br>Monitors the execution of technological operations, ensures compliance with regimes, quality standards and sanitary and hygienic standards at all stages of processing raw materials and production.<br>Conducts pilot work on the development and implementation of new technological solutions, analyzes the results obtained and adapts technological processes in order to improve the quality and efficiency of production.<br>Applies comprehensive professional and scientific knowledge to solve practical problems in the field of technology and organization of food production, ensuring the sustainability of processes, high product quality, safety and efficiency of food processing enterprises. | | |

# Typical curriculum (appendix to the OP) 6B07223 Food Processing Technologies (by Industry)



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| Модуль / Module № 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Жалпы химия<br>Общая химия<br>General Chemistry | БП (ТК)<br>БД (КВ)<br>BD(UC) | ОН 1204-26<br>ОН 1204-26<br>OH 1204-26 | 1 | 5 | | 150 | 45 | 15 | 15 | 15 | 75 | 90 | Химия, химиялық, технология және экология<br>Химия, химическая технология и экология<br>Chemistry, chemical technology and ecology | 1+1+1 | | | | | | | | Емтихан<br>Экзамен<br>Examination | Баға<br>Другое<br>More |
| | 2 | Аналитикалық және физколлоидтық химия<br>Аналитическая и физколлоидная химия<br>Analytical and Physicochemical Colloid Chemistry | | АФХ 1204-26<br>АФХ 1204-26<br>AFH 1204-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | | 5 | | 150 | 45 | 15 | 15 | 15 | 15 | 90 | | | | | | | | | | | | | | | | | |
| Модуль / Module № 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Нан-тоқаш және кондитерлік өнімдерін тауартанымы<br>Товароведение хлебобулочных и кондитерских изделий<br>Commodity Science of Bakery and Confectionery Products | БП (ТК)<br>БД (КВ)<br>BD(UC) | ТНКЖ 2204-26<br>ТНКЖ 2204-26<br>THKJ 2204-26 | 3 | 5 | | 150 | 45 | 15 | 30 | | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | 1+2+0 | | | | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Астық және оны қайта өңдеу өнімдерін тауартану<br>Товароведение зерна и продуктов его переработки<br>Commodity Science of Grain and Its Processed Products | | ТДПР 2204-26<br>ТДПР 2204-26<br>TZPP 2204-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | | 5 | | 150 | 45 | 15 | 30 | 0 | 15 | 90 | | | | | | | | | | | | | | | | | |
| Модуль / Module № 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Теориялық және қолданбалы механика<br>Теоретическая и прикладная механика<br>Theoretical and Applied Mechanics | БП (ТК)<br>БД (КВ)<br>BD(UC) | ТПМ 2203-26<br>ТПМ 2203-26<br>TPM 2203-26 | 3 | 5 | | 150 | 45 | 15 | 30 | | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | 1+2+0 | | | | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Жылу техникасы<br>Теплотехника<br>Heat Engineering | | Т 2202-26<br>Т 2202-26<br>T 2202-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | | 5 | | 150 | 45 | 15 | 30 | 0 | 15 | 90 | | | | | | | | | | | | | | | | | |
| Модуль / Module № 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Өсімдік шаруашылығы негіздерімен астық өндіру<br>Зерноведение с основами растениеводства<br>Grain Science with Fundamentals of Plant Production | БП (ТК)<br>БД (КВ)<br>BD(UC) | ЗОЖ 2205-26<br>ЗОЖ 2205-26<br>ZOK 2205-26 | 4 | 5 | | 150 | 45 | 15 | 30 | | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | 1+2+0 | | | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Азық-түлік өнімдерін реология<br>Реология пищевых продуктов<br>Food Rheology | | ӨПР 2205-26<br>ӨПР 2205-26<br>PPP 2205-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | Жасанды интеллектке кіріспе (Minor)<br>Введение в искусственный интеллект (Minor)<br>Introduction to Artificial Intelligence (Minor) | | VII 2200-26 (Minor 1)<br>VII 2200-26 (Minor 1) | | | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | | 5 | | 150 | 45 | 15 | 30 | 0 | 15 | 90 | | | | | | | | | | | | | | | | | |
| Модуль / Module № 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Техникалық микробиология<br>Техническая микробиология<br>Technical Microbiology | БП (ТК)<br>БД (КВ)<br>BD(UC) | ТМ 2203 -26<br>ТМ 2203 -26<br>TM 2203 -26 | 4 | 5 | | 150 | 45 | 15 | | 30 | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | 1+0+2 | | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Қайта өңдеу өнеркәсібіндегі микробиология<br>Микробиология в перерабатывающем производстве<br>Microbiology in the Processing Industry | | МӨҚ 2203-26<br>МПР 2203-26<br>MPP 2203-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | | 5 | | 150 | 45 | 15 | 0 | 30 | 15 | 90 | | | | | | | | | | | | | | | | | |
| Модуль / Module № 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Жасанды нейрондық желілерді әзірлеу (Minor)<br>Разработка искусственных нейронных сетей (Minor)<br>Development of Artificial Neural Networks (Minor) | БП (ТК)<br>БД (КВ)<br>BD(UC) | RINS 3200-26<br>(Minor 2)<br>RINS 3200-26 | 5 | 5 | | 150 | 45 | 15 | 30 | | 15 | 90 | Барлық кафедралар<br>Все кафедры<br>All chairs | | | | | | 1+2+0 | | | Емтихан<br>Экзамен<br>Examination | Баға<br>Другое<br>More |
| | 2 | Нәубайхана кәсіпорындарының технологиялық жабдықтары<br>Технологическое оборудование предприятий хлебопекарных производств<br>Technological Equipment of Bakery Enterprises | | ТОҚНҒП 3207-26<br>ТОҚНҒП 3207-26<br>TOFEP 3207-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | Астықты қайта өңдеуөнеркәсібі кәсіпорындарының технологиялық жабдықтары<br>Технологическое оборудование предприятий зерноперерабатывающей промышленности<br>Technological Equipment of Grain Processing Enterprises | | ТОҚДП 3207-26<br>ТОҚДП 3207-26<br>TOFZP 3207-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | | 5 | | 150 | 45 | 15 | 30 | 0 | 15 | 90 | | | | | | | | | | | | | | | | | |
| Модуль / Module № 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Нан-тоқаш және кондитерлік өнімдерін өндірісінің технологиялық процестерін автоматтандыру<br>Автоматизация технологических процессов производства хлебобулочных и кондитерских изделий<br>Automation of Technological Processes in the Production of Bakery and Confectionery Products | БП (ТК)<br>БД (КВ)<br>BD(UC) | АТӨҚНӨЖ 3206-26<br>АТПХИИ 3206-26<br>ATPPHIZ 3206-26 | 5 | 5 | | 150 | 45 | 15 | 30 | | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | 1+2+0 | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Астық шаруашылығы<br>Зерноведение<br>Grain Devine | | ДШ 3206-26<br>З 3206-26<br>Z 3206-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | | 5 | | 150 | 45 | 15 | 30 | 0 | 15 | 90 | | | | | | | | | | | | | | | | | |
| Модуль / Module № 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Өсімдік шаруашылығы өнімдерін өңдеу және сақтау<br>Обработка и хранение продукции растениеводства<br>Processing and Storage of Crop Production | БП (ТК)<br>БД (КВ)<br>BD(UC) | ӨӨПР 3208-26<br>ОНРР 3208-26<br>OHPR 3208-26 | 5 | 5 | | 150 | 45 | 15 | 30 | | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | 1+2+0 | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Нәубайхана, макарон және кондитер өнімдерін өндіруге арналған тағамдық қоспалар технологиясы<br>Пищевые добавки технологии хлебопекарных, макаронных и кондитерских производств<br>Food Additives Technology for Bakery, Pasta, and Confectionery Production | | ПТҚТНМКӨ 3208-26<br>PDTHMKP 3208-26<br>PDTHMOP 3208-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | | 5 | | 150 | 45 | 15 | 30 | 0 | 15 | 90 | | | | | | | | | | | | | | | | | |
| Модуль / Module № 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Кондитерлік кәсіпорындардың технологиялық жабдықтары<br>Технологическое оборудование предприятий кондитерских производств<br>Technological Equipment of Confectionery Enterprises | БП (ТК)<br>БД (КВ)<br>BD(UC) | ТОҚКҒ 3209-26<br>ТОҚКҒ 3209-26<br>TOFKP 3209-26 | 6 | 5 | | 150 | 45 | 15 | 30 | | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | | 1+2+0 | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Ұн тарту кәсіпорындарының технологиялық жабдықтары<br>Технологическое оборудование мукомольных производств<br>Technological Equipment of Flour Milling Industries | | ТОМҒ 3209-26<br>ТОМП 3209-26<br>TOMP 3209-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | | 5 | | 150 | 45 | 15 | 30 | 0 | 15 | 90 | | | | | | | | | | | | | | | | | |
| Модуль / Module № 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Нан-тоқаш және кондитерлік өнімдерін сараптау<br>Экспертиза хлебобулочных и кондитерских изделий<br>Examination of Bakery and Confectionery Products | БеП (ТК)<br>ПД (КВ)<br>PD(UC) | ЭНКЖ 3302-26<br>ЭНКЖ 3302-26<br>EHKJ 3302-26 | 5 | 5 | | 150 | 45 | 15 | 30 | | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | | 1+2+0 | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Астық және оны қайта өңдеу өнімдерін сараптау<br>Экспертиза зерна и продуктов его переработки<br>Examination of Grain and Its Processed Products | | ЭДПР 3302-26<br>ЭДПР 3302-26<br>EZPP 3302-26 | | | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | | 5 | | 150 | 45 | 15 | 30 | 0 | 15 | 90 | | | | | | | | | | | | | | | | | |
| Модуль / Module № 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Нан өндіру үдерістерінің биохимиялық негіздері<br>Биохимические основы хлебопекарных процессов<br>Biochemical Foundations of Baking Processes | БеП (ТК)<br>ПД (КВ)<br>PD(UC) | БОНҒ 3301-26<br>БОНҒ 3301-26<br>BOHP 3301-26 | 5 | 5 | | 150 | 45 | 15 | 30 | | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | | 1+2+0 | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Астық және оны қайта өңдеу өнімдерінің биохимиясы<br>Биохимия зерна и продуктов его переработки<br>Biochemistry of Grain and Its Processed Products | | БДПР 3301-26<br>БДПР 3301-26<br>BZPP 3301-26 | | | | | | | | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | 5 | | 150 | 45 | 15 | 30 | 0 | 15 | 90 | | | | | | | | | | | | | | | | |
| Модуль / Module № 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Объектілерді басқарудағы жасанды интеллект (Minor)<br>Искусственный интеллект в управлении объектами (Minor)<br>Artificial Intelligence in Object Management (Minor) | БелІ(ТК)<br>ПД (КВ)<br>PD (UC) | IIJO 3301-26 (Minor 3)<br>IIJO 3301-26 (Minor | 6 | 5 | | 150 | 45 | 30 | 15 | | 15 | 90 | Барлық кафедралар<br>Все кафедры<br>All chairs | | | | | | 2+1+0 | | | Емтихан<br>Экзамен<br>Examination | Басқа<br>Другое<br>More |
| | 2 | Элеватор өнеркәсібінің технологиясы<br>Технология элеваторной промышленности<br>Technology of the Elevator Industry | | TEP 3305-26<br>TEP 3305-26<br>TEP 3305-26 | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | Функционалды тағам өнімдерінің технологиясы<br>Технология функциональных пищевых продуктов<br>Functional Food Technology | | TFPP 3303-26<br>TFPP 3303-26<br>TFPP 3303-26 | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | 5 | | 150 | 45 | 30 | 15 | 0 | 15 | 90 | | | | | | | | | | | | | | | | |
| Модуль / Module № 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Астық өңдеу өндірістерінің кәсіпорындарын жобалау<br>Проектирование предприятий зерноперерабатывающих производств<br>Design of Grain Processing Enterprises | БелІ(ТК)<br>ПД (КВ)<br>PD (UC) | PZP 4308-26<br>PZP 4308-26<br>PZP 4308-26 | 7 | 6 | | 180 | 60 | 30 | 30 | | 12 | 108 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | 2+2+0 | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Нан тоқаш және кондитерлік өнеркәсіп кәсіпорындарын жобалау<br>Проектирование хлебопекарных и кондитерских предприятий<br>Design of Enterprises of the Bakery and Confectionery Industry | | PHKP 4308-26<br>PHKP 4308-26<br>PHKP 4308-26 | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | 6 | | 180 | 60 | 30 | 30 | 0 | 12 | 108 | | | | | | | | | | | | | | | | |
| Модуль / Module № 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Астық және оны қайта өңдеу өнімдерін өндіру жөніндегі кәсіпорындардың жұмысын ұйымдастыру<br>Организация работы предприятий по производству зерна и продуктов его переработки<br>Organization of Work of Enterprises Producing Grain and Its Processed Products | БелІ(ТК)<br>ПД (КВ)<br>PD (UC) | ORPPZPEP 4307-26<br>ORPPZPEP 4307-26<br>ORPPZPEP 4307-26 | 7 | 6 | | 180 | 60 | 30 | 30 | | 12 | 108 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | 2+2+0 | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Нан-тоқаш, кондитерлік және макарон өнімдерін өндіруге кәсіпорындардың жұмысын ұйымдастыру<br>Организация работы предприятий по производству хлебобулочных, кондитерских и макаронных изделий<br>Organization of Work of Enterprises Producing Bakery, Confectionery and Pasta Products | | ORPPHKMI 4307-26<br>ORPPHKMI 4307-26<br>ORPPHKMI 4307-26 | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | 6 | | 180 | 60 | 30 | 30 | 0 | 12 | 108 | | | | | | | | | | | | | | | | |
| Модуль / Module № 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Дәнді дақылдарды өңдеу технологиясы<br>Технология крупяного производства<br>Technology of Cereal Production | БелІ(ТК)<br>ПД (КВ)<br>PD (UC) | TKP 4306-26<br>TKP 4306-26<br>TKP 4306-26 | 7 | 6 | | 180 | 60 | 30 | 30 | | 12 | 108 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | 2+2+0 | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Кондитерлік өнімдер технологиясы<br>Технология кондитерских изделий<br>Confectionery Technology | | TKI 4306-26<br>TKI 4306-26<br>TKI 4306-26 | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | 6 | | 180 | 60 | 30 | 30 | 0 | 12 | 108 | | | | | | | | | | | | | | | | |
| Модуль / Module № 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Ұн тарту технологиясы<br>Технология мукомольного производства<br>Flour Milling Technology | БелІ(ТК)<br>ПД (КВ)<br>PD (UC) | TMP 4305-26<br>TMP 4305-26.<br>TMP 4305-26 | 7 | 6 | | 180 | 60 | 30 | 30 | | 12 | 108 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | 2+2+0 | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Макарон өндіру технологиясы<br>Технология макаронного производства<br>Pasta Production Technology | | TMP 4305-26<br>TMP 4305-26<br>TMP 4305-26 | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | 6 | | 180 | 60 | 30 | 30 | 0 | 12 | 108 | | | | | | | | | | | | | | | | |
| Модуль / Module № 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Астық өңдеу өнеркәсібінің технологиясы<br>Технология зерноперерабатывающих производств<br>Technology of Grain Processing Industries | БелІ(ТК)<br>ПД (КВ)<br>PD (UC) | TZP 4304-26<br>TZP 4304-26<br>TZP 4304-26 | 7 | 6 | | 180 | 60 | 30 | 30 | | 12 | 108 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | 2+2+0 | | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Нан-тоқаш өндірісінің технологиясы<br>Технология хлебобулочного производства<br>Bakery Production Technology | | THP 4304-26<br>THP 4304-26<br>THP 4304-26 | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | 6 | | 180 | 60 | 30 | 30 | 0 | 12 | 108 | | | | | | | | | | | | | | | | |
| Модуль / Module № 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Қайта өңдеу өндірістерінде сапа менеджменті жүйесі<br>Система менеджмента качества на перерабатывающих производствах<br>Quality Management System in Processing Industries | БелІ(ТК)<br>ПД (КВ)<br>PD (UC) | SMKPP 4310-26<br>SMKPP 4310-26<br>SMKPP 4310-26 | 8 | 5 | | 150 | 45 | 30 | 15 | | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | | 2+1+0 | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Қайта өңдеу өндірістерінде сапаны басқару<br>Управление качеством на перерабатывающих производствах<br>Quality Management in Processing Industries | | UKPP 4310-26<br>UKPP 4310-26<br>UKPP 4310-26 | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | 5 | | 150 | 45 | 30 | 15 | 0 | 15 | 90 | | | | | | | | | | | | | | | | |
| Модуль / Module № 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | Азық-түлік концентратының технологиясы<br>Технология пищевых концентратов<br>Technology of Food Concentrates | БелІ(ТК)<br>ПД (КВ)<br>PD (UC) | TPK 4309-26<br>TPK 4309-26<br>TPK 4309-26 | 8 | 5 | | 150 | 45 | 30 | 15 | | 15 | 90 | Технология және стандарттау<br>Технология и стандартизация<br>Technology and standardization | | | | | | | 2+1+0 | | Емтихан<br>Экзамен<br>Examination | Жазбаша<br>Письменный<br>Writing |
| | 2 | Өсімдік шаруашылығының екінші реттік өнімдерін өңдеу технологиясы<br>Технология переработки вторичного сырья продукции растениеводства<br>Technology for Processing Secondary Raw Materials of Crop Production | | TPVSPR 4309-26<br>TPVSPR 4309-26<br>TPVSPR 4309-26 | | | | | | | | | | | | | | | | | | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | 5 | | 150 | 45 | 30 | 15 | 0 | 15 | 90 | | | | | | | | | | | | | | | | |
| Қорытынды аттестация / Итоговая аттестация / Final assessment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Модуль / Module № 21 | 1 | Қорытынды аттестаттау<br>Итоговая аттестация<br>Final assessment | | | 2 | 8 | | 240 | | | | | | | | | | | | | | | | 6 апта / недель / weeks | | | | | |
| Барлығы модуль бойынша / Итого по модулю / Total for module | | | | | 140 | | 240 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| БАРЛЫҒЫ МОДУЛЬДАР БОЙЫНША / ИТОГО ПО МОДУЛЯМ / TOTAL FOR MODULES | | | | | 240 | | 3240 | 930 | 405 | 480 | 45 | 270 | 1800 | | | | | | | | | | | | | | | | |

**Экспертное заключение**

**на образовательную программу** 6B07223 Технология перерабатывающих производств (по отраслям)

**по направлению подготовки** 6B072 - Производственные и обрабатывающие отрасли

**Наименование организации образования/предприятия – партнера по разработке образовательной программы**
НАО «ЗКАТУ имени Жангир хана»

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**Общая характеристика образовательной программы**

Образовательная программа 6B07223 «Технология перерабатывающих производств (по отраслям)» направлена на подготовку высококвалифицированных специалистов для предприятий перерабатывающей и пищевой промышленности, способных осуществлять организацию и управление технологическими процессами, обеспечивать качество и безопасность продукции, а также внедрять современные технологии переработки сельскохозяйственного сырья.

Содержание программы охватывает ключевые направления перерабатывающей промышленности, включая технологии переработки зерна, производство хлебобулочных, макаронных и кондитерских изделий, проектирование предприятий перерабатывающей промышленности, применение современных технологических процессов и оборудования, а также вопросы обеспечения качества и безопасности пищевой продукции.

Особое внимание уделено формированию инженерных, технологических и исследовательских компетенций обучающихся. В программу включены дисциплины, направленные на изучение современных методов переработки сырья, организации производственных процессов, проектирования технологических схем, применения инженерной графики, проведения научных исследований и оценки качества пищевой продукции.

В условиях модернизации пищевой промышленности Республики Казахстан и внедрения инновационных технологий подготовки специалистов данная образовательная программа является актуальной и отвечает современным требованиям работодателей.

**Описание и оценка структуры образовательной программы**

Структура образовательной программы отличается логичной последовательностью изучения дисциплин и обеспечивает формирование профессиональных компетенций на всех этапах обучения.

Особое внимание уделяется следующим профильным дисциплинам:

1. Организация работы предприятий по производству хлебобулочных, кондитерских и макаронных изделий;

2. Организация работы предприятий по производству зерна и продуктов его переработки;

3. Технология переработки вторичного сырья продукции растениеводства.

Дисциплина «Организация работы предприятий по производству хлебобулочных, кондитерских и макаронных изделий» формирует у обучающихся знания по организации производственных процессов, рациональному использованию оборудования и ресурсов, планированию работы производственных подразделений, а также обеспечению качества выпускаемой продукции.

Изучение дисциплины «Организация работы предприятий по производству зерна и продуктов его переработки» позволяет освоить современные принципы организации технологических процессов зерноперерабатывающих предприятий, эффективного управления производством, контроля качества сырья и готовой продукции, а также соблюдения требований пищевой безопасности.

Особое значение имеет дисциплина «Технология переработки вторичного сырья продукции растениеводства», направленная на формирование компетенций в области комплексной переработки растительного сырья, рационального использования вторичных ресурсов, внедрения ресурсосберегающих технологий и принципов безотходного производства. Освоение данной дисциплины способствует развитию экологического мышления и реализации принципов устойчивого развития в перерабатывающей промышленности.

Комплексное сочетание теоретической подготовки, лабораторных занятий, производственных практик и современных профильных дисциплин обеспечивает выпускникам высокий уровень профессиональной подготовки и готовность к решению технологических, организационных и производственных задач на предприятиях пищевой и перерабатывающей промышленности.

**Общее заключение**

Образовательная программа 6В07223 «Технология перерабатывающих производств (по отраслям)» соответствует современным требованиям системы высшего образования Республики Казахстан и ориентирована на подготовку конкурентоспособных специалистов для предприятий пищевой и перерабатывающей промышленности.

Содержание программы обеспечивает формирование у обучающихся профессиональных компетенций в области организации производственных процессов, переработки сельскохозяйственного сырья, рационального использования вторичных ресурсов, обеспечения качества и безопасности пищевой продукции, а также применения современных технологий в перерабатывающих производствах. Включенные в образовательную программу профильные дисциплины позволяют выпускникам успешно адаптироваться к требованиям работодателей и эффективно решать производственные и технологические задачи.

**Рекомендации по использованию или усовершенствованию образовательной программы**

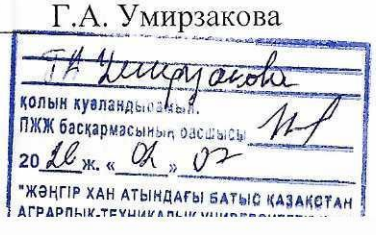
- расширить содержание образовательной программы дисциплинами, связанными с цифровизацией перерабатывающих производств, автоматизацией технологических процессов и применением интеллектуальных систем управления производством;

- усилить практико-ориентированную подготовку обучающихся путем расширения сотрудничества с предприятиями пищевой и перерабатывающей промышленности, включая проведение совместных производственных проектов и стажировок;

**Эксперт:**

Руководитель образовательной программы «Технология перерабатывающих производств» Западно-Казахстанского аграрно-технического университета имени Жангир хана, и.о. доцента Института ветеринарии и агротехнологий, PhD Г.А. Умирзакова



**«Қ. Құлажанов атындағы Қазақ технология және бизнес университеті» АҚ**

**6В07223 Өңдеу өндірістерінің технологиясы (салалар бойынша) білім беру бағдарламасы бойынша**

**Сын-пікір**

Білім беру бағдарламасын (БББ) бағалау

А) Білім беру бағдарламасының заңнамалық талаптарға сәйкестігі

6В07223 «Өңдеу өндірістерінің технологиясы (салалар бойынша)» білім беру бағдарламасы Қазақстан Республикасының жоғары білім беру саласындағы нормативтік-құқықтық актілеріне, мемлекеттік жалпыға міндетті жоғары білім беру стандартына және кредиттік оқыту технологиясының талаптарына сәйкес әзірленген. Бағдарлама құрылымы білім алушылардың кәсіби құзыреттерін қалыптастыруға бағытталған және оқу нәтижелері мен пәндер мазмұны өзара сабақтастықта құрастырылған. Бағдарламада жалпы білім беру, базалық және бейіндеуші пәндер циклдері толық қамтылған.

Б) Кәсіби талаптар мен стандарттарға сәйкестігі

Білім беру бағдарламасы өңдеу өнеркәсібі мен азық-түлік өндірісі саласындағы қазіргі кәсіби талаптарға сәйкес келеді. Бағдарлама өндірістік процестерді ұйымдастыру, технологиялық жабдықтарды пайдалану, шикізат пен дайын өнімнің сапасын бақылау, өндірісті жобалау және ғылыми зерттеу жұмыстарын жүргізу бойынша қажетті құзыреттерді қалыптастыруға бағытталған.

Оқу жоспарына енгізілген пәндер өндірістік кәсіпорындардың қажеттіліктеріне сәйкес құрастырылған және түлектердің кәсіби қызметте заманауи технологияларды тиімді қолдануына мүмкіндік береді.

В) Білім беру бағдарламасының өзектілігі мен заманауилығы

Бағдарлама өңдеу өнеркәсібінің қазіргі даму бағыттарын, еңбек нарығының сұранысын және өндірісті цифрландыру, автоматтандыру, тұрақты даму қағидаттарын ескере отырып әзірленген.

Бағдарлама мазмұнында ғылыми зерттеу әдістері, инженерлік және компьютерлік графика, кәсіпорын экономикасы мен жоспарлау, тұрақты даму, экология және тіршілік қауіпсіздігі, тағам химиясы сияқты пәндердің қамтылуы студенттердің кешенді инженерлік даярлығын қамтамасыз етеді. Сонымен қатар, өңдеу өндірістерінің жалпы технологиясы, тағам өндірісінің үрдістері мен аппараттары, функционалды тағам өнімдерінің технологиясы сияқты кәсіби пәндер өндірістің нақты технологиялық міндеттерін шешуге бағытталған.

Бағдарламада өндірістік тәжірибе мен практикалық дайындыққа ерекше көңіл бөлінуі, сондай-ақ өңдеу өнеркәсібіндегі инновациялық технологияларды пайдалану түлектердің еңбек нарығындағы бәсекеге қабілеттілігін арттырады.

Г) Білім беру бағдарламасының құрылымына сипаттама және бағалау

Бағдарлама құрылымы теориялық дайындық пен практикалық оқытудың тиімді үйлесіміне негізделген.

Білім беру бағдарламасында жалпы инженерлік және кәсіби пәндер арасында логикалық сабақтастық сақталған. Әсіресе келесі пәндер кәсіби құзыреттерді қалыптастыруда маңызды орын алады:

- Қайта өңдеу өндірістерінің жалпы технологиясы;
- Тағам өндірісінің үрдістері және аппараттары;

Сонымен қатар білімалушылар ғылыми зерттеу жұмыстарын ұйымдастыру, инженерлік графика құралдарын пайдалану, тағам өнімдерінің химиялық құрамын зерттеу, өндірістік процестерді жобалау және кәсіпорынның экономикалық тиімділігін бағалау бойынша қажетті білім мен тәжірибе алады. Бағдарлама өндірістік технологияларды жобалау, өнім сапасы мен қауіпсіздігін қамтамасыз ету, өндірісті ұйымдастыру және басқару салаларында кәсіби міндеттерді орындауға мүмкіндік береді.

Жалпы қорытынды

6В07223 «Өңдеу өндірістерінің технологиясы (салалар бойынша)» білім беру бағдарламасы қазіргі еңбек нарығының талаптарына толық сәйкес келеді және өңдеу өнеркәсібі үшін жоғары білікті, өндірістік процестерді ұйымдастыра алатын, технологиялық шешімдерді негіздей алатын және инновациялық технологияларды меңгерген мамандарды даярлауға бағытталған.

Бағдарлама мазмұны ғылыми зерттеу, инженерлік даярлық, өндірісті ұйымдастыру, өнім сапасы мен қауіпсіздігін қамтамасыз ету бағыттарын кешенді қамтиды және түлектердің кәсіби қызметте табысты еңбек етуіне мүмкіндік береді.

Білім беру бағдарламасын пайдалану немесе жетілдіру бойынша ұсыныстар

- Өңдеу өнеркәсібіндегі цифрлық өндіріс, жасанды интеллект элементтері және өндірістік процестерді цифрлық модельдеу бағытындағы элективті пәндердің үлесін кеңейту;
- Шетелдік жоғары оқу орындары және өңдеу өнеркәсібінің жетекші кәсіпорындары мен академиялық ұтқырлық пен өндірістік тағылымдамаларды дамыту;
- Өндірістік кәсіпорындармен бірлескен дуальды оқыту және нақты өндірістік жобаларды орындау үлесін арттыру.

Сын-пікір беруші:

«Шәкәрім университеті» КеАҚ
техника ғылымдарының кандидаты,
қауымдастырылған профессор С. Толеубекова

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ ҒЫЛЫМ ЖӘНЕ ЖОҒАРЫ БІЛІМ МИНИСТРЛІГІНІҢ «Шәкәрім университеті» КОММЕРЦИЯЛЫҚ ЕМЕС АКЦИОНЕРЛІК ҚОҒАМЫ
ПЕРСОНАЛДЫ ДАМЫТУДЫ СҮЙЕМЕЛДЕУ БӨЛІМІ

қолын растаймын

«01» 07 2026 ж.

# ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ

**на образовательную программу** 6B07223 Технология перерабатывающих производств (по отраслям)

**по направлению подготовки** 6B072 - Производственные и обрабатывающие отрасли

**Наименование организации образования/предприятия – партнера по разработке образовательной программы** Кыргызско-Турецкий университет «Манас»

**Общая характеристика образовательной программы**

Образовательная программа 6B07223 «Технология перерабатывающих производств (по отраслям)» разработана в соответствии с современными требованиями к подготовке специалистов в области пищевых и перерабатывающих технологий и ориентирована на формирование профессиональных компетенций, востребованных на национальном и на международном рынке труда.

Программа направлена на подготовку специалистов, обладающих знаниями в области технологий переработки сельскохозяйственного сырья, контроля качества и безопасности пищевой продукции, хранения сырья и готовой продукции, а также внедрения инновационных технологических решений на предприятиях перерабатывающей промышленности.

Актуальность образовательной программы обусловлена глобальными тенденциями развития агропродовольственного сектора, необходимостью повышения эффективности переработки сырья, обеспечения продовольственной безопасности и внедрения принципов устойчивого развития в производственные процессы. Подготовка специалистов данного профиля отвечает современным требованиям предприятий пищевой и перерабатывающей промышленности как на национальном, так и на международном уровнях.

Особенностью программы является сочетание фундаментальной теоретической подготовки с практико-ориентированным обучением, что позволяет выпускникам успешно адаптироваться к условиям современного производства и эффективно решать профессиональные задачи в сфере переработки сельскохозяйственной продукции.

**Описание и оценка структуры образовательной программы**

Структура образовательной программы построена в соответствии с принципами компетентностного подхода и включает дисциплины, направленные на формирование как универсальных, так и профессиональных компетенций.

Содержание программы охватывает ключевые направления перерабатывающей промышленности, включая:

- Технология пищевых продуктов по отраслям;
- Безопасность пищевых продуктов;
- Процессы и аппараты пищевых производств.

Учебный план обеспечивает логическую последовательность изучения дисциплин и предусматривает прохождение различных видов практик, что способствует формированию профессиональных навыков и развитию исследовательских компетенций обучающихся.

Следует отметить, что содержание образовательной программы соответствует современным научным достижениям и технологическим тенденциям в области пищевой инженерии и перерабатывающих производств. Программа предоставляет обучающимся

возможность освоения современных методов управления качеством продукции, ресурсосберегающих технологий и принципов устойчивого производства.

**Общее заключение**

Образовательная программа 6B07223 «Технология перерабатывающих производств (по отраслям)» соответствует современным требованиям высшего образования, потребностям рынка труда и актуальным тенденциям развития пищевой и перерабатывающей промышленности.

Содержание программы обеспечивает формирование профессиональных компетенций, необходимых для осуществления производственной, технологической, исследовательской и организационно-управленческой деятельности. Выпускники программы обладают достаточным уровнем теоретической подготовки и практических навыков для успешной профессиональной деятельности в условиях современной индустрии.

Программа может быть рекомендована к реализации в образовательном процессе как отвечающая современным международным требованиям к подготовке специалистов в области перерабатывающих производств.

**Рекомендации по использованию или усовершенствованию образовательной программы**

- развивать совместные образовательные и научно-исследовательские проекты с зарубежными университетами и научными центрами;
- расширять участие работодателей и международных экспертов в разработке и обновлении содержания образовательной программы.

**Эксперт:**

Заведующий отделением «Пищевая инженерия»
Кыргызско-Турецкого университета «Манас»,
к.т.н., доцент Анарсейит ДЕЙДИЕВ

07.2026

**International Academic Advisor Confirmation/ Шетелдік кеңесшінің қатысуы/ Участие зарубежного консультанта**

| | |
|---|---|
| Educational Program/ Білім беру бағдарламасы/ Образовательная программа | 6B07223 Food Processing Technologies (by Industry) / 6B07223 Өңдеу өндірістерінің технологиясы (салалар бойынша) / 6B07223 Технология перерабатывающих производств (по отраслям) |
| Level/ Дәрежесі/ Уровень | 6 |
| International Academic Advisor/ Шетелдік академиялық кеңесші/ Зарубежный консультант | Plotkin Juriy Romanovich / Плоткин Юрий Романович / Плоткин Юрий Романович |
| Academic degree/ Ғылыми дәреже/ Ученая степень | Doctor of Engineering Sciences / Доктор инженерных наук / Техника ғылымдарының докторы |
| Position/ Лауазымы/ Должность | Professor / Профессор / Профессор |
| University/ Университет/ Университет | Hochschule für Wirtschaft und Recht Berlin / Берлинская высшая школа экономики и права / Берлин экономика және құқық мектебі |
| Country/ Ел/ Страна | Germany / Германия / Германия |

**Approved/ Келісілді/ Согласовано**

The educational program has been reviewed and approved. The updated content of the educational program, the sequence of courses, and the revised learning outcomes (LO) have been developed in accordance with modern academic approaches.

Білім беру бағдарламасы қарастырылып, келісілді. Білім беру бағдарламасының жаңартылған мазмұны, пәндерді оқу реттілігі және жаңартылған оқу нәтижелері (ОН) заманауи академиялық тәсілдерге сәйкес әзірленді.

Образовательная программа рассмотрена и согласована. Актуализированное содержание образовательной программы, последовательность изучения дисциплин и обновленные результаты обучения (РО) сформированы с учетом современных академических подходов.

| | |
|---|---|
| International Academic Advisor/ Шетелдік академиялық кеңесші/ Зарубежный консультант | J. Plotkin / Ю.Плоткин / Ю.Плоткин |

*Seal/ МО/ МП*

HOCHSCHULE FÜR WIRTSCHAFT UND RECHT BERLIN
FACHBEREICH 2 Duales Studium
Studienbereich Technik
Prof. Dr. Juriy Plotkin
Alt-Friedrichsfelde 60 • D-10315 Berlin
Tel.:+49-30-30877-2413 Fax:30877-2149