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MINISTRY OF SCIENCES AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN
M.AUEZOV SOUTH KAZAKHSTAN UNIVERSITY

«APPROVED»
Chairman of the board-
Rector _____
Doctor of historical sciences,
Academician, Kozhamzharova D.P
«___»_____2023 y.

EDUCATION PROGRAMME

6B07182 - Machines and apparatuses of food production

Registration number	6B07100102
Code and classification of the field of education	6B07 - Engineering, Manufacturing and Civil engineering
Code and classification of training areas	6B071 - Engineering and engineering trades
Group of educational programs	B064- Mechanics and metal working
Type of EP	New
ISCE level	6
NQF level	6
SQF of education level	6
Language of learning	Kazakh, Russian, English
The complexity of the EP, not less	240 credits
Distinctive features of EP	-
University Partner (JEP)	-
University Partner (TDEP)	-

Shymkent, 2023

Developers:

Full name	Position	signature
Seithanov N.	c.tc.s., associate professor, head of the department «Technological machines and equipment»	
Volnenko A.	d.t.s, of the department «Technological machines and equipment»	
Korganbayev B.	d.t.s, associate professor of the department «Technological machines and equipment»	
Dosmakanbetova A.	c.tc.s., associate professor of the Department «Technological machines and equipment»	
Pazilova G.	Senior lecturer of the department «Technological machines and equipment»	
Seitkasimova L.	Senior lecturer of the department «Technological machines and equipment»	
Yerbosyn A.	student group MMG-22-7к	
Rakhipbekova Zh.	Director of the LLP «Rakhat-Shymkent »	PS
Abildaev E.	Associate director of the LLP «Uly dala onimderi»	PS
Abdibaev N.	Associate director of the LLP «Karkyn -2030»	PS
Omarov N.	General director LLP "Rauan"	PS
Gapparov D.	Director of the LLP «Shymkent Brewery»	PS

The EP was considered in the direction of training "Engineering and Science in Engineering", at a meeting of the academic committee, Minutes № 6 «14» 02 2023.

Chairman of the Committee _____ Aitureev M.

The EP was considered and recommended for approval at Educational-methodical meeting of M. Auezov SKU

Minutes № 4* from «22» 02 2023.

Chairman of the EMM _____ Abisheva R.D

The EP was approved by the decision of the Academic Council of the University

Minutes № 13 from «23» 02 2023.

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1. CONCEPT OF THE PROGRAM

University Mission	We are focused on generating new competencies, training a leader who translates thinking and culture.
University Values	• Openness–open to change, innovation and cooperation. • Creativity – generates ideas, develops them and turns them into values. • Academic freedom – free to choose, develop and act. • Partnership – creates trust and support in a relationship where everyone wins. • Social responsibility – ready to fulfill obligations, make decisions and be responsible for their results.
Graduate Model	• Deep subject knowledge, their application and continuous expansion in professional activity. • Information and digital literacy and mobility in rapidly changing conditions. • Research skills, creativity and emotional intelligence. • Entrepreneurship, independence and responsibility for their activities and well-being. • Global and national citizenship, tolerance to cultures and languages.
The uniqueness of the educational program	Graduates receive versatile knowledge that affects almost all areas of the food industry
Academic Integrity and Ethics Policy	In universities, measures are enforced to maintain academic integrity and academic freedom, protecting against the loving view of intolerance and discrimination: • Rules of academic integrity (Minutes of the Academic Council №3 dated 30.10.2018); • Anti-Corruption Standard (review No. 373 n/A dated 12/27/2019). • Code ofEthics (Protocol №8 of 31.01.2020).
Regulatory and legal framework for the development of EP	1. Law of the Republic of Kazakhstan "On Education"; 2. Standard rules of activity of educational organizations implementing educational programs of higher and (or) postgraduate education, approved by Order of the Ministry of Education and Science of the Republic of Kazakhstan dated October 30, 2018 No. 595 with amendments and additions dated December 29, 2021 No. 614 3. State obligatory standards of higher and postgraduate education, approved by order of the Ministry of Education and Science of the Republic of Kazakhstan dated July 20.2022 No. 2; 4. Rules for the organization of the educational process on credit technology of training, approved by the Order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 №152; 5. Qualification directory of positions of managers, specialists and other employees, approved by the Order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan on December 30, 2020 №553. 6. Guidelines for the use of ECTS. 7. Guidelines for the development of educational programs of higher and postgraduate education, Appendix 1 to the order of the Director of the Central Research Institute No. 45 o/d dated June 30, 2021.
Organization of the educational process	• Implementation of the principles of the Bologna Process • Student-centered learning • Availability

	• Inclusivity
Quality assurance of the Educational program	• Internal quality assurance system • Involvement of stakeholders in the development of the OP and its evaluation • Systematic monitoring • Updating the content (updating)
Requirements for applicants	They are established according to the Standard Rules for admission to training in educational organizations implementing educational programs of higher and postgraduate education Order of the Ministry of Education and Science of the Republic of Kazakhstan №600 dated 31.10.2018
Conditions for the implementation of educational programs (EP) for persons with disabilities and special educational needs(SSN)	For students with SEN (special educational needs) and persons with disabilities (PSI), tactile PVC tiles, specially equipped toilets, a mnemonic diagram, and shower bars have been installed in educational buildings and student dormitories. Special parking spaces have been created. Crawler lift installed. There are desks for people with limited mobility (PLM), signs indicating the direction of movement, ramps. In the educational buildings (main building, building No. 8) there are 2 rooms with six working places adapted for users with disorders of the musculoskeletal system (DMS).For visually impaired users, the SARA™ CE Machine (2 pcs.) is available for scanning and reading books. The library website is adapted for the visually impaired. There is a special NVDA audio program with a service. The JIC website http://lib.ukgu.kz/ is open 24/7. An individual differentiated approach is provided for all types of classes and in the organization of the educational process.

2. PASSPORT EP

Purpose of the EP	Preparation of competitive bachelor of engineering and technology for information-analytical, entrepreneurial and research activities in the field of design and maintenance of technological machines and equipment in the food industry.
Tasks of the EP	• the formation of socially responsible behavior in society, an understanding of the significance of professional ethical norms and adherence to these norms; • providing basic undergraduate training that allows you to continue learning throughout life, to successfully adapt to changing conditions throughout their professional careers; • ensuring the conditions for acquiring a high general intellectual level of development, mastering literate and developed speech, a culture of thinking and the skills of scientific organization of labor in the field of food industry; • creation of conditions for intellectual, physical, spiritual, aesthetic development to ensure the possibility of their employment or continuing education at subsequent levels of education.
Harmonization of EP	• 6th level of the National Qualifications Framework of the Republic of Kazakhstan; • Dublin descriptors of the 6th level of qualification; • 1 cycle of the Qualification Framework of the European Higher Education Area (the Qualifications System of the European Higher Education Area); • Level 6 of the European Qualification Framework for Lifelong Learning (the European Qualification System for Lifelong Learning).
Connection of EP with the professional sphere	• Professional standard. Repair of technological equipment - NCE RK "Atameken", dated 30.12.2019, № 269. • Professional standard. Conducting tests - NCE RK "Atameken", dated 30.12.2019, № 269. • Professional standard. Production of meat and poultry products – Appendix № 40, NCE RK "Atameken", dated 26.12.2019, № 263. • Professional standard. Production of pasteurized powder and liquid products from chicken eggs - Appendix № 40, NCE RK "Atameken", dated 26.12.2019, № 263. • Professional standard. Yeast production -Appendix № 40, NCE RK "Atameken", dated 26.12.2019, No. 263. • Professional standard. Beverage production -Appendix № 40, NCE RK "Atameken", dated 26.12.2019, № 263. • Industry qualification framework "Food industry" - Almaty, 2019. • Professional standard. Ensuring the reliability and mechanical integrity of the equipment - NCE RK "Atameken", dated 06.12.2022, № 224 • Professional standard. Equipment maintenance and repair management – NCE RK "Atameken", dated 06.12.2022, № 224.
Name of the degree awarded	After the successful completion of this EP, the graduate is awarded "Bachelor of Engineering and Technology of the educational program 6B07182– Machines and apparatuses of food production".
List of qualifications and positions	Primary positions of foreman, installer, engineer and mechanic of technological machines and equipment; commissioning and testing engineer; repair engineer; coordinator of the overhaul of technological installations; engineer for technological installations; engineer for long-

	term maintenance planning; mechanical engineer for planning current and major repairs; mechanical engineer for dynamic equipment; engineer mechanical integrity of equipment; design engineer; foremen and supervisors of the production site or workshop; apparatchiks, operators of complex machines and systems; junior and senior researchers, leading designers in research institutions, design and design organizations without presenting work experience requirements in accordance with the qualification requirements of the Qualification Directory of positions of managers, specialists and other employees approved by the order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan dated December 30 2020 No. 553.
Field of professional activity	Organizations (enterprises) of the food industry; installation, commissioning, repair organizations (enterprises); design organizations; organizational or managerial environment; service environment; pedagogical and research activities; as well as firms of various forms of ownership.
Objects of professional activity	Machines, apparatuses and technological lines of food and small processing industries; installation, adjustment and repair of technological equipment; design and research activities; factory laboratories; organizations of secondary vocational education.
Subjects of professional activity	Technological machines and equipment; power equipment; running equipment; work equipment; drive systems; motion control systems; operator life support systems; general housing to accommodate all parts of the machine; construction and maintenance materials; equipment for the manufacture, testing and disposal of technological machines; equipment for maintenance and repair of technological machines; control and measurement instruments of the manufacture and operation of machines; equipment for automating work processes of machines; equipment for the design of machines.
Types of professional activity	• Project-design activities; • Production-technological activities; • Experimental- research activities; • Organizational-managerial activities; • Assembly and commissioning activities; • Service and operational activities.
Learning outcomes	**LO1.** To communicate freely in the professional environment and society in Kazakh, Russian and English, having the skills of subject-language integrated learning, academic writing, understanding the values of the principles and culture of academic integrity. **LO2.** Apply natural science, mathematical, social, socio-economic, entrepreneurial and engineering knowledge in professional activities, methods of processing scientific and experimental research, regulatory documents and elements of economic analysis. **LO3.** Have an understanding of different market structures by analyzing the company's economy, using legal norms in professional and public activities, having entrepreneurial skills, forming an anti-corruption worldview and zero tolerance for any corruption manifestations, applying social knowledge. **LO4.** To ensure the mechanical integrity, reliability of technological equipment and its operation by applying standard methods of calculating machine parts and assemblies, kinematic schemes of machines, drawing up calculation schemes, designing mechanical gears, choosing structural

	materials for machine parts, using the basic laws and methods of mechanics to solve specific applied problems. **LO5.** To carry out measures to improve the safety and environmental friendliness of production activities, using modern methods for the development of low-waste, energy-saving and environmentally friendly technologies and equipment, owning legislative and legal acts in the field of safety and environmental protection. **LO6.** Apply knowledge about the device of hydromechanical, mechanical, hydropneumatic machines and drives for specified technological conditions, applying methods of optimization of technological processes and ensuring the reliability of technological machines. **LO7.** Develop working design and technical documentation, having the skills to work in the AutoCAD system, perform engineering calculations, applying the basic provisions of the theory of reliability in the design of equipment, checking the compliance of the developed projects with standards, specifications, regulatory documents. **LO8.** To solve the problems of production and technological activity, knowing the structure and principle of operation of machines and apparatuses used in food production, using the basic laws of hydromechanical, thermodynamic, thermal, mass transfer processes and applying modern methods and means of engineering environmental protection. **LO9.** To develop structural schemes for the design of technological lines of food production, carrying out the selection of technological equipment, applying complex mechanization of lifting and transport operations, ensuring the placement of technological equipment and technical equipment of workplaces. **LO10.** To solve the problems of design and technological activities as the basis for the creation and development of new technology and production development, developing technological processes for the manufacture of basic parts of hardware engineering, drawing up routes for the manufacture of parts, using the basic laws of natural science disciplines in professional activity. **LO11.** To present the principles of developing measures for heat and energy and resource conservation, knowing the main problems of scientific and technical development of science and technology; to optimize production processes by conducting a comparative technical and economic analysis of constructive solutions and applying innovative methods of process research. **LO12.**To solve the tasks of service and operational, installation and commissioning activities, ensuring proper condition, trouble-free and reliable operation of maintenance devices and equipment, using various methods of assembling and welding structures with specified operational properties, maintaining technical documentation during installation, commissioning and testing and observing the rules of occupational safety and health during repair work. **LO13.** To work effectively individually and as a team member, to correctly defend your point of view, to adjust your actions and use various methods, to expand the horizons of competencies studied within the framework of the additional program "Minor".

3. COMPETENCIES OF A GRADUATE OF THE EP

GENERAL COMPETENCIES (SOFTSKILLS). Behavioral skills and personal qualities	
GC 1. Competence in managing one's literacy	GC 1.1. The ability to self-study, self-develop and constantly update their knowledge within the chosen trajectory and in an interdisciplinary environment. GC 1.2. The ability to express thoughts, feelings, facts and opinions in the professional sphere. GC 1.3. The ability to mobility in the modern world and critical thinking.
CG 2. Language competence	GC 2.1. Ability to build communication programs in the state, Russian and foreign languages. GC 2.2. The ability to interpersonal social and professional communication in the context of intercultural communication.
GC 3. Mathematical competence and competence in the field of science	GC 3.1. The ability and willingness to apply the educational potential, experience and personal qualities acquired during the study of mathematical, natural science, technical disciplines at the university to solve professional problems.
GC 4. Digital competence, technological literacy	GC 4.1. The ability to demonstrate and develop information literacy through the mastery and use of modern information and communication technologies in all spheres of their lives and professional activities. GC 4.2. The ability to use various types of information and communication technologies: Internet resources, cloud and mobile services for the search, storage, protection and dissemination of information.
GC 5. Personal, social and educational competencies	GC 5.1. The ability to physical self-improvement and orientation to a healthy life to ensure full-fledged social and professional activities through methods and means of physical culture. GC 5.2. The ability to socio-cultural development based on the manifestation of citizenship and morality. GC 5.3 The ability to build a personal educational trajectory throughout life for self-development, career growth and professional success. GC 5.4. The ability to successfully interact in a variety of socio-cultural contexts during study, at work, at home and at leisure.
GC 6. Entrepreneurial competence	GC 6.1. The ability to be creative and enterprising in different environments. GC 6.2. The ability to work in the mode of uncertainty and rapid change of task conditions, make decisions, allocate resources and manage your time. GC 6.3. The ability to work with consumer requests.
GC 7.Cultural awareness and self-expression	GC 7.1. The ability to show ideological, civic and moral positions. GC 7.2. The ability to be tolerant of the traditions and culture of other peoples of the world, to possess high spiritual qualities.
PROFESSIONAL COMPETENCIES(HARDSKILLS).	
Theoretical knowledge and practical skills specific to this field	PC1. The ability to prepare technical specifications for the development of design solutions, to develop draft, technical and working projects of technical developments using design automation tools and advanced experience in the development of competitive products in the food industry.
	PC2. The ability to master theoretical and practical knowledge in the field of technological machines and equipment of the food industry, to be able to develop low-waste technologies, energy-saving ecological

	clean technologies and equipment in the food industry.
	PC3. The ability to participate in the development of structures of production-technological, service-operational and installation and commissioning divisions, organizational and technical documentation.
	PC4. The ability to analyze the current state of problems in the subject area about heat and mass transfer processes in the food industry; to solve tasks, the willingness to define the objectives of the process, to carry out the formulation of design problems
	PC5. The ability to be able to use advanced methods of operation and repair of technological equipment of food industry enterprises, to apply high-performance technologies to improve the operational reliability of machine parts.

3.1 Matrix of correlation of learning outcomes on the EP as a whole with the competencies being formed

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12	LO13
GC1	+								+				
GC2	+												+
GC3		+		+									
GC4							+			+			
GC5		+	+										
GC6			+										
GC7			+										
PC1		+		+	+	+	+	+	+		+	+	
PC2		+	+	+	+		+			+			
PC3			+	+	+		+		+		+		
PC4				+	+		+	+			+		+
PC5	+	+		+	+	+		+	+	+	+	+	+

4. MATRIX OF THE INFLUENCE OF MODULES AND DISCIPLINES ON THE FORMATION OF LEARNING OUTCOMES AND INFORMATION ON LABOR INTENSITY

№	Module na	CYCLE	ВК/КВ	Component Nam	Brief course description (in 30-50 word)	Number of credits	Generated learning outcomes (codes)												
							LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12	LO 13
1	Module of Social Sciences	GED	OC	History of Kazakhstan	**The purpose** of the discipline isformation of an objective idea of the history of Kazakhstan based on a deep understanding and scientific analysis of the main stages, patterns and originality of the historical development of Kazakhstan. **Content:** Ancient people and the formation of nomadic civilization. Turkic civilization and the great steppe. Kazakh Khanate. Kazakhstan in the era of modern times. Kazakhstan as part of the Soviet administrative-command system. Declaration of Independence of Kazakhstan. State system, socio-political development, foreign policy and international relations of the Republic of Kazakhstan. Methods and techniques of historical description for the analysis of the causes and consequences of events in the history of Kazakhstan.	5		v	v									
		GED	OC	Philosophy	**Purpose:** The formation of a holistic idea among students about philosophy as a special form of knowledge of the world, about its main sections, problems and methods of studying them in the context of future professional activity. And also the formation of philosophical reflection, introspection and moral self-regulation	5		v	v									

					among students. **Content:** Emergence of a culture of thinking. Subject and method of philosophy. Fundamentals of philosophical understanding of the world: questions of consciousness, spirit and language. Being. Ontology and metaphysics. Cognition and creativity. Education, science, technology and technology. Human philosophy and the world of values. Ethics. Philosophy of values. The subject of aesthetics as a field of philosophical knowledge. Philosophy of freedom. Philosophy of art. Society and culture. Philosophy of history. Philosophy of religion. "Mangilik El" and "Modernization of Public Consciousness" are a new Kazakhstan philosophy**.**														
2	Module of Social and Political Knowledge	GED	OC	Social and Political Studies	**Purpose:** The goal of forming knowledge about social and political activities, explaining social and political processes and phenomena. **Content:** Consideration of the system of socio-ethical values of the society. Ways to use social, political, cultural, psychological institutions, features of youth policy in the modernization of Kazakhstani society and solve conflict situations in society and professional environment based on them. To study the methods of analysis and interpretation of political institutions and processes, ideas about politics, power, state and civil society, to understand and use the methods and methods of sociological, comparative analysis, to understand the meaning and content of the political	4		**v**	**v**											

					situation in the modern world. Analysis and classification of the main political institutions.														
		GED	OC	Cultural Studies and Psychology	**Purpose:** the formation of scientific knowledge of history, modern trends, current problems and methods for the development of culture and psychology, the skills of a systematic analysis of psychological phenomena. **Contents:** Morphology, language, semiotics, anatomy of culture. Culture of nomads, proto-Turks, Turks. Medieval culture of Central Asia. Kazakh culture at the turn of the XVIII - XIX centuries, XX century. Cultural policy of Kazakhstan. State Program "Cultural Heritage". National consciousness, motivation. Emotions, intellect. The will of man, the psychology of self-regulation. Individual typological features. Values, interests, norms are the spiritual basis. The meaning of life, professional self-determination, health. Communication of the individual and groups. Socio-psychological conflict. Models of behavior in conflict.	4		**v**	**v**									
3	Socio-ethni development module	GED	HSC	Ecosystem and law	**Purpose:** Formation of integrated knowledge in the field of economics, law, anti-corruption culture, ecology and life safety, entrepreneurship, scientific research methods. **Content:** Fundamentals of safe human-nature interaction, ecosystem and biosphere productivity. The entrepreneurial activity of society in conditions of limited resources, increasing the competitiveness of business	5		**v**	**v**					**v**					

					and the national economy. Regulation of relations in the field of ecology and human life safety. Knowledge and compliance of Kazakhstan's law, obligations and guarantees of subjects, state regulation of public relations to ensure social progress. Application of scientific research methods.															
		BD	EC	Mukhtar Studies	**Purpose:** Formation of a historical, literary idea of M. Auezov's work in the context of literary history, patriotism and cultural and spiritual position. Development of artistic thinking, skills of independent research activity. **Content:**. The life and creative path of M. Auezov Semipalatinsk, Tashkent, St. Petersburg periods. M. Auezov's activity in the magazines «Sholpan», «Abai». M. Auezov's journalism. An artistic review of the short stories "Korgansyzdyn kuni", "Kyr suretteri", "Okagan azamat", "Kokserek", the play Enlik-Kebek and the stories "Kili Zaman", "Karash-Karash" okigasy", the monograph "Abai Kunanbayev", the epic novel "Abai Zholy".	3	**v**	**v**												
		BD	EC	Actual Problems and Modernization of Public Consciousness	**The purpose** of the discipline is the restoration of spirituality, deformed during the periods of tsarist and Soviet reality, the formation of a creative personality based on the modernization of the public consciousness of young people. **Content:**. Spiritual modernization: origin and background. Modern national identity. Pragmatism and competitiveness. National identity and national code. Experience and prospects of evolutionary development. The		**v**	**v**											

					triumph of knowledge and openness of consciousness. Alphabet Reform: Experience and Priorities. Fatherland is the basis of the state. Education through nationwide sacred places and history. Modern Kazakh culture is the cornerstone of spiritual revival. New humanitarian education and the future national intelligentsia. Abai Kunanbaev and Kazakh society.															
		BD	EC	Abay Studies	**Purpose:** Based on the creativity of A.Kunanbayev, the preservation of the «national code» and in the project «Kazakhtanu» **Content:**. Historical overview of the history of Kazakhstan and Kazakh literature of the XIX-XX centuries. Studies of Abai's legacy of the XX-XXI century. Chronology of Abai's creativity. Abai is a great poet, ethnographer, founder of Kazakh written literature. Abai is the compiler of the code of laws «The Position of Karamola», social significance. Abai is a thinker, religious scholar, philosopher. The role of Abai in education and science, the concept of a «Holistic person». «Words of Edification»by Abai, an epic novel by M.Auyezova «The Way of Abai» . K. Tokayev «Abai and Kazakhstan in the XXI century», role, significance.		**v**	**v**												
		BD	EC	Service to Society	**Purpose:** Formation of socially significant skills and competencies in students based on the assimilation of academic programs, carrying out socially useful activities related to the disciplines studied at the		**v**		**v**										

					university. **Content.** The concept and meaning of Service learning, the history of the formation and development of the concept of Service Learning. Key components of Service Learning, socially useful activities in the children's and youth environment, organization of volunteer movement in the world and Kazakhstan practice, profile orientation of Service Learning. International practice of learning through socially useful activities. General principles and methodology for the development of social projects. Methods of analysis of implemented social projects.														
		BD	EC	Foundations of Anticorruption Culture	**Purpose:** Formation of an anti-corruption worldview, strong moral foundations of a personality, civic position, stable skills of anti-corruption behavior. **Content:** Overcoming legal nihilism, formation of the basics of students' legal culture in the field of anti-corruption legislation. Formation of a conscious perception/attitude towards corruption.Moral rejection of corrupt behaviour, corrupt morality and ethics.Development of skills necessary to fight corruption.Development of anti-corruption standards of conduct.Anticorruption propaganda, dissemination of lawfulness and respect for the law. Activities aimed at understanding the nature of corruption, awareness of social damage caused by its manifestation, ability to defend one's position with		**v**		**v**										

					arguments, seeking ways to overcome manifestation of corruption.														
4	Communication and Physical Education module	GED	OC	Kazakh (Russian) language	**Purpose:** formation of communicative competence using the Kazakh (Russian) language in the socio-cultural, professional and public life, improvement of the ability to write academic texts. **Content:** Levels A1, A2, B1, B2-1, B2-2 (B2, C1 Russian language) are presented in the form of cognitive-linguocultural complexes, consisting of spheres, themes, sub-themes and typical situations of communication of the international standard: social, social - cultural, educational and professional, modeled by forms: oral and written communication, written speech works, listening. Demonstration of understanding of the language material in the texts on the educational program, knowledge of terminology and development of critical thinking.	10	**v**	**v**											
		GED	OC	Foreign language	**Purpose:** Formation of students' intercultural and communicative competence in the process of foreign language education at a sufficient level A2 and a level of basic sufficiency B1. Student reaches B2level of common European competence if the language level at the start is higher than B1level of common European competence. **Content:**. Levels A1, A2, B1, B2 are presented in the form of cognitive-linguocultural complexes, consisting of spheres, themes, sub-themes and typical	10	**v**	**v**											

					situations of international standard'scommunication: social, social - cultural, educational and professional, modeled by forms: oral and written communication, written speech works, listening.Demonstration of language material'sunderstanding in texts on educational program, knowledge of terminology and critical thinking development.															
		GED	OC	Physical Training	**Purpose:**: The formation of social and personal competencies and the ability to purposefully use the means and methods of physical culture that ensure the preservation and strengthening of health in preparation for professional activity; to the persistent transfer of physical exertion, neuropsychic stresses and adverse factors in future work. **Content:** Implementation of physical culture and health and training programs. A complex of general development and special exercises. Sports (gymnastics, sports and outdoor games, athletics, etc.). Control and self-control during classes, insurance and self-insurance. Refereeing competitions, Means of professionally applied physical training. Modern health-improving systems: the breathing system according to A.Strelnikova, K.Buteyko, K.Dinaiki, joint gymnastics according to Bubnovsky.	8		**v**											**v**
		BD	HSC	Professional Kazakh (Russian) Language	**Purpose:** To provide professionally oriented language training of a specialist who is able to competently construct communication in professionally significant	3	**v**	**v**											**v**	

					situations and speak the language norms for special purposes. **Content:** Professional language and its components. Professional terminology as the main feature of scientific style. Scientific vocabulary and scientific constructions in educational-professional and scientific-professional spheres. Algorithm of work on the analysis and production of scientific texts on specialty. Producing scientific and professional texts. Basics of business communication and documentation within the framework of future professional activity.														
		BD	HSC	Professionally Oriented Foreign Language	**Purpose:** To train a future specialist in speech skills in a professional language, ethics of professional language communication. **Content:** Introduction to the theory of technical translation. Professionally-oriented foreign language vocabulary. The use of the numeral name in the technical literature. The meaning and role of the verb in the translation of technical texts. Scientific and technical translation and its types. Audio and video materials in a foreign language for the formation of professional competencies.	3	**v**						**v**					**v**	
		GED	OC	Information and Communication Technologies (in English)	**Purpose:** formation of the ability to critically evaluate and analyze processes, methods of searching, storing and processing information, methods of collecting and transmitting information through digital technologies. Development of new "digital" thinking, acquisition of	5	**v**	**v**		**v**			**v**						

					knowledge and skills in the use of modern information and communication technologies in various activities **Contents:** Introduction and architecture of computer systems. Software. Operating systems. Human-computer interaction. Database systems. Data analysis. Data management. Networks and Telecommunications.Cybersecurity. Internet technologies. Cloud and Mobile technologies. Multimedia technologies. Smart technology. E-technologies. Electronic business. Electronic government.														
5	Fundamentals of Engineering and Technical Sciences	BD	HSC	Higher Mathematics	**Purpose:** to perform the necessary measurements and related calculations, apply theorems, formulas and mathematical methods to solve professional problems. **Content:** Matrices. Determinants. Inverse matrix. Methods for solving systems of linear equations. Vectors. Various equations of a straight line on a plane and a straight line and a plane in space. Curves and surfaces of the second order. Function. Function limit. Remarkable limits. Differential and integral calculus of one variable function. Derivatives and differentials of higher orders. Investigation of function and sketching the graph. Indefinite and definite integrals. Multivariable function. Differential equations of the first and second orders. Series.	5		**v**		**v**						**v**			
		BD	HSC	Physics	**Purpose:** Formation of knowledge of physical laws and skills of their application in engineering and production technology,	6		**v**		**v**				**v**		**v**			

					development of scientific thinking based on an interdisciplinary approach. **Content:** The laws of classical and modern physics (mechanics, molecular physics, thermodynamics, electromagnetism, optics, quantum and atomic physics).Application of knowledge of physical phenomena and processes for solving applied and technical problems.Scientific research methods, methods for processing and analyzing theresults oftheoretical and experimental research.														
		BD	HSC	Fundamentals of Design and Machines Components	**Purpose:** Formation of complex of knowledge, skills, research skills in field of analysis, calculations of machine parts, assemblies, design of machinery and equipment in industry. **Content:** Classification and basic requirements for machine parts and assemblies. Principles and methods of design, stages of development. Design, verification calculations. Multivariance, multi-criteria design. Computer-aided design. Stages of machine design and development of design documentation. Mechanical transmissions. Gearboxes. Shafts and axles. Sliding and rolling bearings. Couplings. Elastic elements. Body parts. Connections. Detachable and non-removable connections.	5				**v**			**v**			**v**			
		BD	HSC	Engineering Computer Graphics	**Purpose:** Formation knowledge, skills and abilities sufficient to compile engineering and design documentation using AutoCAD. **Content:** Projection. Point and straight line. Plane. Axonometric projections.	4		**v**					**v**			**v**			

					Geometric surfaces and bodies. Basic information on graphic design of drawings. Views, cuts and sections in drawings. Methods of connecting parts. Threaded products. Making sketches of parts. Compilation and design, reading and detailing of assembly drawings and general drawings. Initial setup. Completion and saving images. Building a drawing of a flat figure. Building a drawings of parts. Image Editing. Building a three-dimensional model of an object.														
		BD	EC	Technology of Constructional Materials	**Purpose:** Formation of knowledge about the production of ferrous and non-ferrous metals, about the methods of shaping blanks and machine parts from metals and non-metallic materials. **Content.** Fundamentals of metallurgical production. Manufacture of iron and steel. Production of non-ferrous metals and alloys. Powder metallurgy. Foundry technology. Metal forming technology. Hot and cold stamping. Forging, rolling, drawing. Technology of welding production. Physical bases for obtaining welded joints. Physical bases of metal cutting. Cutting methods. Electrophysical and electrochemical processing methods. Technology for the production of blanks and machine parts from non-metallic materials.	4				**v**			**v**			**v**			
		BD	EC	Materials Science	**Purpose:** Formation of knowledge about the atomic-crystalline structure of materials and the laws of its influence on the properties of metals and alloys, the					**v**			**v**			**v**			

					formation of the structure of metals and alloys during crystallization, plastic deformation, heat treatment. **Content**. Structure and properties of metals. Crystallization of metals. Deformation and destruction of materials. Fundamentals of the theory of alloys. State diagrams of alloys. Steel and cast iron. Theory and technology of heat treatment of materials. Chemical-thermal treatment of steel. Structural and tool steels. Steels and alloys for special purposes. Non-ferrous metals and alloys. Basic non-metallic materials and composites.															
		BD	EC	Theoretical Mechanics and Strength of Materials	**Purpose:** Master general laws, methods of theoretical mechanics, materials resistance; form skills of using theoretical provisions of discipline in solving professional problems. **Content:** Main provisions of statics, force vector concept, force projection on axis, moment of forces pair. Motion laws of solids - trajectory of body, speed, acceleration. Differential equation of point motion, dynamics main problems.Main hypotheses, assumptions of materials resistance are axial tension-compression, transverse bending, shear, torsion, complex types of deformations, stress-strain state, fatigue failure, stability of systems.	5				**v**			**v**					**v**	
		BD	EC	Analytical mechanics	**Purpose:** Formation of knowledge in field of studying laws of mechanical phenomena related processes taking place in machines, devices, structures, elements by analytical mechanics methods.					**v**			**v**					**v**	

					Content: Analytical mechanics basic concepts. Connections of mechanical system, equations. Generalized velocities, accelerations. Possible, virtual movements. Analytical statics. Lagrange principle. Equilibrium conditions in generalized coordinates. Analytical dynamics. D'Alembert principle for material point. Impact theory. Stability of equilibrium of mechanical system. Mechanical system small free oscillations. Application of mathematical modeling of machines, apparatuses, objects, supporting elements.													
		BD	EC	Theory of Mechanisms and Machines	**Purpose:** Formation of knowledge about general research, machines, devices design methods, general principles of mechanisms interaction in a machine due to their kinematic, dynamic properties, about basics of structural, kinematic, dynamic analysis, synthesis of mechanisms. **Content:** Main elements of block diagram. Kinematic pairs, chains, their classification. Main types of mechanisms. Formation principle of lever mechanisms. Assur structural groups, classification. Main tasks, methods of kinematic, force analysis of mechanisms. Balancing mechanisms. Mechanisms dynamic analysis. Mechanisms synthesis, its methods. Manipulators, industrial robots.	4				**v**			**v**					**v**	
		BD	EC	Mechanics of Machines	**Purpose:** Formation of knowledge about properties of mechanical systems, mechanical processes occurring in machine, about software control systems in machines, optimal solutions ensuring					**v**			**v**					**v**	

					required quality of designs being developed, research skills. **Content:** Classification of kinematic pairs, chains, mechanisms. Lever mechanisms analysis, synthesis. Mechanism kinematic scheme, its parameters. Assemblies, quality criteria for motion transmission. Classification of tasks, methods of synthesis. Precision of gear pairs, kinematic chains. Introduction to machines dynamics. Machines dynamics with rigid, variable links. Industrial robots structure, kinematics, dynamics.														
		BD	HSC	Standartizatio n, Certification and Metrology	**Purpos:** Formation of theoretical knowledge and practical skills in the field of standardization, certification and metrology to solve problems of ensuring the uniformity of measurements and quality control of products, services and works in their professional activities **Content:** Objects of standardization, certification and metrology. Legislative and regulatory-technical base of standardization systems, technical regulation, metrology and conformity assessment. General scientific and special methods of standardization. Certification and declaration schemes. Methods and types of measurements. Calculation of measurement errors and uncertainties. The technical basis of metrology. The role of international management systems in improving the competitiveness of enterprises.	4		**v**					**v**					**v**	
6	Service and	ChD	EC	Assembly and Operation of	**Purpose:** The study of the discipline aims to the aim is to teach the future specialist to	5									**v**			**v**	

	operation of machines			Technological Machines	make sound engineering decisions when operating and installing technological machinery and equipment. **Content:** Organisation of assembly and rigging work. Modern methods of operation and installation of technological equipment. Basic scientific and technical problems of operation, preparation and design of technological machines and equipment. Basic rules and regulations of the operation and installation of technological machines and equipment. Established requirements for the operation and installation of technological machines, complexes and units. Technical devices for monitoring and diagnostics. Lubrication of technological equipment, lubricants. Inspection of foundations for installation of equipment.Balancing. Methods of balancing rotating parts. Types of balancing.Shaft alignment.															
		ChD	EC	Sequence of installation works and preparation for operation of technological machinest	**Purpose:** To take theoretical foundations and gain practical skills in the selection, calculation and development of processing technology of machines and apparatuses of the industry. **Content:** Methods of installation and operation of technological machines and apparatuses. Drawing up wiring diagrams of technological machines. Safety regulations for the operation of support structures, lifting machines and mechanisms, the construction of foundations, rigging work, alignment and fastening of equipment on supports.										**v**			**v**	

					Proposals for the design of means of mechanization of installation work and modernization of equipment in order to improve its operation.															
		BD		Training Practice	**Purpose:** To consolidate and deepen students' theoretical knowledge, to gain practical skills and competencies, as well as experience in independent professional activity. **Content:** Study of the basics of professional activity, introduction to the specialty. Typical locksmith operations used in the preparation of metal for welding. Welding of products, technologies of the main types of welding, quality control of joints. Various methods, methods and techniques of assembly and welding of structures; technical preparations for the production of welded structures. Thermal and technological properties of a gas flame and their use in gas welding processes, oxygen cutting and other types of heat treatment.	1		v										v	v
		PD	EC	Repair of technological machines	**Purpose:** To study and master methods and means of organization and carrying out diagnostics and repair of technological machines in the production process control system. **Content:** General information. Organization of repair work. Modern methods of restoration of machine parts. Technology of repair of products made of non-metallic materials. Technological process of equipment repair. Repair of housings and linings. Repair of standard	5				v								v	v

					units of industrial equipment. Repair of standard technological equipment. Repair of transporting devices. Repair of pumping and compressor equipment. Repair of pipelines. Ways to improve repair production.															
		PD	EC	Restoration of Technical Resource of Technological Machines	**Purpose:** Formation of knowledge, skills and abilities in the field of restoration of the technical resource of technological machines. **Content:** Maintenance of technological machines and equipment. Methods and methods of control and restoration of parts and machines. Methods and means of non-destructive testing of parts, assembly units and technical diagnostics of the condition of machines. Restoration of parts by locksmith and mechanical processing. Restoration of parts by welding and surfacing. Electromechanical methods of restoring parts. Restoration and repair of threaded surfaces. Registration of technological documentation for the restoration of parts.					**v**								**v**	
		BD	EC	Welding Business	**Purpose:** To possess theoretical and practical knowledge of welding equipment structures, study methods of welding permanent joints. **Content:** Fundamentals of welding production. Classification and types of welding. Welding equipment for arc welding methods. Manufacturing technology of welded structures. Preparatory operations before welding. Quality control of welded joints. Electric	4		**v**		**v**								**v**	

					arc cutting of metal. Deformations and stresses during welding. The main defects of welds and their causes. Features of arc welding of carbon and alloy steels. Transformer connection rules. Tools, accessories and workwear of an electric welder. Welding wire and electrodes. Safety precautions during welding operations.															
		BD	EC	Gas Welding	**Purpose:** To study the theoretical foundations and practical application of gas welding in industry. **Content:** Gas welding technique and technology. Methods of gas welding. Materials for gas welding. Gases used in welding. Gas welding of carbon and alloy steels. Gas welding of cast iron. Welding of non-ferrous metals and their alloys. The technology of oxygen cutting of metals. Defects in welds and joints during gas welding. Methods of correcting defects in gas welding. Safety precautions for gas welding.			v		v								v	
7	Module of basis of speciality	BD	EC	Introduction to the Food Industry	**Purpose:** In accordance with the peculiarities of the university to provide orientation of the student, to give a basic idea of the current situation and scientific and technical issues of the development of the food industry. **Content:** To familiarize students with the system of organization of the educational process, its activities, regulatory documents of the field of education. Classification of technological machines and equipment of the food industry by main types of industry.	3								v			v			

					The main processes of industrial technology. The classification of processes is based on the basic laws that determine the speed of transition. General concepts. Basic equipment, calculation methods and design features of the food industry. The role and place of the educational program on machines and equipment of the food industry in the development of the national economy.														
		BD	EC	Fundamentals of Acadimic Writing	**Purpose:** To form knowledge about the main tasks and principles of academic writing and apply them in their professional activities. **Content:** Academic literacy and its importance for professional activity. The main objectives and principles of academic writing. Basic elements and units of academic text. Writing academic and scientific texts. Types of scientific texts: scientific article, scientific report, abstract, abstract, review; grant application. Work on various elements of a scientific text. Principles of construction of a scientific text and its preparation for publication. Requirements for checking for anti-plagiarism.		**v**	**v**												
		PD	EC	Thermal Energy Integration of Technological Processes	**Purpose:** Formation of knowledge of energy and resource saving, as well as rational use, organization and optimization, about the main recommendations and activities. **Content:** Regulatory and methodological support of energy saving. Organization and optimization of energy and resource saving.	4					**v**						**v**		

					Criteria methods for optimizing energy and resource saving processes. Rational use of material and energy resources in industry. Processes of recovery of mechanical and thermal energy. Fundamentals of energy saving in heat exchange and heating installations. Progressive sources of energy for thermal power plants. Energy-saving measures in heating, ventilation and air conditioning systems. Energy audit and pinch analysis. Evaluation of equipment energy efficiency. Basic recommendations and measures for energy saving.														
		PD	EC	Optimization of Technological Schemes Based on Process Integration	**Purpose:** Mastering the methods of multicriteria optimization of energy and resource saving, technological processes. **Content:** Regulatory and methodological support of energy saving. Strategy for organizing and optimizing energy saving. Theoretical foundations for building intelligent systems for organizing and optimizing energy-resource-saving technology processes. System multi-criteria analysis of production efficiency. The main directions of energy saving, rational use of material and energy resources in production. Basic methods of rational use of resources. Energy saving through the use of alternative energy sources and secondary energy sources. Basic organizational and technical measures of energy saving. Development of key proposals and measures for energy saving.						**v**	**v**					**v**		
		PD	EC	Hydro-mechanical	**Purpose:** To study the hydro-mechanical and mechanical equipment of industry for	6						**v**		**v**						

				and Mechanical Equipment of Industry	its subsequent selection, calculation, design and operation. **Content:** Equipment for conducting mechanical and hydromechanical processes. Types of heterogeneous systems. Machines for transporting liquids and gases. Equipment for separation of liquid heterogeneous systems. Devices for cleaning gas inhomogeneous systems. Devices for mixing liquid media. Equipment for crushing and crushing materials. Equipment for sorting materials.													
		PD	EC	Machines for grinding and separation of solid materials	**Purpose:** To study equipment for grinding and sorting of solid materials for its subsequent selection, calculation, design and operation. **Content:** Grinding processes. Physical and mechanical properties of materials. Classification of machines for grinding and separating materials. Machines for crushing materials: crushers that destroy material by compression; impact crushers. Machines for grinding materials: drum ball mills; medium-speed mills, mills for particularly fine grinding. Machines for mechanical, air, hydraulic sorting of materials.							**v**		**v**					
		PD	EC	Equipment for Drying Solid Materials	**Objective:** Formation of ideas and skills about the process of drying materials, material and heat balances of the drying process, the choice of dryers for a specific production or drying process. **Content:** Theoretical foundations of the drying process of solid materials. Basic parameters of wet gas. Determination of material and heat balances of the drying	6						**v**		**v**					

					process, air and heat consumption for drying. Drying options. Classification of drying equipment. Designs, principles of operation and application of convective, pneumatic, drum, contact, roller, spray, special dryers. Parameters of the vapor-gas mixture in the main drying plants. Selection of accessories for the dryer. Hydrodynamic characteristics of the drying layer. Study of the operation of closed-type dryers. Selection of types of dryers.														
		PD	EC	Equipment for carrying out the process of granulation/	**Purpose:** Formation of ideas and skills about the processes of granulation and separation of materials, material and thermal balances of granulation and separation processes. **Content:** Theoretical foundations of the process of granulation of materials. Basic parameters of wet gas. Material and heat balances of the granulation process. General concepts of the granulation process. Classification of granulators and auxiliary equipment. Designs, principles of operation, application of granulators and auxiliary equipment. Parameters of the vapor-gas mixture in the main drying plants. Selection of auxiliary equipment for granulation plants.							**v**		**v**					
8	Scientific Fundamentals of the creation of machines	BD	EC	Hydraulic machines and compressors	**Purpose:** To possess knowledge in the field of device, principle of operation, calculations of the most common types of pumps and compressors used in industrial enterprises. **Content:** General classification of hydraulic machines. The main technical	4						**v**		**v**					

					indicators of pumps. Principles of operation and design features of pumps. Classification of dynamic pumps. The device of centrifugal and axial pumps. Classification of volumetric pumps. Piston pumps. Rotary pumps. Calculation of the main parameters of pumps. Machines for moving and compressing gases. Classification of compressors. Reciprocating compressors. Centrifugal compressors. Rotary and axial compressors. Calculation and selection of compressor equipment.														
		BD	EC	Pumps, Fans and compressor Units	**Purpose:** To study the schematic diagrams, operational characteristics and designs of pumps, fans and compressor units. **Content:** Classification, application of pumps, fans, compressors. Parameters of pumps, fans, compressors. Theory of operation of centrifugal pumps and fans. Designs of industrial centrifugal pumps, the principle of operation. Centrifugal fans. Axial pumps and fans. Volumetric piston and rotary pumps. Special types of pumps. Centrifugal, vane, axial, reciprocating, rotary compressors, their designs, stages, performance characteristics, power.							**v**		**v**					
		BD	EC	Ecological Equipment of Industrial Enterprises	**Purpose:** Formation of knowledge about the basics of technological processes, equipment and technical means designed to protect the environment. **Content:** Engineering methods of environmental protection from man-made pollution. Technique of protection of atmospheric air. Devices for dry and wet	4					**v**			**v**					

					cleaning of industrial gases. Electrical methods of gas purification. Equipment, technological schemes and installations for wastewater treatment of industrial enterprises. Recycling of solid industrial waste.														
		BD	EC	Principles of Waste-free Industrial Production	**Purpose:** Formation of knowledge and skills necessary to create modern waste-free and low-waste technologies. **Content:** Waste–free production is the basis of industrial ecology. Principles of organization of low-waste and waste-free production. Requirements for waste-free production. Methods of development of waste-free technological processes. Use of secondary material resources. The main directions of development of waste-free and low-waste technology in certain industries. Processes and installations for processing industrial waste.						**v**			**v**					
		BD	EC	Technology of Apparatus Construction	**Purpose:** Formation of competencies to create optimal technological processes for the preparation of devices that meet the requirements of high performance at low cost and provide high performance. **Content:** General technical requirements for the manufacture and design of devices and devices in industrial production. Factors influencing the manufacturing technology of devices during the introduction of innovative technologies. Preparation of the workpiece and hole processing. Heat treatment. Methods of root preparation and equipment used. Assembly methods.	4				**v**			**v**			**v**			

		BD	EC	Fundamentals of Designing of Technological Devices	**Purpose:**Apply knowledge to make optimal, technically competent decisions that meet specific situations that arise in the process of creating industrial equipment. **Content:** Design and technological development of new equipment with improved design characteristics. The main factors influencing the design of machines when introducing new technologies. Factors influencing the technology of assembly and assembly of devices in the implementation of innovative techniques and technologies. Measures aimed at fulfilling the requirements of regulatory legal acts for the design of devices. General technical requirements for the assembly and design of devices in industrial production.					v			v			v			
		BD	EC	Fundamentals of Scientific- -Research and Educational-Research Work of Students	**Purpose:** To develop students' research skills, to introduce students to scientific knowledge, their readiness and ability to conduct research. **Content:** Scientific research as a kind of creative activity. Information and bibliographic resources. Types and forms of educational research and research work. Preparatory stage of research work. Features of preparation and protection of educational and research works. The choice of the topic of scientific research. Search, collection and processing of scientific information. Requirements for the technical design of scientific work.	4		v									v			
		BD	EC	Fundamentals of patenting	**Purpose:** Formation of theoretical knowledge in the field of intellectual			v									v			

					property and the organization of patent business among future specialists; application of the acquired knowledge in the practice of engineering work at the enterprises of the industry. **Content:** Intellectual property objects, their classification. Copyright and related rights. Industrial property and its legal protection. Registration of patent rights for inventions, utility models, industrial designs. The formula of the invention and its meaning. The rights of the authors of the invention, utility model, industrial design. Patent information and its uses.													
		PD		Practical Training for students I	**Purpose:** To consolidate the knowledge gained by students in the educational process based on the study of work experience at the enterprise in the specialty direction, as well as the acquisition of production skills. **Content:** The main types and designs, physico-chemical processes occurring in the elements of technological equipment. Study of the organization of repair and mechanical services of the enterprise. Purpose and principles of operation of turning, milling, grinding, drilling, boring and other production machines. Devices and installations for gas cleaning and dust collection; schemes, methods and equipment for wet and dry cleaning of gas and air media.	4				**v**								**v**	**v**
9	Fundamentals of calculation,	BD	EC	Fundamentals of Designing of Food	**Purpose:** engineering training of students in the field of calculation and design of typical equipment for food production	5				**v**			**v**			**v**				

	design and manufacture of machines and devices of food industry			Processing Equipment	**Contents:** General principles of calculation and design of parts and assemblies. Calculation of round and annular plates subjected to bending. The choice of the design scheme when calculating parts according to the theory of plates and shells. Details and assemblies of capacitive and heat exchange equipment. Fast rotating parts and assemblies.Construction of support units of high-speed rotors and disks. Fundamentals of calculating the elements of equipment for vibrations.Frequency characteristics of food machines.														
		BD	EC	Calculation and Design of Machines and Apparatus of Food Productions	**Purpose:** To study design and verification calculations to ensure the reliability and trouble-free operation of food equipment **Content:** Calculation of the strength and stability of elements and components of food equipment. Momentary and momentary theory of strength. Calculation and design of covers, bottoms and conical transitions of vessels and apparatuses. Fundamentals of the design and calculation of vessels and apparatuses with integral jackets. Calculation and design of separable solid-tight joints of vessels and apparatuses. High-pressure apparatuses and valves. Critical speeds of rotating shafts. Fundamentals of the theory of reliability and durability of machines.					**v**			**v**			**v**			
		BD	EC	Processes and Apparatus of Food Production	**Purpose:** Systematization of knowledge on the basics of technological processes of food production, development of the ability and skills of calculating devices,	6						**v**		**v**	**v**				

					development of students' ability to independently search, analyze and assimilate knowledge about chemical and technological processes. **Content:** Theoretical foundations of the main processes of food technology. The law of thermodynamic equilibrium. Classification of the main processes of food technology. General principles of analysis and calculation of processes and devices. Material balances. Heat balances. Hydraulic processes. Hydro-mechanical processes. Processes of separation of heterogeneous systems. Mass-heat exchange processes. Equipment for chemical processes.															
		BD	EC	General Technology of Food Production	**Purpose:** To study the scientific foundations and technology of food production necessary for deep mastery of the profession. **Content:** Current state and prospects of development of the food industry. Classification of food production. The main processes and hardware design of food production, the theoretical laws of processes and devices, the device and the principle of operation of machines and devices used in food production.							**v**		**v**	**v**				
		PD	EC	Reliability of Technological Machines of Food Industry	**Purpose:** To study the basic properties of the reliability of technological machines and equipment, to teach the application of the basic provisions of the theory of reliability in the design, manufacture and operation of equipment. **Content:** Features of food industry	4						**v**	**v**					**v**	

					production. The significance of the reliability problem for modern machines. System elements of diagnostic studies. The basic theory of machine reliability. Conditions for standardization of reliability. Conditions for the implementation of a typical chemical-technological process (CTP). Typical technology. Types of technological schemes and stages of food production. Compositions of reliability of service of the equipment design. Malfunctions. Their types. Specific malfunctions of food production equipment.														
		PD	EC	Diagnostics and Service of Food Equipment	**Purpose:** Formation of knowledge on technical diagnostics and maintenance of the main and auxiliary technological equipment of food production. **Content:** Prospects for the development of new methods of equipment diagnostics. Fundamentals of diagnostics of food production machines and apparatuses. Types, methods and means of technical diagnostics. Organization of maintenance of machines and apparatuses. The procedure for external inspection and maintenance of the machine. Fixing works. Balancing of rotating machine parts. Adjustment of the belt drive. Measurement and adjustment of clearances in sliding bearings. Tools and devices for diagnostics and maintenance of machines. Safety precautions during machine maintenance.							**v**						**v**	
		PD	EC	Design of Machines and	**Purpose:** Formation of skills in designing technological lines of food enterprises	5				**v**			**v**		**v**					

				Units of Food Production	related to the choice of a rational type of machines and apparatuses, compliance with the rules and norms of design. **Content:** Fundamentals of technological design of machines and aggregates of food production. Principles and methods of design. Development of technological schemes for various food industries. Development of the machine and hardware scheme of the technological line. General principles of analysis, calculation and selection (development) of technological equipment. Development of a workshop plan with equipment placement.														
		PD	EC	Design of Technological Lines of Food Production	**Purpose:** Formation of knowledge, skills and abilities in the field of designing technological lines for food production. **Content:** Design of food production lines. Sketch technological scheme. Features of designing lines of individual branches of the food industry. Calculation of material and thermal balances by production stages. Basic principles of equipment layout. Calculation of productivity and number of machines on the food production line. The principles of the layout of the technological line equipment in the workshop space.					**v**			**v**		**v**				
		BD	EC	Transport Machines of Food Industry	**Purpose:** To study the structural and operational properties of transport vehicles; to possess the skills of calculation, design and practical application of lifting and transport machines. **Content:** Classification of transporting machines. Characteristics of transported goods. Device, types, main parameters of	5				**v**					**v**				

					belt, bucket, scraper, screw conveyors. Installations of pneumatic transport. Cranes. Purpose and arrangement of winches, hoists, lifts, elevators, conveyors. Calculation of lifting devices. Calculation of performance, drive power and selection of the traction body.														
		BD	EC	Lifting – Transport Plants	**Purpose:** Students acquire knowledge about modern lifting mechanisms and transporting machines, methods of their selection and calculation, basic principles of safe operation. **Content:** Purpose and classification of lifting and transport installations. The main types of lifting machines. Cargo handling devices. Elements of cargo and traction devices. Continuous machines with a traction element. Fundamentals of calculation of lifting devices.					v					v				
		BD	EC	Technology of Mechanical Engineering of Food Industry	**Purpose:** to provide students with knowledge and practical skills that will allow them to design technological processes for manufacturing specific parts and assembling machines used in food engineering with the required quality and accuracy. **Content:** Features of food engineering technology. Technical and sanitary requirements for food machines and apparatuses. Electrophysical and electrochemical methods of processing materials in the production of food machinery and equipment. Technology of assembly of food machines and equipment. Technological control of assembly	6		v		v						v			

					drawings. Types of assembly. Requirements for the assembly of quick-release units of food machines. Basic requirements for welded structures of apparatuses and vessels.																
		BD	EC	Food Engineering	**Purpose:** Formation of knowledge about the physical essence of the latest technological processes and their impact on economic indicators in the work of production, depending on the level of production technology. **Contents:** The main provisions and concepts in mechanical engineering technology. Fundamentals of designing technological processes of machining parts by cutting. Fundamentals of the design of assembly processes. Analysis of technical conditions for assembly units, calculation of assembly dimensional chains, selection of bases and calculation of the accuracy of basing of the connected parts. Modes of automatic connection of parts. The accuracy of the installation of the connected parts and the necessary accuracy of their relative position.			**v**		**v**						**v**			
		PD	EC	Engineering Fundamentals of Designing Food Industry Machines	**Purpose:** To familiarize students with the system of indicators that determine the quality of machines, requirements for technical facilities and signs of technology development **Content:** Requirements for food processing machines. Formation of technical requirements for the manufacture of machines in the food industry. Economic fundamentals of designing technological	4				**v**			**v**			**v**			

					machines of the food industry. The content and stages of design and construction. Design documents of technical proposals. Draft design, their contents and documents. Technical project. Design documents of the technical project. Requirements for technical project documents. Areas of application of standards-unified design documents.															
		PD	EC	Processes of Creation and Development of New Equipment in the Food Industry	**Purpose:** To familiarize students with the system of indicators that determine the quality of competitive machines that meet modern requirements. **Content:** Achievements, features and history of the origin of engineering industries. The place of the machine-building industry in the improvement of scientific and technological progress. Functions of machines and mechanisms and their classification. The concept of the quality of production products. Quality assurance measures. Requirements for design documents of the draft project. Design documents. Types of design documents.					**v**			**v**			**v**			
		PD	EC	Heat and Mass Transfer Equipment of Food Industry	**Purpose:** Development of professional competencies to improve the efficiency of engineering activities in the food industry. **Content:** General information about food processing machines. Devices for tempering and increasing the concentration of food media. Devices for drying food media. Devices for baking and roasting food media. Devices for cooling and freezing food media. Equipment for the rectification process.Heat exchangers for	6								**v**	**v**				

					food production.														
		PD	EC	Machines and Apparatus for Heat and Mechanical Treatment of Raw Materials in the Food Industry	**Purpose:** A clear understanding of the technical, operational and other characteristics of food production machines and equipment. **Content:** Classification of food machinery and equipment. Washing machines for grain, sugar beet, fruits and vegetables, their structure and calculation. Calibration and verification of food production raw materials. Equipment for mechanical processing of food raw materials. Constructive calculation of heat exchangers. Calculation of devices for mechanical processing of food raw materials. Technological, structural and mechanical calculations.							**v**		**v**	**v**				
		PD	EC	Technological Equipment of Food Industry	**Purpose:** To teach students to use the knowledge gained as a result of fundamental training in general technical disciplines to solve engineering problems related to technological equipment. **Content:** Classification of technological equipment by functional and industry characteristics; basic requirements for technological equipment; machine and hardware options; equipment for the preparation of raw materials, semi-finished products for basic production operations; technological equipment for mechanical processing of products, raw materials and semi-finished products, technological equipment for weighing, dosing, packaging and packaging of finished products; technological equipment for conducting	7						**v**		**v**	**v**				

					heat and mass transfer processes.														
		PD	EC	Complex Equipment in the Processing Line of Food Raw Materials	**Purpose:** To study the theory, design and operation of complex equipment in the food industry. **Content:** Organization of machine technologies of food products. Technological lines for the production of food products by disassembling agricultural raw materials into components. Technological line for the production of varietal flour from wheat grain. Technological production line of potato starch. Technological malt production line. Technological production line of wine materials. Technological line for the production of pasteurized drinking milk and cream.							v		v	v				
		PD		Practical Training for students II	**Purpose:** Familiarization with the peculiarities of the functioning of a particular enterprise; systematization, consolidation and expansion of theoretical knowledge for solving production tasks. **Content:** Considers methods of multi-criteria optimization and development of energy- and resource-saving chemical-technological processes. Actual problems of industrial enterprises related to the design, development and improvement of the design of technological machines and equipment. Conducting literary and patent research on the chosen topic. Study of technological features of repair of standard assembly units and modern methods of restoration.	6					v					v		v	v
10	Module	BD	EC	Subjects on	**Purpose:** Development of additional	12												v	v

	acquisition of new professional competencies			the Additional Educational Program	professional competencies in the field of technological and special equipment for oil and gas production. **Content:** Analyze technological schemes and hardware design of oil and gas preparation and processing processes. Carry out technological processes of operation, repair, reconstruction and restoration of oil and gas facilities.														
11	Module of final certification	PD		Pre degree or Industrial Practice	**Purpose:** The purpose of the pre degree or industrial practice is to collect materials for writing a final qualifying work, to expand the professional knowledge gained in the course of training, to form practical skills and skills for conducting independent scientific and practical work. **Content:** Technological equipment of the workshop or department, its structure, purpose and principles of operation. Selection of schemes of technological machines and equipment. Improvement and research of the design of devices. Development, design, calculation and design of equipment. Instilling skills in the repair of technological equipment, search and rational use of scientific and technical information.	10							v	v		v		v	
				Writing and Defending aThesis, a Graduate work, or Preparing and Passing a Comprehensiv	**Purpose:** Systematization, consolidation and expansion of theoretical knowledge and practical skills in the specialty and their application in solving specific scientific and research tasks. **Content:** To make optimal decisions in the design, construction and operation of technological machines and apparatuses.	8							v	v	v			v	

				e Exam	Development of modern designs of machines and apparatuses, patent and license study of design solutions. From the point of view of the specifics of the projected production facility, to select and justify the optimal technological schemes of production and equipment, to present all the calculation and descriptive material in the calculation and explanatory note, providing it with a set of graphic documentation, highlighting new, original design solutions that give an individual character to the work performed by the graduate.														

5. SUMMARY TABLE ON THE VOLUME OF LOANS DISBURSED IN THE CONTEXT OF EP MODULES

Course of Study	Semester	The number of mastered modules	The number of studied disciplines			Number of KZ credits					Total hours	Total KZ credits	The number of	
			OC	HSC	EC	Theoretical training	Physical training	Educational Practice	Industrial practice	Final examination			exam	cr.test
1	1	4	5	1	1	28	2				900	30	6	1
	2	4	3	2	2	27	2	1			900	30	4	4
2	3	5	2	3	3	28	2				900	30	6	2
	4	6	3	2	1	24	2		4		900	30	4	2
3	5	3			6	30					900	30	6	
	6	2			4	24			6		900	30	3	2
4	7	2			4	21					630	21	4	
	8	3			4	21					630	21	4	
	9	1							10	8	540	18		1
Total			13	8	25	203	8	2	20	8	7200	240	37	12

6. LEARNING STRATEGIES AND METHODS, MONITORING AND EVALUATION

Learning strategies	**Student–centered learning:** The student is the center of teaching/learning and an active participant in the learning and decision-making process. **Practice-oriented training:** orientation to the development of practical skills.
Teachingmethods	Conducting lectures, seminars, various types of practices: • *using innovative technologies:* • problem-based learning; • case study; • group work; • discussions and dialogues, quizzes; • presentations; • lecture with analysis of specific situations; • lecture-visualization; • lecture-consultation; • round table; • situational analysis; • analysis of production documentation; • solving situational problems • *rational and creative use of information sources:* • multimedia training programs; • electronic textbooks; • digital resources. Organization of independent work of students, individual consultations.
Monitoring and evaluation of the achievability of learning outcomes	**Current control** on each topic of the discipline, control of knowledge in classroom and extracurricular classes (according to syllabus). Assessment forms: • survey in the classroom; • testing on the topics of the discipline; • control works; • protection of independent work; • discussions; • colloquiums; • essays, etc. **Boundary control** at least twice during one academic period within the framework of one academic discipline. Intermediate certification is carried out in accordance with the working curriculum, academic calendar. **Forms of holding:** • exam in the form of testing; • oral examination; • written exam; • protection of term papers (projects); • protection of practice reports; • differentiated credit **Final certification.**

7. EDUCATIONAL AND RESOURCE SUPPORT OF THE EP

Information Resource Center	The structure of the Educational Information Center includes 6 subscriptions, 16 reading rooms, 2 electronic resource centers (ERC). The basis of the network infrastructure of the Educational and Information Center is 180 computers with Internet access, 110 workstations, 6 interactive whiteboards, 2 video doubles, 1 video conferencing system, 3 A-4 format scanners, JIC software - AIBS "IRBIS-64" under MS Windows (basic set of 6 modules), stand-alone server for uninterrupted operation in the IRBIS system. The library fund is reflected in the electronic catalog available to users on the site http://lib.ukgu.kz on-line 24 hours 7 days a week. Thematic databases of their own generation: "Almamater", "Proceedings of SKSU scientists", "Electronic archive" have been created. Online access from any device 24/7 via the external link http://articles.ukgu.kz/ru/pps. Catalogs are processed electronically. EC consists of 9 databases: "Books", "Articles", "Periodicals", "Proceedings of the teaching staff of SKSU", "Rare Books", "Electronic Fund", "SKGU in Print", "Readers" and "SKU". The EIC provides its users with 3 options for accessing its own electronic information resources: from the “Electronic Catalog” terminals in the catalog hall and in the EIC subdivisions; through the information network of the university for faculties and departments; remotely on the library website http://lib.ukgu.kz/. Open access to international and republican resources: "SpringerLink", "Polpred", "Web of Science", "EBSCO", "Epigraph", to electronic versions of scientific journals in the public domain, "Zan", "RMEB", "Adebiet", Digital library "Aknurpress", "Smart-kitar", "Kitar.kz", etc. For people with special needs and disabilities, the library website has been adapted to the work of visually impaired users
Material and technical base	• Educational and research, scientific laboratory named after O.S.Balabekov; • Educational and research, scientific Laboratory of mechanical tests named after A.Ainabekov. **Specializedlaboratories:** • Informationandcommunicationtechnologies; • Physics; • Engineeringcomputergraphics; • Standardization, certificationandmetrology; • Educational and Research Laboratory of cutting theory; • Educational laboratory "Theory of machines and mechanisms"; • Materials Science Training Laboratory; • Educational laboratory "Technology of mechanical engineering"; • Training laboratory "Machine parts"; • Educational laboratory "Materials Science and Foundry processes". **UNPC base** • SHF JSC "NGSK Kazstroyservice". **Practicebases:** • LLP «Shymkent Brewery» • LLP «Rakhat-Shymkent» • SHF JSC "NGSK Kazstroyservice" and so on.

AGREEMENT SHEET

by Education Program
«6B07182 - «Machines and apparatuses of food production»

Director of AID _____ A.Naukenova

Director of ASD _____ U.Nazarbek

Director of DEK _____ T.Bazhirov