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

EDUCATIONAL PROGRAM

6B07117 Chemical Technology of Organic Substances

code and name of the educational program

Level: Bachelor's

Approved
by the Board of Directors of JSC
«K.Kulazhanov KazUTB»
"27" 02 2026 protocol No. 4

Recommended
by the Academic Council of JSC
«K.Kulazhanov KazUTB»
"27" 02 2026 protocol No. 7

Astana, 2026

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Preface

The educational program "6B07117 Chemical technology of organic substances" 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 No. 2, as well as on the basis of professional standards (if any).

The program also takes into account the competencies of the professions "Innovation Technologist," "Technologist for the Production of Rubber, Polypropylene, Rubber Products and Plastics from Coal," "Laboratory Chemist for the Development of New Materials," and "Chemical Technologist for Coal Processing," presented in the "Atlas of New Professions and Competencies in the Republic of Kazakhstan," as well as the competencies of the regional atlas standard "Digital Laboratory Technician for Quality Control in the Oil and Gas Industry."

The educational program "6B07117 Chemical technology of organic substances" was approved at Academic Quality on "22" 01 2026, protocol №. 3
Chairman E.B. Askarbekov

The educational program "6B07117 Chemical technology of organic substances" was approved at the meeting of the Commission on Academic Quality of the Faculty on "21" 12 2025, protocol №.3
Chairman B.A. Serimbetov

The educational program "6B07117 Chemical technology of organic substances" was developed and discussed at the meeting of the department "Chemistry, Chemical Technology and Ecology" dated "27" 11 2025, protocol №.. 4
Head of the department J. T. Nurtai

Approval sheet

Educational program «6B07117 Chemical technology of organic substances»

AGREED:

Vice-Rector for Administrative Affairs		E. Askarbekov	"22" 01 2026 year
Head of Educational Programs Department		B. Bayadilova	"22" 01 2026 year
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1 Passport of the educational program

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	6B071 - Engineering and engineering affairs
Number and name of the group of educational programs	6B06 – Chemical Engineering and processes
Code and name of the educational program (EP	6B07117 Chemical technology of organic substances
Educational program profile	Higher engineering education
goal of the educational program	Training of highly qualified graduates of chemical technologists in the field of organic and petrochemical production technology, with deep professional and social competencies, in demand in almost all sectors of the market economy and competitive in the international space.
completion criterion of an educational program	At least 240 academic credits, including all types of student learning activities
language of instruction of the educational program	Kazakh, Russian
Distinctive features of the educational program	
Partner University	

2 Qualification characteristics of a graduate of an educational program

Degree awarded	Bachelor in the educational program "6B07117 Chemical technology of organic substances"
Field of professional activity	Oil refining, petrochemistry, polymer processing, geology, hydrogeology, mining, science and education
Types of professional activities	Bachelors in the specialty 6B07117 - Chemical technology of organic substances can perform the following types of professional activities: - organizational and technological activities; - production and management; - project activities; - research activities - educational (pedagogical) activities

Types of professional activities	Organizational and technological activities: - organization and implementation of incoming inspection of raw materials from the standpoint of the possibility of production and processing of organic substances; - assessment of the composition and properties of the initial raw materials in order to be able to develop new technological processes that ensure high quality; - analysis of ways to improve and modernize process lines and equipment in order to implement highly efficient technological processes for the production and processing of organic substances; Production and management: - organization of the team's work in the conditions of existing production; - implementation of technical control; Project activities: - design of new and modernization of existing process flow diagrams, selection of process parameters, calculation of equipment selection; - development of design and estimate documentation ensuring the effectiveness of design solutions; - analysis and evaluation of alternative options for the process flow diagram and individual units based on the extensive use of mathematical models. Research activities: - planning and conducting research in the field of chemical technology of organic substances; - modeling and optimization of production facilities and process flow charts; - analysis of scientific and technical literature and conducting patent searches. Educational (pedagogical) activities: - teaching young people chemistry and technology of processing organic substances; - educating the younger generation in pedagogical and industrial activities
Object of professional activity	The objects of professional activity of graduates are: enterprises for the production of organic processing of oil, gas, coal, production of synthetic fibers, solid and liquid rocket fuels, for the extraction of hydrocarbon raw materials and their preparation for transportation; research and design industry institutes; secondary technical educational institutions; defense enterprises
Functions of professional activity	A bachelor in his/her professional activity performs the following functions: - Providing support for the technological process and monitoring the operation of technological facilities and structural divisions of an oil and gas refining organization (production) production) - Ensuring normal operation of equipment and devices under the

	control of the laboratory - Organization of product testing - Technical support for quality control activities - Organization of measures to identify substandard products - Organization of timely and high-quality implementation of the laboratory control schedule

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)	**82**
University component	38
Component of choice	44
Professional practice	**7**
Cycle of major disciplines (MD)	**75**
University component	5
Component of choice	70
Professional practice	**12**
Final assessment	**8**
Total	**240**

4 Additional educational programs (minor)

4.1 Minor «Modern aspects of artificial intelligence application»

Name of disciplines	Workload in academic credits
Introduction to Artificial Intelligence (Minor)	5
Development of Artificial Neural Networks (Minor)	5
Artificial Intelligence in Object Management (Minor)	5
Total	15

5 Competency map of the educational program «6B07117 Chemical Technology of Organic Substances»

Competence map of the educational program	Learning outcome code	Learning Outcome (according to Bloom's Taxonomy)
Behavioral skills and personality traits (Softskills)	GEK_1	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.
	GEK_3	Promotes the development of information literacy through the mastery and use of modern information and communication technologies in all areas of activity.
	LO_1	Applies methods of economic and financial planning, knowledge in the field of the legal system, anti-corruption culture, using key

		economic and legal principles of financial literacy and entrepreneurship in practical activities.
Digital competencies (Digital skills)	GEK_2	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
Professional skills (Hardskills)	LO_2	Has mastered modern mathematical methods and means of modeling chemical-technological processes, principles of depicting objects and general drawing rules for solving spatial problems and reading drawings using computer technologies.
	LO_3	Applies methods of planning, conducting and analyzing scientific experiments to study chemical systems, physical and chemical processes and the synthesis of organic compounds, explaining the behavior of substances under various conditions.
	LO_4	Ensures occupational safety and management of oil and gas processing operations with consideration of sustainable development and environmental safety.
	LO_5	Applies the advances of natural compound chemistry for the processing of organic substances and the synthesis of pharmaceuticals.
	LO_6	Carries out the analysis, design, and optimization of processes and equipment in chemical-technological schemes of organic synthesis based on comprehensive knowledge of the methods and principles of chemical technology, taking into account the selection of available raw material sources.
	LO_7	Supports the technological process, the work of technological facilities and structural divisions of oil and gas processing enterprises, using methods of process-technological parameters in the implementation of chemical-technological processes.
	LO_8	Conducts laboratory analysis and testing of samples of oil and oil products, with the development and execution of technical documentation on the quality control of oil, gas and their processed products, using qualitative, quantitative and physicochemical methods of analysis.
	LO_9	Uses technologies for obtaining and processing polymers, their physical and chemical properties, methods for producing plastic materials, as well as modern analytical approaches to studying their characteristics for the use of high-molecular compounds with specified properties in various industries.
	LO_{10}	Applies basic laws of physics, thermodynamics, effective methods of processing secondary energy resources, design and operation of technological

		equipment, as well as modern methods of application of artificial intelligence for development, optimisation, automation of chemical-technological processes of chemical industry.
	LO_{11}	Studies the chemical composition of various fuels, technologies for the preparation of solid fossil fuels, the main directions of their thermal processing, semi-coking and high-temperature coking processes, obtaining technology for lubricants and synthetic fuels, environmental protection issues and the creation of possible waste-free processes.

6 Learning outcomes of the educational program and modules

(The design layout is landscape)

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)	GEK$_1$ 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.	Language and socio-cultural training	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
				Philosophy
				Physical Culture
				Module of Socio-Political Knowledge (Political Science, Sociology, Cultural Studies, Psychology)
	LO$_1$ Applies methods of economic and financial planning, knowledge in the field of the legal system, anti-corruption culture, using key economic and legal principles of financial literacy and entrepreneurship in practical activities.		- is able to understand the social and ethical values of society as a product of integration processes in the systems of basic knowledge of the disciplines of the socio-political module; - the ability to apply scientific methods and research techniques in the context of a specific academic discipline and in the procedures of interaction of the disciplines of the module.	Module of Economics, Entrepreneurship, Law and Financial Literacy (Fundamentals of Economics and Entrepreneurship, Fundamentals of Law and Anti-corruption Culture, Fundamentals of Financial Literacy)
	GEK$_3$ Promotes the development of information literacy through the mastery and use of modern information and communica-tion technologies in all areas of activity.		Possesses various types of information and communica-tion technologies for searching, storing, processing, pro-tecting, and disseminating information.	Foreign language Kazakh (Russian) language

Digital competencies (Digital skills)	GEK_2 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	Capable of interpersonal social and professional communication in Kazakh, Russian, and foreign languages.	Information and Communication Technologies
Professional skills (Hardskills)	LO_2 Has mastered modern mathematical methods and means of modeling chemical-technological processes, principles of depicting objects and general drawing rules for solving spatial problems and reading drawings using computer technologies.	Technical science	Demonstrates students' theoretical and practical preparation in mathematics, as well as solving engineering problems	Engineering Graphics
				Descriptive Geometry
				Mathematical Modeling of Chemical Technological Processes
		Chemical technology of oil, gas, coal and polymers	Applies basic AI algorithms, including machine learning and inference methods	Control Systems of Chemical Technological Processes
		Organic Synthesis and Chemical Industry Safety	Applies mathematical models for designing and upgrading chemical engineering systems	Fundamentals of Chemical-Technological Production Design
	LO_3 Applies methods of planning, conducting and analyzing scientific experiments to study chemical systems, physical and chemical processes and the synthesis of organic compounds, explaining the behavior of substances under various conditions.	Technical science	Possesses basic knowledge of chemistry, general patterns of chemical processes, structure and properties of chemical compounds, understanding of the kinetics and mechanism of physical and chemical processes and acquisition of skills in conducting basic organic analysis.	Analytical Chemistry
				Introduction to the Specialty
				Inorganic Chemistry
				Organic Chemistry
				Physical and Colloid Chemistry
				Descriptive Geometry
				Synthesis of Drugs
		Innovative chemical engineering processes of recycling processing of organic subatances	Applies biochemical knowledge to solve applied problems in chemical and biological research and technology	Fundamentals of Scientific Research

		Technology of processing of hydrocarbon raw materials	Has basic knowledge of writing scientific articles, reports, presentations and formatting references	Chemistry of Natural Compounds
	LO_4 Ensures occupational safety and management of oil and gas processing operations with consideration of sustainable development and environmental safety.	Technical science	Demonstrates knowledge of the strategy for the development of organic synthesis, the technology of organic substances, polymers, their properties, general patterns of production and the area of their application.	Sustainable Development, Ecology, and Life Safety
				Methods of Environmental Protection
		Innovative chemical engineering processes of recycling processing of organic subatances		Occupational Safety in the Chemical Industry
				Chemical Ecology
	LO_5 Applies the advances of natural compound chemistry for the processing of organic substances and the synthesis of pharmaceuticals.	Technology of processing of hydrocarbon raw materials	Demonstrates knowledge of the classification, structure and properties of the main classes of natural compounds: alkaloids, terpenes, flavonoids, steroids, etc.	Chemistry of Natural Compounds
		Technical science	Has knowledge of multi-stage organic synthesis methods and strategies for creating molecules with a given biological activity	Synthesis of Pharmaceutical Compounds
	LO_6 Carries out the analysis, design, and optimization of processes and equipment in chemical-technological schemes of organic synthesis based on comprehensive knowledge of the methods and principles of chemical technology, taking into account the selection of available raw material sources.	Innovative chemical engineering processes of recycling processing of organic subatances	Demonstrates knowledge of hydrocarbon raw materials as the main element of petrochemical and basic organic synthesis.	Basic Chemical Engineering Processes and Equipment
				General Chemical Technology
			Has knowledge of the main methods and technologies for processing oil and gas hydrocarbons, synthesizing carbon materials based on theoretical approaches, methods and techniques.	Modern Technologies for Processing Organic Materials
				Theoretical Foundations of Chemical-Technological Processes for Organic Matter Processing
				Raw Material Base of Industrial Organic Synthesis
				Technology and Equipment for Oil and Gas Processing

		Technology of processing of hydrocarbon raw materials	Has a technical level of knowledge in the field of oil and gas processing and obtaining products of their synthesis	Technology of Hydrocarbon Feedstock Processing Chemical Technologies of Organic Synthesis Technology of Production and Properties of Solid Fuels
	LO_7 Supports the technological process, the work of technological facilities and structural divisions of oil and gas processing enterprises, using methods of process-technological parameters in the implementation of chemical-technological processes.	Technology of processing of hydrocarbon raw materials	Demonstrates knowledge of hydrocarbon raw materials as the main element of petrochemical and basic organic synthesis. Critically evaluates the current state of production of organic compounds, analyzes and selects ways to improve existing and develop new technological processes based on modern achievements of science and technology.	Fundamentals of Oil and Gas Processing Technology and Equipment for Oil and Gas Processing Petrochemistry
		Organic Synthesis and Chemical Industry Safety		Modern Methods for Studying the Properties of Oil and Petroleum Products
		Chemical technology of oil, gas, coal and polymers	Demonstrates knowledge of the theoretical and technological foundations of oil refining processes, physical and chemical characteristics, methods for obtaining intermediate and final products of petrochemical chemistry and polymer production, and the sequential conversion of hydrocarbons in the process of petrochemical synthesis	Promising Technologies for Deep Oil and Gas Processing Organization and Management of Oil and Gas Refining Enterprises
	LO_8 Conducts laboratory analysis and testing of samples of oil and oil products, with the development and execution of technical documentation on the quality control of oil, gas and their processed products, using qualitative, quantitative and physicochemical methods of analysis.	Innovative chemical engineering processes of recycling processing of organic subatances	Has a basic understanding of writing scientific articles, reports, presentations and formatting references Critically evaluates the current state of production of organic compounds, analyzes and selects ways to improve existing and develop new technological processes based on modern achievements of science and technology.	Modern Technologies for Processing Organic Materials Fundamentals of Scientific Research Production practice I
		Chemical technology of oil, gas, coal and polymers	Able to demonstrate the basics of process theory in chemical engineering, methodology for studying the interaction of chemical transformation processes and phenomena, as well as the main reaction processes and apparatuses of chemical and petrochemical engineering	Natural and Associated Gases and Their Processing Gas Chemistry and Gas Processing Technology Quality Control of Oil and Petroleum Products

			Has a technical level of knowledge in the field of oil and gas processing and obtaining products of their synthesis	Main Quality Indicators of Petroleum Products
				Promising Technologies for Deep Oil and Gas Processing
				High-Molecular Compounds Technology
		Technology of processing of hydrocarbon raw materials	Demonstrates knowledge of the theoretical and technological foundations of oil refining processes, physical and chemical characteristics, methods for obtaining intermediate and final products of petrochemical chemistry and polymer production, and the sequential conversion of hydrocarbons in the process of petrochemical synthesis	Physicochemical Methods of Analysis
				Raw Material Base of Industrial Organic Synthesis
				Technology of Organic and Petrochemical Synthesis
				Technology and Equipment for Oil and Gas Processing
				Production practice II
		Organic Synthesis and Chemical Industry Safety	Demonstrates knowledge of the theoretical and technological foundations of oil refining processes, the sequential conversion of hydrocarbons in the process of petrochemical synthesis	Modern Methods for Studying the Properties of Oil and Petroleum Products
	LO_9 Uses technologies for obtaining and processing polymers, their physical and chemical properties, methods for producing plastic materials, as well as modern analytical approaches to studying their characteristics for the use of high-molecular compounds with specified properties in various industries.	Chemical technology of oil, gas, coal and polymers	Demonstrates knowledge of the theoretical and technological foundations of oil refining processes, physical and chemical characteristics, methods for obtaining intermediate and final products of petrochemical chemistry and polymer production, and the sequential conversion of hydrocarbons in the process of petrochemical synthesis Uses the laws of chemical and technological sciences to solve problems of petroleum products and organic synthesis and the chemical industry	General Chemical Technology
				Physics and Chemistry of Natural and Synthetic Polymers
				Plastics and Polymer Production Technology
		Organic Synthesis and Chemical Industry Safety		Production of Natural and Synthetic Rubbers
				Modern Methods for Studying the Properties of Polymers and Polymer Materials
		Innovative chemical engineering processes of recycling processing of organic subatances		High-Molecular Compounds Technology

		Technical science		Analytical Chemistry
	LO_{10} Applies basic laws of physics, thermodynamics, effective methods of processing secondary energy resources, design and operation of technological equipment, as well as modern methods of application of artificial intelligence for development, optimisation, automation of chemical-technological processes of chemical industry.	Technical science	Applies basic AI algorithms, including machine learning and inference methods Applies thermodynamic laws to the analysis and calculation of energy and chemical engineering processes	Physics
				Introduction to Artificial Intelligence (Minor)
				Physical and Colloid Chemistry
		Chemical technology of oil, gas, coal and polymers	Able to apply modern technical control means in automation systems for various purposes.	Artificial Intelligence in Object Management (Minor)
				Development of Artificial Neural Networks (Minor)
				Promising Technologies for Deep Oil and Gas Processing
				Control Systems of Chemical Technological Processes
		Innovative chemical engineering processes of recycling processing of organic subatances	Applies thermodynamic laws to the analysis and calculation of energy and chemical-technological processes	Technical thermodynamics and energytechnology of chemical production
				Technology of Secondary Energy Resources of Chemical production
		Organic Synthesis and Chemical Industry Safety	Possesses the skills of drawing up material and heat balances, calculating the main and auxiliary devices of the process flow diagram and their selection during the design and modernization of equipment	Mathematical Modeling of Chemical Technological Processes
				Fundamentals of Chemical-Technological Production Design
				Fundamentals of Design and Operation of Process Equipment
	LO_{11} Studies the chemical composition of various fuels,	Technology of processing of	Demonstrates knowledge of technological schemes and processes of fuel processing and enrichment	Chemical Technology of Lubricating Materials

	technologies for the preparation of solid fossil fuels, the main directions of their thermal processing, semi-coking and high-temperature coking processes, obtaining technology for lubricants and synthetic fuels, environmental protection issues and the creation of possible waste-free processes.	hydrocarbon raw materials	Analyzes methods of fuel quality analysis	Chemical Processing of Fuels
				Petrochemistry
				Technology of Production and Properties of Solid Fuels
		Innovative chemical engineering processes of recycling processing of organic subatances	Demonstrates knowledge of the theoretical and technological foundations of oil refining processes, physical and chemical characteristics, methods for obtaining intermediate and final products of petrochemical chemistry and polymer production, and the sequential conversion of hydrocarbons in the process of petrochemical synthesis	Fundamentals of the Chemistry of Fuels and Carbon Materials
				Alternative Liquid Fuels from Solid Fossil Fuels
		Organic Synthesis and Chemical Industry Safety		Solid Fossil Fuels Technology
		Chemical technology of oil, gas, coal and polymers		Coal Hydrogenation
				Undergraduate Practice/ (Production practice)
				Final Certification
		Technical science	Has a basic understanding of chemistry Demonstrates knowledge of the regulatory framework in the field of environmental protection and environmental safety	Inorganic Chemistry
				Sustainable Development, Ecology and Life Safety

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

(The design layout is landscape)

№	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}	LO_{11}
Cycle of general education disciplines University component																	
1		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		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 the emergence and development of philosophy, the foundations of the philosophical understanding of the	5	+													

		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		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	+													
4	Module of Socio-Political Knowledge (Political Science, Sociology, Cultural Studies, Psychology)	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, 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	8	+													

		Kazakhstan.															
5		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			+											
6	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 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.	10			+											

7	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		+												
Cycle of general education disciplines University component																	
1	Module of Economics, Entrepreneurship, Law and Financial Literacy (Fundamentals of Economics and Entrepreneurship, Fundamentals of Law and Anti-corruption Culture, Fundamentals of Financial Literacy)	The discipline is aimed at developing entrepreneurial thinking, financial responsibility, and legal literacy, while fostering an anti-corruption culture and commitment to the principles of law and order within a market economy. The content includes the foundations of economics, entrepreneurship, financial literacy, and law, alongside the promotion of the ideology of the rule of law. Upon successful completion of the course, the learner possesses skills for effective economic decision-making, legal protection, financial management, and compliance with anti-corruption behavior.	5				+										
Cycle of basic disciplines University component																	
1	Analytical Chemistry	The discipline is aimed at developing in students knowledge about the methods	5						+						+		

		and techniques of chemical analysis, methods for determining the composition and structure of substances, and the fundamentals of modern analytical chemistry. In the process of studying the discipline, students develop skills in using chemical methods for detecting and identifying inorganic substances (qualitative analysis), as well as the ability to conduct quantitative analysis of homogeneous and heterogeneous systems.															
2	Introduction to the Specialty	This course aims to develop a general understanding of the chosen specialty, its significance, and the scope of professional activity. The content covers the main areas, objects, and objectives of professional activity. Upon completion of this course, students will understand the core professional processes and functions of their specialty, acquiring the basic skills for their future profession.	3						+								
3	Inorganic Chemistry	The discipline is aimed at developing students' knowledge about the theoretical foundations of inorganic chemistry, the essence of chemical processes and the basic laws of their occurrence. Students can determine the types of chemical reactions, the properties of elements and their compounds; understand the general laws of chemical processes and the chemical properties of substances.	5						+								
4	Organic Chemistry	The discipline is aimed at developing students' knowledge about the theory of the structure of organic compounds, the theory of hybridization of atomic orbitals, classes of organic compounds and their properties. In the process of	5						+								

		studying the discipline, students develop the ability to analyze high-molecular, oxygen- and nitrogen-containing organic compounds and their formation.															
5	Basic Chemical Engineering Processes and Equipment	The discipline is aimed at developing students' knowledge of the main technological processes in chemical production and skills in calculating chemical apparatuses and chemical-technological systems. During the course, students acquire the ability to independently search for, analyze, and assimilate new knowledge about chemical-technological processes, as well as select the designs of key apparatuses appropriate for each process.	5									+					
6	Fundamentals of Scientific Research	The discipline is aimed at developing students' knowledge of research skills; introducing students to scientific knowledge, their readiness and ability to conduct research work. Students will master the methodology of theoretical and experimental research in the field of professional activity; mastering the culture of scientific research, including the use of modern information and communication technologies.	3						+								
7	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							+							

		health and safety to manage energy and waste within a circular economy framework.															
8	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.	4													+	
Cycle of basic disciplines Elective component																	
1	Alternative Liquid Fuels from Solid Fossil Fuels	The discipline is aimed at developing students' knowledge about the physical and chemical properties of alternative liquid fuels, advanced methods for their production from solid fossil fuels (coal, shale, peat). Students acquire the ability to apply technologies of gasification, direct hydrogenation, coking, thermal dissolution, pyrolysis, hydropyrolysis; physical and chemical methods of product quality control.	5														+
2	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 of machine learning, elements of neural	5													+	

		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.															
3	Gas Chemistry and Gas Processing Technology	The discipline is aimed at developing students' knowledge about modern methods of chemical processing of hydrocarbons (part of natural and associated petroleum gases), processes of oxidation, conversion, nitration, chlorination of hydrocarbons and other gas processing processes. Students acquire the ability to describe technological schemes of gas processing processes using examples of individual plants and installations, analyze production schemes and ways to further improve them using the experience of foreign practice.	5											+			
4	Engineering Graphics	The purpose of the discipline is to study and master the rules for the implementation, designation, drawing, which make it possible to depict parts and assemblies of technological machines using views, sections, sections, assembly drawings at the request of the unified system for design documentation. The study of the discipline allows you to develop the spatial and logical thinking of a specialist necessary for the development of drawings when creating new technological equipment.	4					+									
5	Descriptive Geometry	The purpose of the discipline is to study the basic provisions of the rectangular projection method, on which the theoretical foundations and rules for constructing images of spatial objects	4					+									

		on a plane, their properties and features, and mastering the rules when drawing up a technical drawing at the request of the unified system for design documentation are based. The study of the discipline allows you to develop the ability to analyze and synthesize spatial forms and their relationships based on graphic models of space.															
6	General Chemical Technology	The discipline is aimed at developing in students knowledge about the theoretical and practical foundations of chemical technological processes and the stages of development of chemical production and chemical technology, raw materials for chemical production, and the use of energy in chemical production. Students acquire the ability to analyze the current state of chemical production and fuel processing, and apply chemical technological methods to produce certain products.	5									+			+		
7	Fundamentals of the Chemistry of Fuels and Carbon Materials	The discipline is aimed at developing students' knowledge in the field of processes of separation and processing of oil and gas, production of carbon materials, hydrocarbon composition of oil and gas, industrial processes of conversion of energy carriers and carbon materials. As part of the discipline, students acquire the ability to apply methods and techniques for the production of fuels and carbon materials, methods for predicting the composition and properties of target products.	5														+
8	Fundamentals of the Chemistry of Fuels and Carbon Materials	The discipline is aimed at developing students' knowledge in the field of processes of separation and processing of oil and gas, production of carbon materials, hydrocarbon composition of	5									+					+

		oil and gas, industrial processes of conversion of energy carriers and carbon materials. As part of the discipline, students acquire the ability to apply methods and techniques for the production of fuels and carbon materials, methods for predicting the composition and properties of target products.															
9	Plastics and Polymer Production Technology	The discipline is aimed at developing in students knowledge about the basics of the production of polymer materials, technological processes for producing polymers with specified qualities. Students will be ab'e to analyze the physical and chemical features of the processes for producing plastics, the properties and use of plastics, taking into account the environmental aspects of production, and assessing the current state of plastics production.	5												+		
10	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													+	
11	Natural and Associated Gases and Their Processing	The discipline is aimed at developing students' knowledge about technologies for processing natural and associated gas, the basics of processes for	5											+			

		separating natural and associated hydrocarbon gases, and the main equipment of installations. In the process of studying the discipline, students develop the ability to apply methods for calculating equipment for the preparation and separation of natural and associated gases.															
12	Synthesis of Pharmaceutical Compounds	The discipline is aimed at developing students' knowledge about modern approaches and methods for the synthesis of medicines from natural and synthetic sources. The discipline helps students develop practical skills in organizing and conducting the synthesis of medicinal substances, mastering methods for studying the physicochemical properties of medicinal products and identifying medicinal substances.	5								+						
13	Modern Technologies for Processing Organic Materials	The discipline is aimed at developing students' knowledge about innovative and promising technologies for processing organic raw materials, requirements for organizing production and the quality of new types of products. Students can analyze the current state of the chemical industry, new directions and trends in the use of organic raw materials, and also acquire the ability to apply methods of control and product quality, environmental monitoring when processing organic substances.	5									+					
14	Theoretical Foundations of Chemical-Technological Processes for Organic Matter Processing	The discipline is aimed at developing students' knowledge about the patterns of chemical and technological processes in the processing of organic substances, material flows of the main chemical industries, and optimization of technological parameters of processes. Develops in students the ability to	5									+					

		determine engineering approaches and solutions for organizing the processing of organic substances, as well as when modeling chemical technological processes.															
15	Technical Thermodynamics and Energy Technology of Chemical Industries	The discipline is aimed at developing students' knowledge about the basic laws of technical thermodynamics and energy technology of chemical production, including the laws of thermodynamics and energy conservation in relation to chemical production. Students acquire the ability to use the laws of technical thermodynamics and methods for optimizing the operation of chemical-technological and energy-technological devices and circuits, as well as high-temperature fuel-generating and heat-using installations, taking into account the cyclical nature of their actions.	5													+	
16	Technology of Secondary Energy Resources in Chemical Production	The discipline is aimed at developing students' knowledge about high-temperature, heat-generating and heat-using installations used in technologies for secondary energy resources in chemical production. In the process of studying the discipline, students develop the ability to apply methods of thermodynamic analysis of chemical technological systems and implement recycling measures for the rational use of secondary energy resources in chemical industries.	5													+	
17	Technology of Production and Properties of Solid Fuels	The discipline is aimed at developing students' knowledge about the properties and formulations of solid rocket fuels and their production technologies. In the process of studying the discipline, students develop the ability to apply methods for analyzing	5														+

		technological schemes for the production of solid fuel charges, testing rocket engines using solid fuel, and methods for their disposal.															
18	Physics and Chemistry of Natural and Synthetic Polymers	The discipline is aimed at developing students' knowledge about the physics and chemistry of natural and artificial polymers from the perspective of the spatial position of atoms in macromolecules, chemical composition, and sources of origin. Students acquire the ability to analyze the deformation properties of polymers, the structure of high-molecular compounds, the influence of various factors on the mechanical properties and strength of polymers.	5												+		
19	Physicochemical Methods of Analysis	The discipline is aimed at developing in students knowledge about modern physical and chemical methods of analysis, as well as methods and standards used in analysis on analytical equipment. The discipline contributes to the development of students' competencies in the practical application of physical and chemical methods of analysis of various objects, mastering new data on achievements in the field of development and application of modern analytical equipment.	5						+					+			
20	Physical and Colloid Chemistry	The discipline is aimed at developing in students knowledge about the laws of thermodynamics and the basic equations of chemical thermodynamics, thermodynamics of electrolyte solutions and electrochemical systems, the fundamentals of homogeneous, heterogeneous and enzymatic catalysis. Students acquire the ability to apply the equations of formal kinetics and the theory of the kinetics of complex, chain,	5						+								

		heterogeneous and photochemical reactions, and also methods of thermodynamic description of chemical and phase equilibria in multicomponent systems of electrochemical systems.																
21	Chemistry of Disperse Systems	This course aims to develop students' knowledge of the structure, properties, and behavior of dispersed systems. The course covers the stability and methods of producing sols, gels, emulsions, aerosols, coagulation, adsorption, and surface phenomena of dispersed systems. Upon completion of this course, students analyze the properties of dispersed systems and the physicochemical processes occurring at the interface for the production of new industrial products.	5						+									
Cycle of major disciplines University component																		
1	Petrochemistry	The discipline is aimed at developing students' knowledge of the characteristics of oil and gas as hydrocarbon raw material products, their physical properties, elemental and fractional composition of oil, mineral components, methods of identification, properties, and applications. Students acquire the ability to determine the role of intermolecular interactions of resin-asphaltene substances and hydrocarbons in oil processing, understand the chemical composition of oil fractions and petroleum products, and analyze gaseous, liquid, and solid paraffinic hydrocarbons in oil.	5										+	+				
2	Fundamentals of Oil and Gas Processing	The discipline is aimed at developing in students knowledge about the composition and structure of hydrocarbons, their physical and chemical properties, chemical and	5										+	+				

		technological schemes for the production of organic substances from liquid and gaseous raw materials, the fundamentals of thermodestructive, catalytic, hydrogenation processes. Students acquire skills in using methods and methods of oil and gas processing to develop technological schemes for producing liquid fuel components, lubricants, and solid carbons.															
Cycle of major disciplines Elective component																	
1	Coal Hydrogenation	This course aims to develop knowledge of the scientific principles and methods of coal hydrogenation to produce liquid and gaseous hydrocarbon products. The course covers the fundamental principles of coal processing flow charts, as well as hydrogenation methods and stages. Upon completion of this course, students will analyze the influence of temperature, pressure, and catalysts on the efficiency of physical and chemical processes.	5														+
2	Artificial Intelligence in Object Management (Minor)	The discipline is aimed at forming knowledge and skills in the application 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.	5													+	
3	Quality Control of Oil and Petroleum	The discipline is aimed at developing students' knowledge about modern	5											+			

	Products	widely used methods of analysis in monitoring the quality of oil and petroleum products. Students can analyze the physical and chemical properties of petroleum products, acquire practical skills in mastering the basic methods of analysis used to control the quality of oil and petroleum products.															
4	Mathematical Modeling of Chemical Technological Processes	The discipline is aimed at developing students' knowledge of the basic concepts and methods of modeling, including computer modeling of chemical-technological processes. Students acquire practical skills in using the ChemCad package for modeling equilibrium (steady-state) chemical-technological processes (CC-Steady State), creating technological schemes, calculating equipment parameters, using the CC-Patch Column for periodic injection, analyzing parameter sensitivity, performing thermal balance calculations, and determining optimal process conditions.	5					+								+	
5	Methods of Environmental Protection	The discipline is aimed at developing students' knowledge of engineering and environmental methods for protecting the environment in the design and organization of chemical-technological production, based on the principle of rational use of natural resources. Students acquire the ability to analyze the classification of existing types of pollution, their main characteristics, as well as methods and ways of protecting the atmosphere, hydrosphere, and lithosphere from chemical and physical impacts, and the fundamental laws of environmental management.	5							+							
6	Organization and	The discipline is aimed at developing	5										+	+			

	Management of Oil and Gas Refining Enterprises	students' knowledge of theoretical and practical methods for evaluating the effectiveness of design decisions in the organization and management of enterprises. During the course, students acquire skills in organizing and managing oil and gas processing enterprises, calculating production costs and financial results, and applying key factors to assess enterprise performance.															
7	Main Quality Indicators of Petroleum Products	The discipline is aimed at developing students' knowledge about the main indicators of the quality of petroleum products. Students acquire the ability to conduct analysis in the field of certification and standardization of petroleum products, the nomenclature and properties of petroleum products, improving their quality, and also acquire practical skills in mastering analysis methods for quality control of petroleum products.	5											+			
8	Fundamentals of Design and Operation of Process Equipment	The discipline is aimed at developing students' knowledge on creating new and modernizing existing technological equipment, reducing costs, and improving product quality. Students acquire practical skills in mechanizing technological processes, designing equipment, and controlling and diagnosing technological equipment.	5													+	
9	Fundamentals of Chemical-Technological Production Design	The discipline is aimed at developing students' knowledge of modern automated design systems, their structure, subsystems, types of support, and interactions between subsystems in the automated design process. Students can apply software of industrial automated systems based on artificial intelligence, use information	5					+								+	

		technologies to automate design, engineering, and technological tasks, and classify methods for organizing the design and engineering process.															
10	Occupational Safety in the Chemical Industry	The discipline is aimed at developing students' knowledge of the principles of organizing occupational safety at a chemical enterprise, the prevention of industrial injuries and occupational diseases, and the minimization of their social consequences. Students are able to analyze socially acceptable risks in the workplace and ensure the preservation of human life and health through the use of modern technical means, as well as monitoring and forecasting methods.	5							+							
11	Promising Technologies for Deep Oil and Gas Processing	The discipline is aimed at developing students' knowledge about modern technologies for advanced processing of hydrocarbon raw materials, priorities for the development of oil and gas processing. Students acquire the ability to analyze thermal, thermal condensation and catalytic processes and be able to use installations for processing oil residues of raw materials and catalytic cracking and catalysts in the processes of upgrading oil residues and heavy oils, and their deasphalting.	5										+	+			
12	Production of Natural and Synthetic Rubbers	The discipline is aimed at developing students' knowledge of modern chemical-technological processes for obtaining and synthesizing natural and synthetic rubbers, as well as their underlying regularities. Students develop the ability to apply methods for producing and using natural and synthetic rubbers, and to analyze the features of rubber production and the prospects for the development of this	5												+		

		field.															
13	Control Systems of Chemical Technological Processes	The discipline is aimed at developing students' theoretical knowledge necessary for analyzing and synthesizing automatic control systems for chemical-technological processes. Students develop skills in managing technological processes, automating and diagnosing chemical-technological processes, designing automatic control systems, and applying tools for organizing automatic control systems for chemical-technological processes.	5					+								+	
14	Modern Methods for Studying the Properties of Oil and Petroleum Products	The discipline is aimed at developing students' knowledge of the theoretical foundations of modern science regarding the composition and properties of oil and its individual fractions. During the course, students acquire practical skills in applying oil research methods using the latest physicochemical analysis techniques.	5											+			
15	Modern Methods for Studying the Properties of Polymers and Polymer Materials	The discipline is aimed at developing students' knowledge about modern methods for studying the properties of polymers and polymer materials, the principles of operation of various instruments used for the analysis of polymers. Students gain the ability to use methods for determining the basic physical, chemical and mechanical properties of polymer materials and analysis methods that are most suitable for determining the required properties of a polymer material.	5												+		
16	Raw Material Base of Industrial Organic Synthesis	The discipline is aimed at developing students' knowledge of the raw material sources for organizing the production of organic synthesis products, existing approaches and technologies for raw material processing, environmental	5									+		+			

		issues, and ways to address them. Students acquire the ability to analyze the raw material base of petrochemistry and gas chemistry, classify raw materials, and assess the current state of oil and gas processing in the Republic of Kazakhstan.															
17	High-Molecular Compounds Technology	The discipline is aimed at developing in students knowledge about the methods and techniques of chemical analysis, methods for determining the composition and structure of substances, and the fundamentals of modern analytical chemistry. In the process of studying the discipline, students develop skills in using chemical methods for detecting and identifying inorganic substances (qualitative analysis), as well as the ability to conduct quantitative analysis of homogeneous and heterogeneous systems.	5												+		
18	Technology and Equipment for Oil and Gas Processing	The discipline is aimed at developing knowledge among students on the issues of creating new and modernizing existing technological equipment, reducing costs and improving product quality. Students acquire practical skills in the field of mechanization of technological processes, equipment design, control and diagnostics of technological equipment.	5										+	+			
19	Technology of Organic and Petrochemical Synthesis	Study of the main directions in the technology of basic organic synthesis, petrochemistry and solid fuels based on products of primary and secondary processing of oil and coke. Considers the main organic and petrochemical syntheses, the principles of creating highly selective and low-waste technologies and studies in depth the	5									+		+			

		most dynamically developing processes for obtaining products of basic organic and petrochemical synthesis, allowing for production, technological, organizational, technological, research and design work															
20	Technology of Hydrocarbon Feedstock Processing	The discipline is aimed at developing students' knowledge about the main scientific and technical problems and development prospects in the field of hydrocarbon processing technology, the raw material base for hydrocarbon processing. As part of the discipline, students acquire the ability to use basic methods of oil, gas, coal and shale processing, technological process flow diagrams and standard equipment designs, as well as intermediate and target products of hydrocarbon processing..	5									+					
21	Solid Fossil Fuels Technology	The discipline is aimed at developing students' knowledge of the scientific principles and general methods for constructing technological schemes for the processing of solid combustible minerals, as well as the interconnection of various processes involved in their processing. Students acquire skills in controlling the processes of solid combustible mineral processing and obtaining liquid and gaseous fuels from coal and oil shale. Additionally, they can apply the principles of creating and designing optimal thermal processing technologies for fuels.	5														+
22	Chemical Processing of Fuels	The discipline is aimed at developing students' knowledge of the features of chemical-technological processes for the separation and processing of fuel raw materials, and the regularities that allow increasing the efficiency of the	5														+

		production of petroleum products and carbon materials. Students can use methods of fuel processing and analyze modern approaches to the primary and secondary processing of oil, natural, and associated gases.															
23	Chemical Technologies of Organic Synthesis	The discipline is aimed at developing students' knowledge about the fundamental principles of chemistry and the technology of basic organic synthesis, and the characteristics of chemical technological processes. Students can determine the raw material base of hydrocarbon raw materials, approaches to choosing methods for processing oil, gas, and coal when obtaining intermediate and target products of processing.	5									+					
24	Chemical Technology of Lubricating Materials	The discipline is aimed at developing students' knowledge of the theoretical and practical foundations of lubricants production, managing and improving the technologies of their production, the raw material base of lubricants production, and the physicochemical properties of oils. Students are able to apply methods for refining and separating petroleum raw materials, special technologies for refining lubricants, and methods for organizing activities to ensure the environmental safety of production and improve product quality.	5														+
25	Chemical Ecology	This course aims to develop students' knowledge of the basic concepts and principles of chemical ecology, as well as methods for protecting the environment from chemical impacts. The course covers methods for protecting the atmosphere, hydrosphere, and lithosphere, as well as	5							+							

		environmental monitoring and assessment methods. Upon completion of this course, students analyze the impact of chemicals on the environment and human health.																
26	Chemistry of Natural Compounds	The discipline is aimed at developing students' knowledge in the field of the molecular basis of the functioning of natural compounds in living organisms and the chemical structure of carbohydrates, lipids, porphyrins, vitamins and antibiotics. Students acquire the ability to use methods of synthesis and analysis of natural compounds based on the study of their physical and chemical properties, the principles of creating new drugs based on them.	5								+						

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

(The design layout is landscape)

Learning Outcomes (LO) Number	Planned learning outcomes for the module	Assessment technologies (tools)	Methods of learning and teaching
GEK_1	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.	Creative Assignment	Group or Individual Creative Assignments
GEK_2	Capable of interpersonal social and professional commu-nication in Kazakh, Russian, and foreign languages.	Colloquium	Questions on the Topics and Sections of the Disciplines
GEK_3	Possesses various types of information and communica-tion technologies for searching, storing, processing, pro-tecting, and disseminating information.	Colloquium	Questions on the Topics and Sections of the Disciplines
LO_1	Is able to understand the social and ethical values of society as a product of integration processes in the systems of basic knowledge of the disciplines of the socio-political module; The ability to apply scientific methods and research techniques in the context of a specific academic discipline and in the procedures of interaction of the disciplines of the module.	Project activities, colloquium	Project method, case analysis
LO_2	Demonstrates students' theoretical and practical preparation in mathematics, as well as solving engineering problems Applies basic AI algorithms, including machine learning and inference methods Applies mathematical models for designing and upgrading chemical engineering systems	Interactive lecture, Multi-level tasks and assignments	
LO_3	Possesses basic knowledge of chemistry, general patterns of chemical processes, structure and properties of chemical compounds, understanding of the kinetics and mechanism of physical and chemical processes and acquisition of skills in conducting basic organic analysis.	Group work, discussion, practical tasks	Problem solving

LO_4	Demonstrates knowledge of the strategy for the development of organic synthesis, the technology of organic substances, polymers, their properties, general patterns of production and the area of their application.		
LO_5	Demonstrates knowledge of the classification, structure and properties of the main classes of natural compounds: alkaloids, terpenes, flavonoids, steroids, etc. Has knowledge of multi-stage organic synthesis methods and strategies for creating molecules with a given biological activity	Interactive lecture Research work, Multi-level tasks and assignments	
LO_6	Demonstrates knowledge of hydrocarbon raw materials as the main element of petrochemical and basic organic synthesis. Has knowledge of the main methods and technologies for processing oil and gas hydrocarbons, synthesizing carbon materials based on theoretical approaches, methods and techniques.	Testing	Test, solving situational problems
LO_7	Demonstrates knowledge of hydrocarbon raw materials as the main element of petrochemical and basic organic synthesis. Critically evaluates the current state of production of organic compounds, analyzes and selects ways to improve existing and develop new technological processes based on modern achievements of science and technology. Demonstrates knowledge of the theoretical and technological foundations of oil refining processes, physical and chemical characteristics, methods for obtaining intermediate and final products of petrochemical chemistry and polymer production, and the sequential conversion of hydrocarbons in the process of petrochemical synthesis	Colloquium, creative assignment	Brainstorming
LO_8	Has a basic understanding of writing scientific articles, reports, presentations and formatting references Critically evaluates the current state of production of organic compounds, analyzes and selects ways to improve existing and develop new technological processes based on modern achievements of science and technology.	Interactive practical exercise, Project activity Case study, survey of conditions	Practical tasks, project/case presentations, Colloquium,

	Able to demonstrate the basics of process theory in chemical engineering, methodology for studying the interaction of chemical transformation processes and phenomena, as well as the main reaction processes and apparatuses of chemical and petrochemical engineering Has a technical level of knowledge in the field of oil and gas processing and obtaining products of their synthesis Demonstrates knowledge of the theoretical and technological foundations of oil refining processes, physical and chemical characteristics, methods for obtaining intermediate and final products of petrochemical chemistry and polymer production, and the sequential conversion of hydrocarbons in the process of petrochemical synthesis Demonstrates knowledge of the theoretical and technological foundations of oil refining processes, the sequential conversion of hydrocarbons in the process of petrochemical synthesis		
LO_9	Demonstrates knowledge of the theoretical and technological foundations of oil refining processes, physical and chemical characteristics, methods for obtaining intermediate and final products of petrochemical chemistry and polymer production, and the sequential conversion of hydrocarbons in the process of petrochemical synthesis Uses the laws of chemical and technological sciences to solve problems of petroleum products and organic synthesis and the chemical industry	Interactive lecture, case studies, case study	Brainstorming. SWOT analysis, case studies
LO_{10}	Applies basic AI algorithms, including machine learning and inference methods Applies thermodynamic laws to the analysis and calculation of energy and chemical engineering processes Able to apply modern technical control means in automation systems for various purposes. Applies thermodynamic laws to the analysis and calculation of energy and chemical-technological processes	Interactive lecture, case studies, creative assignment	

	Possesses the skills of drawing up material and heat balances, calculating the main and auxiliary devices of the process flow diagram and their selection during the design and modernization of equipment		
LO_{11}	Demonstrates knowledge of technological schemes and processes of fuel processing and enrichment Analyzes methods of fuel quality analysis Demonstrates knowledge of the theoretical and technological foundations of oil refining processes, physical and chemical characteristics, methods for obtaining intermediate and final products of petrochemical chemistry and polymer production, and the sequential conversion of hydrocarbons in the process of petrochemical synthesis Has a basic understanding of chemistry Demonstrates knowledge of the regulatory framework in the field of environmental protection and environmental safety		Test, Interactive practical lesson

9 Correlation of learning outcomes of the educational program with the labor functions of professional standards (if any)

(The design layout is landscape)

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
Processing of oil, gas and petrochemicals	Petrochemical engineer	**LF1.** Ensuring technological process support and control of technological facilities and structural subdivisions of the oil and gas processing organization (production)	**Task 1:** Ensuring production of components and preparation of goods	LO_{10}, LO_7,
			Task 2: Ensuring regular modes of operation of technological facilities	LO_1 LO_9,
			Task 3: Control of the operation of technological facilities	LO_3, LO_9,
			Task 4: Planning production and technological work	LO_6, LO_7,
Quality control of oil and petroleum products	Chemical engineer (oil and gas)	**LF1.** Ensuring the normal operation of equipment and instruments in the laboratory	**Task 1:** Preparation of equipment and testing of oil, gas and product processing	LO_2

			Task 2: Development and preparation of technical documentation for oil, gas and product processing quality control	LO_4, LO_7
			Task 3: Organization of measures to identify substandard oil, gas and products of their processing	LO_{10}
	Quality engineer	**LF1.** Organization of test production	**Task 1:** Preparation of equipment and testing of oil, gas and product processing	LO_1, LO_5, LO_6, LO_8, LO_9, LO_{11}
			Task 2: Control procedure of sampling of tested products	LO_3, LO_5, LO_7, LO_8, LO_{10}, LO_{11}
		LF2. Technical support for quality control activities	**Task 1:** Development and preparation of technical documentation for production quality control	LO_3, LO_5, LO_7, LO_8, LO_{10}, LO_{11}
			Task 1: Control of production processes	LO_3, LO_5, LO_7, LO_{10}, LO_{11}
		LF3. Organization of measures to identify substandard production	**Task 1:** Development of action plans to prevent the reception of substandard products	LO_1, LO_2, LO_4, LO_6, LO LO_9, LO_{10}, LO_{11}
			Task 2: Development of measures to restore production quality	LO_1, LO_2, LO_4, LO_6, LO_9, LO_{10}, LO_{11}
	Laboratory engineer, chemistry	**LF1.** Organization of timely and qualitative implementation of schedule of laboratory control	**Task 1:** Conducting work on the execution of the schedule of laboratory control	LO_3, LO_4, LO_5, LO_8, LO_{11}
			Task 2: Behavior of scientific research work and organization of laboratory control of production	LO_8, LO_2, LO_4

10 Graduate model

<table>
<tr><td rowspan="5">The program also takes into account the competencies of the professions "Innovation Technologist," "Technologist for the Production of Rubber, Polypropylene, Rubber Products and Plastics from Coal," "Laboratory Chemist for the Development of New Materials," and "Chemical Technologist for Coal Processing," presented in the "Atlas of New Professions and Competencies in the Republic of Kazakhstan," as well as the competencies of the regional atlas standard "Digital Laboratory Technician for Quality Control in the Oil and Gas Industry."</td><td colspan="3">GRADUATE MODEL</td></tr>
<tr><td colspan="3">Competencies (soft skills, digital skills)</td></tr>
<tr><td>Attributes of a graduate</td><td>knowledge</td><td>Skills</td></tr>
<tr><td>- Responsibility;
- Accuracy;
- Stress tolerance;
- Technical literacy;
- Performance;
- Work effectively as a team member;
- Accuracy in performance of assigned tasks;
- Independence;
- Responsibility for own work and team work;
- Ability to independently develop professional qualifications and skills</td><td>- Deep knowledge in the field of chemistry and chemical technology, especially in the field of organic substances (oil, gas, polymers, pharmaceuticals, etc.).
- Knowledge of the development, optimization and implementation of technological processes for the production of organic substances and materials
- Knows how to design chemical production facilities taking into account the requirements of safety, ecology and sustainable development.
- Knows methods of analysis and quality control of raw materials, intermediate products and finished products.
- Knows normative legal acts in the field of industrial safety and environmental protection</td><td>- Development of plans for carrying out all types of repair of technological equipment
Planning of measures to improve the efficiency of the work of the technological facility
- Implementation of the control of the operation of the technological equipment according to the requirements of the norms of the technological regime
- Planning of measures to improve technological processes, increase the quality of manufactured products, analysis of the results of production activity of installations
- Plan for production quality control activities
- Plan the implementation of measures to control the quality of oil, gas and product processing.
- Analyze regulatory documents.
- Ability to develop, optimize and implement technological processes for obtaining organic substances and materials.</td></tr>
<tr><td colspan="3">Professional skills (hard skills)</td></tr>
<tr><td colspan="3">- Preparation of equipment and testing of oil, gas and product processing
- Development and preparation of technical documentation for quality control of oil, gas and processing products
- Organization of measures to identify substandard oil, gas and products of processing
- Control of reliability, objectivity and required accuracy of test results
- Control procedure of sampling of the tested products
- Development and preparation of technical documentation for quality control of production
- Control of production processes
- Development of action plans, preventing the reception of substandard products Development of measures to restore production quality
- Implementation of analysis of oil, gas and product processing
- Implementation of chemical-analytical quality control of oil, gas and processing products</td></tr>
</table>

Типтік оқу жоспары
Типичный учебный план
Typical curriculum

Білім беру бағдарламасының коды және атауы: **6B07117 Органикалық заттардың химиялық технологиясы**
Код и наименование образовательной программы:**6B07117 Химическая технология органических веществ**
Code and name of the educational program:**6B07117 Chemical technology of organic substances**

Оқу түрі / Форма обучения / Form of training Күндізгі / Очное/ Internal
Курс / Year 1,2,3,4

Модульдің №/ № модуля / Module №	Пәндердің № / № дисциплины / Discipline №	ОҚУ ПӘНДЕРІНІҢ АТАУЫ НАИМЕНОВАНИЕ УЧЕБНЫХ ДИСЦИПЛИН NAME OF TEACHING DISCIPLINES	Оқу пәндерінің циклы (міндетті компонент) / циклу дисциплин (обязательный компонент / компонент по выбору) Educational disciplines cycle (compulsory component / component of choice)	Оқу пәндерінің коды Код учебной дисциплины Educational discipline code	Семестр / semester	Кредиттер саны Количество кредитов Number of credits	Білім алушылардың жұмыс уақытының бюджеті сағатпен Бюджет рабочего времени (час) Budget of working time (hours)							Кафедра атауы/ Наименование кафедры	Семестр бойынша бөлу Распределение по семестрам Distribution of semesters								Пән бойынша қорытынды бағалау (емтихан, дифференциалды сынақ, мемлекеттік емтихан, жоба және т.б.)/ Форма итогового контроля по дисциплине (экзамен, дифференцированный зачет, государственный экзамен, проект и др.)/ Final assessment form for the discipline (exam, differentiated credit, state exam, project, etc.)
							Барлық сағат / Всего часов / Total hours	Аудиториялық жұмыс / Аудиторная работа / Class work				ОБӨЖ / СРОП / IWST	БАӨЖ / СРО / IWS		1 КУРС / YEAR		2 КУРС / YEAR		3 КУРС / YEAR		4 КУРС / YEAR		
								Барлық аудит. сағат Всего аудит. часов Total classroom hours	оның ішінде / в том числе / including						1 Академиялық кезең / Academic period	2 Академиялық кезең / Academic period	3 Академиялық кезең / Academic period	4 Академиялық кезең / Academic period	5 Академиялық кезең / Academic period	6 Академиялық кезең / Academic period	7 Академиялық кезең / Academic period	8 Академиялық кезең / Academic period	
									Д / ЛК / Lec	СЗС / СПЗ / SPL	ЛС / ЛЗ / LC				Семестрдағы апталар саны / Недель в семестре / Weeks in a semester								
															15	15	15	15	15	15	15	15	
															аптасына аудиториялық сағат / аудиторных часов в неделю / classroom hours per week								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
		ЦИКЛ ОБЩЕОБРАЗОВАТЕЛЬНЫХ ДИСЦИПЛИН (ООД) - 56 академических кредитов																					
		Обязательный компонент -51 академических кредитов																					
Модуль/ Module № 1	1	Қазақстан тарихы История Казахстана History of Kazakhstan	ЖБП (МК) ООД (ОК) GER (CS)	ІК 1101-26 IK 1101-26 IK 1101-26	2	5	150	45	30	15		15	90	СГД		5							мемлекеттік емтихан государственный экзамен state exam
Модуль/ Module № 1	2	Философия Философия Philosophy	ЖБП (МК) ООД (ОК) GER (CS)	Fil 2102-26 Fil 2102-26 Fil 2102-26	3	5	150	45	30	15		15	90	СГД			5						емтихан экзамен exam
Модуль/ Module № 1	3	Әлеуметтік-саясаттану білім модулі (әлеуметтану, саясаттану, мәдениеттану, психология) Модуль социально-политических знаний (политология, социология, культурология, психология) Module of Socio-Political Knowledge (Political Science, Sociology, Cultural Studies, Psychology)	ЖБП (МК) ООД (ОК) GER (CS)	MSPZ 2103-26 MSPZ 2103-26 MSPZ 2103-26	3	8	240	120	60	60		24	96	СГД			8						емтихан экзамен exam
Модуль/ Module № 1	4	Шетел тілі Иностранный язык Foreign language	ЖБП (МК) ООД (ОК) GER (CS)	ІУа 1104-26 ІУа 1104-26 ІУа 1104-26	1,2	10	300	90		90		30	180	ГиИЯ	5	5							емтихан экзамен exam
Модуль/ Module № 1	5	Қазақ (Орыс) тілі Казахский (Русский) язык Kazakh (Russian) language	ЖБП (МК) ООД (ОК) GER (CS)	К(Р)Уа 1105-26 К(Р)Уа 1105-26 К(Р)Уа 1105-26	1,2	10	300	90		90		30	180	ГиИЯ	5	5							емтихан экзамен exam
Модуль/ Module № 2	6	Ақпараттық-коммуникациялық технологиялар Информационно-коммуникационные технологии Information and Communication Technologies	ЖБП (МК) ООД (ОК) GER (CS)	ІКТ 1106-26 ІКТ 1106-26 ІКТ 1106-26	1	5	150	45	15		30	15	90	ИТ	5								емтихан экзамен exam
Модуль/ Module № 1	7	Дене шынықтыру Физическая культура Physical Culture	ЖБП (МК) ООД (ОК) GER (CS)	ФК 1107-26 ФК 1107-26 ФК 1107-26	1,2,3,4	8	240	120		120			120	ФВ	2	2	2	2					дифференциалды сынақ дифференцированный зачет differentiated credit
				ВСЕГО:		51	1530	555	135	390	30	129	846		17	17	15	2	0	0	0	0	
		Вузовский компонент и (или) компонент по выбору - 5 академических кредитов																					
Модуль/Module № 3	1	Экономика, кәсіпкерлік, құқық және қаржылық сауаттылық модулі (экономика және кәсіпкерліктің негіздері, құқық негіздері және сыбайлас жемқорлыққа қарсы мәдениет, қаржылық сауаттылық негіздері) Модуль экономики, предпринимательства, права и финансовой грамотности (основы экономики и предпринимательства, основы права и антикоррупционная культура, основы финансовой грамотности) Module of Economics, Entrepreneurship, Law and Financial Literacy (Fundamentals of Economics and Entrepreneurship, Fundamentals of Law and Anti-corruption Culture, Fundamentals of Financial Literacy)	ЖБП (ЖК) ООД (ВК) GER (UC)	MEPPFG 1101-26 MEPPFG 1101-26 MEPPFG 1101-26	2	5	150	45		45		15	90	Эко СГД Фил		5							емтихан экзамен exam
				ВСЕГО:		5	150	45	0	45		15	90		0	5	0	0	0	0	0	0	
				ИТОГО ООД:		56	1680	600	135	435	30	144	936		17	22	15	2	0	0	0	0	
		ЦИКЛ БАЗОВЫХ ДИСЦИПЛИН (БД) -84 академических кредитов																					
		Вузовский компонент 35 академических кредитов																					
Модуль/ Module № 4	2	Физика Физика Physics	БП (ЖК) БД (ВК) BD (UC)	Fiz 1201-26 Fiz 1201-26 Fiz 1201-26	1	4	120	45	15	15	15	3	72	ХХТиЭ	4								емтихан экзамен exam
Модуль/ Module № 4	1	Бейорганикалық химия Неорганическая химия Inorganic Chemistry	БП (ЖК) БД (ВК) BD (UC)	NH 1202-26 NH 1202-26 NH 1202-26	2	5	150	45	15	15	15	15	90	ХХТиЭ		5							емтихан экзамен exam
Модуль/ Module № 4	3	Введение в специальность Мамандыққа кіріспе Introduction to the Specialty	БП (ЖК) БД (ВК) BD (UC)	VS 1203-26 VS 1203-26 VS 1203-26	2	3	90	30	15	15		6	54	ХХТиЭ		3							емтихан экзамен exam
Модуль/ Module № 4	4	Ғылыми зерттеу негіздері Основы научных исследований Fundamentals of Scientific Research	БП (ЖК) БД (ВК) BD (UC)	ONI 2204-26 ONI 2204-26 ONI 2204-26	4	3	90	30	15	15		6	54	ХХТиЭ				3					емтихан экзамен exam
Модуль/ Module № 4	5	Аналитикалық химия Аналитическая химия Analytical Chemistry	БП (ЖК) БД (ВК) BD (UC)	AH 2205-26 AH 2205-26 AH 2205-26	3	5	150	45	15	15	15	15	90	ХХТиЭ			5						емтихан экзамен exam
Модуль/ Module № 4	6	Органикалық химия Органическая химия Organic chemistry	БП (ЖК) БД (ВК) BD (UC)	OH 2206-26 OH 2206-26 OH 2206-26	3	5	150	45	15	15	15	15	90	ХХТиЭ			5						емтихан экзамен exam

Модуль/ Module № 4	7	Химия өндірісінің негізгі процестері мен аппараттары Основные процессы и аппараты химического производства Basic Chemical Engineering Processes and Equipment	БП (ЖК) БД (ВК) BD (UC)	ОРАНР 3208-26 ОРАНР 3208-26 ОРАНР 3208-26	5	5	150	45	15	30		15	90	ХХТиЭ					5				емтихан экзамен exam
Модуль/ Module № 4	8	Тұрақты даму, экология және тіршілік қауіпсіздігі Устойчивое развитие, экология и безопасность жизнедеятельности Sustainable Development, Ecology, and Life Safety	БП (ЖК) БД (ВК) BD (UC)	UREBZh 3207-26 UREBZh 3207-26 UREBZh 3207-26	6	5	150	45	30	15		15	90	ЭиБ ХХТиЭ						5			емтихан экзамен exam
				ВСЕГО:	35	1050	330	135	135	60	90	630		4	8	10	3	5	5	0	0	
		Компонент по выбору -49 академических кредитов																								
		Дисциплина по выбору БД-1				0																				
Модуль/ Module № 4	1	Сызба геометриясы Начертательная геометрия Descriptive Geometry	БП (ТК) БД (КВ) BS (ES)	NG 1201-26 NG 1201-26 NG 1201-26	1	4	120	45	15	30		3	72	ТЛПиД	4								емтихан экзамен exam
Модуль/ Module № 4	2	Инженерлік графика Инженерная графика Engineering Graphics		IG 1201-26 IG 1201-26 IG 1201-26																			емтихан экзамен exam
		Дисциплина по выбору БД-2																								
Модуль/ Module № 4	5	Физикалық және коллоидық химия Физическая и коллоидная химия Physical and Colloid Chemistry	БП (ТК) БД (КВ) BS (ES)	FKH 2202-26 FKH 2202-26 FKH 2202-26	3	5	150	45	15	30		15	90	ХХТиЭ			5						емтихан экзамен exam
Модуль/ Module № 2	6	Жасанды интеллектке кіріспе (Minor) Введение в искусственный интеллект (Minor) Introduction to Artificial Intelligence (Minor)		VII 2202-26 (Minor 1) VII 2202-26 (Minor 1) VII 2202-26 (Minor 1)										ИТ									емтихан экзамен exam
		Дисциплина по выбору БД-3																								
Модуль/ Module № 6	7	Жалпы химиялық технология Общая химическая технология General Chemical Technology	БП (ТК) БД (КВ) BS (ES)	OHT 2203-26 OHT 2203-26 OHT 2203-26	4	5	150	45	15	15	15	15	90	ХХТиЭ				5					емтихан экзамен exam
Модуль/Module № 6	8	Органикалық заттарды өңдеудің химиялық және технологиялық процестерінің теориялық негіздері Теоретические основы химико-технологических процессов переработки органических веществ Theoretical Foundations of Chemical-Technological Processes for Organic Matter Processing		TOHTPROB 2203-26 TOHTPROB 2203-26 TOHTPROB 2203-26																			емтихан экзамен exam
		Дисциплина по выбору БД-4																								
Модуль/ Module № 5	3	Органикалық заттарды өңдеудің заманауи технологиясы Современные технологии переработки органических веществ Modern Technologies for Processing Organic Materials	БП (ТК) БД (КВ) BS (ES)	STPOV 2204-26 STPOV 2204-26 STPOV 2204-26	4	5	150	45	15	30		15	90	ХХТиЭ				5					емтихан экзамен exam
Модуль/ Module № 5	4	Отын және көміртекті материалдар химиясының негіздері Основы химии топлив и углеродных материалов Fundamentals of the Chemistry of Fuels and Carbon Materials		OHTYM 2202-26 OHTYM 2202-26 OHTYM 2202-26																			емтихан экзамен exam
		Дисциплина по выбору БД-5																								
Модуль/ Module № 6	9	Химиялық өндірістің қайталама энергетикалық ресурстарының технологиясы Технология вторичных энергоресурсов химических производств Technology of Secondary Energy Resources in Chemical Production	БП (ТК) БД (КВ) BS (ES)	TBEHP 2205-26 TBEHP 2205-26 TBEHP 2205-26	4	5	150	45	30	15		15	90	ХХТиЭ				5					емтихан экзамен exam
Модуль/ Module № 6	10	Химиялық өндірістің техникалық термодинамикасы және энергетикалық технологиясы Техническая термодинамика и энерготехнология химических производств Technical Thermodynamics and Energy Technology of Chemical Industries		TTEHP 2205-26 TTEHP 2205-26 TTEHP 2205-26																			емтихан экзамен exam
		Дисциплина по выбору БД-6																								
Модуль/ Module № 2	11	Жасанды нейрондық желілерді әзірлеу (Minor) Разработка искусственных нейронных сетей (Minor) Development of Artificial Neural Networks (Minor)	БП (ТК) БД (КВ) BS (ES)	RINS 3200-26 (Minor 2) RINS 3200-26 (Minor 2) RINS 3200-26 (Minor 2)	5	5	150	45	15	30		15	90	ИТ					5				емтихан экзамен exam
Модуль/Module № 7	12	Табиғи және жасанды полимерлердің физикасы мен химиясы Физика и химия природных и искусственных полимеров Physics and Chemistry of Natural and Synthetic Polymers		FHPIP 3206-26 FHPIP 3206-26 FHPIP 3206-26										ХХТиЭ									емтихан экзамен exam
		Дисциплина по выбору БД-7																								
Модуль/ Module № 7	13	Пластмасса және полимер өндірісінің технологиясы Пластмасса и технология производства полимеров Plastics and Polymer Production Technology	БП (ТК) БД (КВ) BS (ES)	PTPP 3307-26 PTPP 3307-26 PTPP 3307-26	5	5	150	45	15	30		15	90	ХХТиЭ					5				емтихан экзамен exam
Модуль/ Module № 7	14	Қатты қазбалы отындардан балама сұйық отындар Альтернативные жидкие топлива из твердых горючих ископаемых Alternative Liquid Fuels from Solid Fossil Fuels		AZhTTG 3307-26 AZhTTG 3307-26 AZhTTG 3307-26																			емтихан экзамен exam
		Дисциплина по выбору БД-8																								
Модуль/ Module № 5	15	Технология производства и свойства твердых топлива Қатты отын өндірісінің технологиясы және қасиеттері Technology of Production and Properties of Solid Fuels	БП (ТК) БД (КВ) BS (ES)	TPSTT 3208-26 TPSTT 3208-26 TPSTT 3208-26	5	5	150	45	15	30		15	90	ХХТиЭ					5				емтихан экзамен exam
Модуль/ Module № 5	16	Физика-химиялық зерттеу әдістері Физико-химические методы анализа Physicochemical Methods of Analysis		FHMA 3208-26 FHMA 3208-26 FHMA 3208-26																			емтихан экзамен exam
		Дисциплина по выбору БД-9																								
Модуль/ Module № 7	17	Табиги және ілеспе газдар және олардың өңделуі Природные и попутные газы и их переработка Natural and Associated Gases and Their Processing	БП (ТК) БД (КВ) BS (ES)	PPGP 3209-26 PPGP 3209-26 PPGP 3209-26	5	5	150	45	15	30	0	15	90	ХХТиЭ					5				емтихан экзамен exam
Модуль/ Module № 7	18	Газхимиясы және газды өңдеу технологиясы Газохимия и технология переработки газа Gas Chemistry and Gas Processing Technology		GTPG 3209-26 GTPG 3209-26 GTPG 3209-26																			емтихан экзамен exam
		Дисциплина по выбору БД-10																								
Модуль/ Module № 7	19	Дисперсті жүйелер химиясы Химия дисперсных систем Chemistry of Disperse Systems	БП (ТК) БД (КВ) BS (ES)	HDS 3210-26 HDS 3210-26 HDS 3210-26	6	5	150	45	15	15	15	15	90	ХХТиЭ									емтихан экзамен exam
Модуль/ Module № 5	20	Дәрілік заттардың синтезі Синтез лекарственных средств Synthesis of Pharmaceutical Compounds		SZS 3210-26 SZS 3210-26 SZS 3210-26																5			емтихан экзамен exam
				ВСЕГО:	49	1470	450	165	255	30	138	882		4	0	5	15	20	5	0	0	
				ИТОГО ПО ЦИКЛУ БД:	84									8	8	15	18	25	10	0	0	
		ЦИКЛ ПРОФИЛИРУЮЩИХ ДИСЦИПЛИН (ПД) -92 академических кредитов																								
		Вузовский компонент -10 академических кредитов																								
Модуль/ Module № 7	1	Мұнай мен газды өңдеу негіздері Основы переработки нефти и газа Fundamentals of Oil and Gas Processing	БП (ЖК) ПД (ВК) PD (UC)	OPNG 1201-26 OPNG 1201-26 OPNG 1201-26	2	5	150	45	15	30		15	90	ХХТиЭ		5							емтихан экзамен exam
Модуль/ Module № 7	2	Мұнайхимиясы Нефтехимия Petrochemistry	БП (ЖК) ПД (ВК) PD (UC)	NH 3302-26 NH 3302-26 NH 3302-26	6	5	150	45	15	30		15	90	ХХТиЭ						5			емтихан экзамен exam

					ВСЕГО:	10	300	90	30	60		30	180		0	5	0	0	0	5	0	0	
		Профессиональная практика 17 академических кредитов																											
Модуль/Module № 6	1	Өндірістік практика 1 Производственная практика 1 Industrial Practice 1	БеП (ЖК) ПД (ВК) PD (UC)	PP 1-26 (ChTOS) PP 1-26 (ChTOS) PP 1-26 (ChTOS)	4	5	150							ХХТиЭ				5					Защита отчёта по практике Практика есебін қорғау Defense of the internship report
Модуль/Module № 7	2	Өндірістік практика 2 Производственная практика 2 Industrial Practice 2	БеП (ЖК) ПД (ВК) PD (UC)	PP 2-26 (ChTOS) PP 2-26 (ChTOS) PP 2-26 (ChTOS)	6	5	150							ХХТиЭ						5			Защита отчёта по практике Практика есебін қорғау Defense of the internship report
Модуль/Module № 8	3	Диплом алдындағы практика/ Өндірістік практика Преддипломная практика/Производственная практика Pre-Diploma Practice / Industrial Practice	БеП (ЖК) ПД (ВК) PD (UC)	PDP/PP 26 (ChTOS) PDP/PP 26 (ChTOS) PDP/PP 26 (ChTOS)	8	7	210							ХХТиЭ								7	Защита отчёта по практике Практика есебін қорғау Defense of the internship report
					ВСЕГО:	17	510	0	0	0	0	0	0		0	0	0	5	0	5	0	7	
		Компонент по выбору -65 академических кредитов																											
		Дисциплина по выбору ПД-1																											
Модуль/Module № 5	1	Химия природных соединений Табиғи қосылыстардың химиясы Chemistry of Natural Compounds	БеП (ТК) ПД (КВ) PD (EC)	HPS 2201-26 HPS 2201-26 HPS 2201-26	4	5	150	45	15	30		15	90	ХХТиЭ				5					емтихан экзамен exam
Модуль/Module № 7	2	Мұнай мен газды қайта өңдеу технологиясы мен жабдығы Технология и оборудование переработки нефти и газа/ Technology and Equipment for Oil and Gas Processing		TOPNG 2201-26 TOPNG 2201-26 TOPNG 2201-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-2																											
Модуль/Module № 7	3	Контроль качества нефти, нефтепродуктов Мұнай, мұнай өнімдерінің сапасын бақылау Quality Control of Oil and Petroleum Products	БеП (ТК) ПД (КВ) PD (EC)	KKNN 3302-26 KKNN 3302-26 KKNN 3302-26	5	5	150	45	30	15		15	90	ХХТиЭ					5				емтихан экзамен exam
Модуль/Module № 7	4	Основные показатели качества нефтепродуктов Мұнай өнімдері сапасының негізгі көрсеткіштері Main Quality Indicators of Petroleum Products		OPKN 3302-26 OPKN 3302-26 OPKN 3302-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-3																											
Модуль/Module № 8	5	Көмірсутекті шикізатты өңдеу технологиясы Технология переработки углеводородного сырья Technology of Hydrocarbon Feedstock Processing	БеП (ТК) ПД (КВ) PD (EC)	TPUS 3303-26 TPUS 3303-26 TPUS 3303-26	6	5	150	45	15	30		15	90	ХХТиЭ						5			емтихан экзамен exam
Модуль/Module № 8	6	Органикалық синтездің химиялық технологиясы Химическая технология органического синтеза Chemical Technologies of Organic Synthesis		HTOS 3303-26 HTOS 3303-26 HTOS 3303-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-4																											
Модуль/Module № 7	7	Мұнай мен газды өзық өңдеудің перспективалы технологиялары Перспективные технологии углубленной переработки нефти и газа Promising Technologies for Deep Oil and Gas Processing	БеП (ТК) ПД (КВ) PD (EC)	PTUPNG 3304-26 PTUPNG 3304-26 PTUPNG 3304-26	6	5	150	45	30	15		15	90	ХХТиЭ							5		емтихан экзамен exam
Модуль/Module № 2	8	Объектілерді басқарудағы жасанды интеллект (Minor) Искусственный интеллект в управлении объектами (Minor) Intelligence in Object Management (Minor) Artificial		ПУО 3304-26 ПUO 3301-26 (Minor 3) ПУО 3304-26 ПUO 3301-26 (Minor 3) ПУО 3304-26 ПUO 3301-26 (Minor 3)																			емтихан экзамен exam
		Дисциплина по выбору ПД-5																											
Модуль/Module № 5	9	Майлау материалдарының химиялық технологиясы Химическая технология смазочных материалов Chemical Technology of Lubricating Materials	БеП (ТК) ПД (КВ) PD (EC)	HTSM 4305-26 HTSM 4305-26 HTSM 4305-26	7	5	150	45	15	30		15	90	ХХТиЭ								5	емтихан экзамен exam
Модуль/Module № 5	10	Отындарды химиялық өңдеу Химическая переработка топлив Chemical Processing of Fuels		HPT 4305-26 HPT 4305-26 HPT 4305-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-6																											
Модуль/Module № 7	11	Табиғи және синтетикалық каучуктарды өндіру Производство природных и синтетических каучуков Production of Natural and Synthetic Rubbers	БеП (ТК) ПД (КВ) PD (EC)	PPSK 4306-26 PPSK 4306-26 PPSK 4306-26	7	5	150	45	15	30		15	90	ХХТиЭ								5	емтихан экзамен exam
Модуль/Module № 7	12	Өндірістік органикалық синтездің шикізат базасы Сырьевая база промышленного органического синтеза Raw Material Base of Industrial Organic Synthesis		SBPOS 4306-26 SBPOS 4306-26 SBPOS 4306-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-7																											
Модуль/Module № 8	13	Органикалық және мұнай химия синтезінің технологиясы Технология органического и нефтехимического синтеза Technology of Organic and Petrochemical Synthesis	БеП (ТК) ПД (КВ) PD (EC)	TONS 4307-26 TONS 4307-26 TONS 4307-26	7	5	150	45	15	30		15	90	ХХТиЭ								5	емтихан экзамен exam
Модуль/Module № 8	14	Мұнай мен мұнай-өнімдерін қасиеттерін зерттеудің заманауи әдістері мұнай өнімдері Современные методы исследования свойств нефти и нефтепродуктов Modern Methods for Studying the Properties of Oil and Petroleum Products		SMISNN 4307-26 SMISNN 4307-26 SMISNN 4307-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-8																											
Модуль/Module № 5	15	Көмірді гидрогенизациялау Гидрогенизация угля Coal Hydrogenation	БеП (ТК) ПД (КВ) PD (EC)	GU 4308-26 GU 4308-26 GU 4308-26	7	5	150	45	15	30		15	90	ХХТиЭ								5	емтихан экзамен exam
Модуль/Module № 5	16	Катты қазбалы отындардың технологиясы Технология твердых горючих ископаемых Solid Fossil Fuels Technology		TTGI 4308-26 TTGI 4308-26 TTGI 4308-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-9																											
Модуль/Module № 8	17	Химия өнеркәсібіндегі еңбекті қорғау Охрана труда в химической промышленности Occupational Safety in the Chemical Industry	БеП (ТК) ПД (КВ) PD (EC)	OTHP 4309-26 OTHP 4309-26 OTHP 4309-26	7	5	150	45	30	15		15	90	ХХТиЭ								5	емтихан экзамен exam
Модуль/Module № 8	18	Қоршаған ортаны қорғаудың әдістері Методы защиты окружающей среды Methods of Environmental Protection		MZOS 4309-26 MZOS 4309-26 MZOS 4309-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-10																											
Модуль/Module № 7	19	Полимерлердің және полимерлік материалдардың қасиеттерін зерттеудің заманауи әдістері методы исследования свойств полимеров и полимерных материалов/ Studying the Properties of Polymers and Polymer Materials Современные Modern Methods for	БеП (ТК) ПД (КВ) PD (EC)	SMISPPM 4310-26 SMISPPM 4310-26 SMISPPM 4310-26	7	5	150	45	15	30		15	90	ХХТиЭ								5	емтихан экзамен exam
Модуль/Module № 7	20	Жоғары молекулалық қосылыстардың технологиясы Технология высокомолекулярных соединений Compounds Technology High-Molecular		TVS 4310-26 TVS 4310-26 TVS 4310-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-11																											

Модуль/Module № 6	21	Химиялық-технологиялық процестерді басқару жүйелері Системы управление химико-технологических процессов Control Systems of Chemical Technological Processes	БеП (ТК) ПД (КВ) PD (EC)	SYHTP 4311-26 SYHTP 4311-26 SYHTP 4311-26	8	5	150	45	15	30		15	90	ХХТиЭ								5	емтихан экзамен exam
Модуль/Module № 6	22	Химиялық-технологиялық процестерді математикалық модельдеу Математическое моделирование химико-технологических процессов Mathematical Modeling of Chemical Technological Processes		ММНТР 4311-26 ММНТР 4311-26 ММНТР 4311-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-12																					
Модуль/Module № 7	23	Химиялық экология Химическая экология Chemical Ecology	БеП (ТК) ПД (КВ) PD (EC)	HE 4312-26 HE 4312-26 HE 4312-26	8	5	150	45	15	30		15	90	ХХТиЭ								5	емтихан экзамен exam
Модуль/Module № 7	24	Мұнай-газ өңдеу кәсіпорындарын ұйымдастыру және басқару Организация и управление нефтегазоперерабатывающими предприятиями Organization and Management of Oil and Gas Refining Enterprises		OiYNP 4312-26 OiYNP 4312-26 OiYNP 4312-26																			емтихан экзамен exam
		Дисциплина по выбору ПД-13																					
Модуль/Module № 8	25	Технологиялық жабдықтарды жобалау және пайдалану негіздері Основы проектирования и эксплуатации технологического оборудования Fundamentals of Design and Operation of Process Equipment	БеП (ТК) ПД (КВ) PD (EC)	OPETO 4313-26 OPETO 4313-26 OPETO 4313-26	8	5	150	45	15	30		15	90	ХХТиЭ								5	емтихан экзамен exam
Модуль/Module № 8	26	Химиялық-технологиялық өндірісті жобалаудың негіздері Основы проектирования химико-технологического производства Fundamentals of Chemical-Technological Production Design		OPHTP 4313-26 OPHTP 4313-26 OPHTP 4313-26																			емтихан экзамен exam
				ВСЕГО:	**65**	**1950**	**585**	**240**	**345**	**0**	**195**	**1170**		**0**	**0**	**0**	**5**	**5**	**10**	**30**	**15**	
				ИТОГО ПО ЦИКЛУ ПД:	**92**									**0**	**5**	**0**	**10**	**5**	**20**	**30**	**22**	
		Қорытынды аттестация / Итоговая аттестация / Final assessment																					
Модуль/Module № 9	1	Қорытынды аттестаттау Итоговая аттестация Final assessment			8	8	240							ХХТиЭ								8	Защита ДП/ДР/ Прием комплексного экзамена 1,2 ДЖ/ДЖ қорғау/ Кешенді емтихан 1,2 Defense of the diploma thesis / diploma project Comprehensive exam 1,2
				ВСЕГО:	**8**	**240**	**0**	**0**	**0**	**0**				ХХТиЭ								8	
БАРЛЫҒЫ КЕЗЕҢ БОЙЫНША / ИТОГО ПО ЦИКЛАМ / TOTAL BY CYCLES					**240**	**7200**	**2055**	**705**	**1230**	**ЖЗНАЧ!**	**597**	**3798**		**25**	**35**	**30**	**30**	**30**	**30**	**30**	**30**		

Наименование модуля*

1. Адам және қоғам дүниетанымның және қоғамдық саяси білімнің негізі / Человек и общество-основа мирозззренческих и социально-политических знаний / Man fnd Society - the foundation of worldview and sociopolitical knowledge
2. Ақпараттық-коммуникативтік / Информационно-коммуникативный / Information and communication
3. Экономикалық-құқықтық, ғылыми және экологиялық білім модулі / Модуль экономико-правовых, научных и экологических знаний / Module of economic, legal, scientific and environmental knowledge
4. Техникалық және экологиялық ғылымдар / Технические и экологические науки / Technical and environmental sciences
5. Көмірсутек шикізатын өңдеу технологиясы / Технология переработки углеводородного сырья / Technology of processing of hydrocarbon raw materials
6. Органикалық заттарды өңдеудің инновациялық химиялық және технологиялық процестері / Инновационные химико-технологические процессы переработки органических веществ / Innovative chemical engineering processes of recycling processing of organic subatances
7. Мұнай, газ, көмір және полимерлердің химиялық технологиясы / Химическая технология нефти, газа, угля и полимеров / Chemical technology of oil, gas, coal and polymers
8. Органикалық синтез және химия өнеркәсібінің қауіпсіздігі / Органический синтез и безопасность химической промышленности / Organic Synthesis and Chemical Industry Safety
9. Қорытынды аттестаттау / Итоговая аттестация / Final assessment

EXPERT OPINION
on educational program 6B07117 – "Chemical Technology of Organic Substances" for 2026-2030
JSC "Kazakh University of Technology and Business named after K. Kulazhanov"

Educational program 6B07117 – "Chemical Technology of Organic Substances" was developed in accordance with the requirements of the State Compulsory Standard for Higher and Postgraduate Education, approved by Order No. 2 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022, and also reflects the provisions of relevant professional standards.

The duration of the bachelor's degree program in specialty 6B07117 – "Chemical Technology of Organic Substances" is 4 years. The total workload of theoretical training, including the study of general, basic, and specialized disciplines, is 240 credits and includes all types of classroom and independent work.

The program's goal is to provide specialized education and advanced training for specialists in the chemical and petrochemical industries. This goal is achieved through the study of specialized courses across all modules. The educational program aims to prepare highly qualified graduates in chemical engineering in the field of organic and petrochemical production technology, with deep professional and social competencies that are in demand in virtually all sectors of the market economy and internationally competitive.

I believe that the disciplines of the educational program and the catalog of elective courses for specialty 6B07117 – "Chemical Technology of Organic Substances" submitted for approval are sufficiently developed, logically interconnected, and aimed at developing practical skills and abilities in students in the field of the course.

For the development of the educational program and the comprehensive educational activity, the proposed disciplines represent broad opportunities for training highly qualified specialists in chemical engineering in line with modern trends in the development of chemical science and production, as well as the needs of Kazakhstan's petrochemical clusters and national research centers. This educational program is recommended for implementation as it provides a sufficiently high level of theoretical and practical training for qualified chemical engineers capable of effectively addressing challenges arising in their professional activities in the field of "Chemical Technology of Organic Substances."

Expert _____ Lu N. Yu., Deputy Director for Research, Branch of the Zh. Abishev Chemical-Metallurgical Institute of the National Center for Integrated Processing of Mineral Raw Materials, Ph.D.

EXPERT OPINION
on the educational program 6B07117 – "Chemical Technology of Organic Substances" for 2026-2030
JSC "Kazakh University of Technology and Business named after K. Kulazhanov"

The educational program has been developed in accordance with the requirements of the State Compulsory Standard for Higher and Postgraduate Education, approved by Order No. 2 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022, and also reflects the provisions of relevant professional standards.

The total workload of theoretical training, including the study of general, basic, and specialized disciplines, is 240 credits and includes all types of classroom and independent work. The duration of the bachelor's degree program in specialty 6B07117 – "Chemical Technology of Organic Substances" is 4 years.

The goal of the educational program is achieved through the study of specialized courses in all modules. The educational program is aimed at training highly qualified graduates in chemical engineering in the field of organic and petrochemical production technology, with deep professional and social competencies that are in demand in virtually all sectors of the market economy and competitive internationally.

I believe that the disciplines of the educational program and the catalog of elective courses for specialty 6B07117 – "Chemical Technology of Organic Substances" submitted for approval are sufficiently developed, logically interconnected, and aimed at developing students' practical skills and abilities in the field of study. The proposed disciplines for the development of the educational program offer extensive opportunities for training highly qualified specialists with the knowledge and professional competencies to monitor and improve the production of organic and chemical products, as well as existing and proven technologies for the creation of organic substances and materials. They also possess a sufficiently sound general theoretical background and are capable of effectively solving problems arising during professional work in the field of "Chemical Technology of Organic Substances", "Chemistry of Natural Compounds" and "Production Technology and Properties of Solid Fuels."

Expert:
Karaganda National Research
University named after E.A. Buketov,
Doctor of Chemical Sciences,
Research Professor _____ Marat Kirimbayevich

ҚОЙЫЛҒАН ҚОЛДЫ РАСТАЙМЫН

EXPERT OPINION

on the Educational Program 6B07117- "Chemical technology of organic substances" for 2026-2030

The educational program and the catalog of elective disciplines have been developed in accordance with the requirements of the State Mandatory Standard of Higher and Postgraduate Education approved by the Order No. 2 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022, as well as based on the professional standards: "Oil, Gas and Petrochemical Processing" (No. 224 dated 06.12.2022) and "Quality Control of Oil, Gas and Their Processed Products" (No. 224 dated 06.12.2022).

The duration of study for the bachelor's degree educational program 6B07117 – «Chemical technology of organic substances» is 4 years. The total academic workload of the educational program is 240 academic credits and includes general education, basic and major disciplines, as well as all types of classroom and independent work of students.

The purpose of the educational program is to train highly qualified specialists for the chemical, petrochemical, and oil and gas processing industries. This goal is achieved through the study of specialized disciplines aimed at developing professional competencies, practical skills, research abilities, and engineering thinking.

The educational program is focused on training competitive graduates in the field of chemical technology of organic substances who possess modern professional and social competencies and are востребованы in both domestic and international labor markets.

The disciplines included in the educational program and the catalog of elective disciplines submitted for approval are relevant, logically interconnected, comply with modern industry requirements, and are aimed at developing students' practical skills and professional competencies.

During the development of the educational program and the catalog of elective disciplines, such courses as "Introduction to the Specialty" and "Fundamentals of Chemical-Technological Production Design" were proposed to improve the quality of specialist training. These disciplines ensure the formation of theoretical knowledge and practical skills necessary for solving professional tasks in the field of chemical technology of organic substances.

Based on the conducted expert evaluation, we conclude that the educational program 6B07117 - «Chemical technology of organic substances» meets the modern requirements of the higher education system and can be recommended for implementation.

Expert:
Head of the Chemical Products
Development Directorate
of JSC "Kazakhstan Industry and
Export Center "QazIndustry" Zhatkanbaev E.E.

EXPERT OPINION

on educational program 6B07117 – "Chemical Technology of Organic Substances" for 2026-2030 JSC "Kazakh University of Technology and Business named after K. Kulazhanov"

Educational program 6B07117 – "Chemical Technology of Organic Substances" was developed in accordance with the requirements of the State Compulsory Standard for Higher and Postgraduate Education, approved by Order No. 2 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022, and also reflects the provisions of relevant professional standards.

The duration of the bachelor's degree program in specialty 6B07117 – "Chemical Technology of Organic Substances" is 4 years. The total workload of theoretical training, including the study of general, basic, and specialized disciplines, is 240 credits and includes all types of classroom and independent work.

The program's goal is to provide specialized education and advanced training for specialists in the chemical and petrochemical industries. This goal is achieved through the study of specialized courses across all modules. The educational program aims to prepare highly qualified graduates in chemical engineering in the field of organic and petrochemical production technology, with deep professional and social competencies that are in demand in virtually all sectors of the market economy and internationally competitive.

I believe that the disciplines of the educational program and the catalog of elective courses for specialty 6B07117 – "Chemical Technology of Organic Substances" submitted for approval are sufficiently developed, logically interconnected, and aimed at developing practical skills and abilities in students in the field of the course.

For the development of the educational program and the comprehensive educational activity, the proposed disciplines represent broad opportunities for training highly qualified specialists in chemical engineering in line with modern trends in the development of chemical science and production, as well as the needs of Kazakhstan's petrochemical clusters and national research centers. This educational program is recommended for implementation as it provides a sufficiently high level of theoretical and practical training for qualified chemical engineers capable of effectively addressing challenges arising in their professional activities in the field of "Chemical Technology of Organic Substances."

Expert: _____ B.N. Satbaev, Director of the Astana ranch of the National Center for Integrated Processing of Mineral Raw Materials, Doctor of Engineering, Professor, and Laureate of the State Prize of the Republic of Kazakhstan

EXPERT OPINION
on the educational program 6B07117 – "Chemical Technology of Organic Substances" for 2026-2030
JSC "Kazakh University of Technology and Business named after K. Kulazhanov"

The educational program's content is aligned with current trends in chemical engineering, the industrial and innovative development objectives of the Republic of Kazakhstan, and the needs of the domestic labor market.

The program is designed to develop students' fundamental knowledge in general, organic, physical, analytical, and colloidal chemistry; chemical engineering processes and apparatus; chemical engineering of organic substances; petrochemistry; polymeric materials; industrial organic synthesis; and methods of product quality control and environmental safety.

The practical nature of the educational program is particularly important. Students acquire skills in conducting chemical engineering calculations, developing process flow diagrams, selecting equipment, analyzing raw materials and finished products, conducting laboratory and research work, and evaluating the technological and environmental parameters of production processes. A significant advantage of the program is the inclusion of practical training, which allows students to consolidate theoretical knowledge in a real-world production environment.

The graduate competency model is developed taking into account professional standards and employer needs. Graduates of the program are capable of pursuing production and technological, organizational and managerial, research, and project-based activities. It is worth noting that the program develops students' critical thinking skills, professional communication, academic mobility, and independent research.

The relevance of this educational program stems from the economic need of the Republic of Kazakhstan for chemical engineering specialists for petrochemical enterprises, organic raw material processing, polymer production, paints and varnishes, reagents, pharmaceuticals, and other areas of the chemical industry.

Based on the analysis, it can be concluded that the bachelor's degree program "Chemical Technology of Organic Substances" meets the current requirements of the higher education system of the Republic of Kazakhstan, possesses high practical and scientific significance, ensures the development of professional competencies necessary for graduates to succeed in the chemical and petrochemical industries, and can be recommended for implementation in higher and postgraduate educational institutions of the Republic of Kazakhstan.

Expert: _____ Bakibayev A.A., Professor, Department of Organic Chemistry, National Research Tomsk State University, Doctor of Chemical Sciences, Professor, Tomsk, Russia

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

Educational Program/ Білім беру бағдарламасы/ Образовательная программа	6B07117 Chemical technology of organic substances/ 6B07117 Органикалық заттардың химиялық технологиясы/ 6B07117 Химическая технология органических веществ
Level/ Дәрежесі/ Уровень	Bachelor/Бакалавр/Бакалавр
International Academic Advisor/ Шетелдік академиялық кеңесші/ Зарубежный консультант	Khudaiberdieva Dilfuza Bakhramovna / Худайбердиева Дилфуза Бахрамқызы / Худайбердиева Дилфуза Бахрамовна
Academic degree/ Ғылыми дәреже/ Ученая степень	Doctor of Technical Sciences/ Техника ғылымдарының докторы/ Доктор технических наук
Position/ Лауазымы/ Должность	Professor/ Профессор/ Профессор
University/ Университет/ Университет	Tashkent Institute of Textile and Light Industry/ Ташкент тоқыма және жеңіл өнеркәсіп институты/ Ташкентский институт текстильной и легкой промышленности
Country/ Ел/ Страна	Uzbekistan /Өзбекстан /Узбекистан

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/	D. Khudaiberdieva /	_____	_____
Шетелдік академиялық кеңесші/	Д. Худайбердиева/	*(Signature/ Қолы/*	*(Date/ Күні/*
Зарубежный консультант	Д. Худайбердиева	*Подпись)*	*Дата)*

Seal/ МО/ МП