

MINISTRY OF LABOR AND SOCIAL PROTECTION OF THE POPULATION
OF THE REPUBLIC OF KAZAKHSTAN

“DEVELOPMENT OF LABOR SKILLS AND STIMULATION OF
WORKPLACES” PROJECT

EDUCATIONAL PROGRAM

by specialty

0816000-Chemical Technology and Production (by types)

(code and name of the specialty)

Professional Level qualifications : middle-level specialist

Duration of training: 3 years 10 months.

Astana, 2018

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INTRODUCTION

This educational program is developed on the basis of the main standard instruments:

- Law of the Republic of Kazakhstan “On education” dated July 27, 2007 No. 319-III (as amended and added as of 09.04.2016);
- State compulsory standard for technical and vocational education, approved by the Government of the Republic of Kazakhstan dated August 23, 2012 No. 1080 (as amended and added as of 15.08.2017) ;
- National Qualifications framework approved Protocol dated March 16, 2016;
- Sectorial Qualifications framework in education, approved on 2016;
- Classifier of professions and specialties in technical and vocational, post-secondary education;
- Integrated classifier of professions and specialties in technical and vocational, post-secondary and higher education;
- Order of the Minister of education and science of the Republic of Kazakhstan dated March 18, 2008, No. 125 “On approval of the Model rules for the ongoing monitoring of academic performance, intermediate and final appraisal of students”;
- Order of the Minister of education and science of the Republic of Kazakhstan dated October 31, 2017 No. 553 “On approval of model curricula and model academic plans for technical and professional education occupations”;
- Order of the Ministry of education and science of the Republic of Kazakhstan “Rules for the Educational Process Organization on credit technology of education” dated April 20, 2011 № 152.

A distinctive characteristic of this educational program is compliance with professional social order through the establishment of basic and professional competencies associated with essential practical activity.

SYMBOLS AND ABBREVIATIONS

BC	Basic competence
BM	Basic module
HE	Higher education
SCES	The State compulsory education standard
EQF	European qualification frame
ETF	The European Training Foundation
K&S	Knowledge and skills
AC	Assessment criterion
NOCS	National classifier of occupations
NQF	National Qualifications framework
NSC	National qualifications system
NCEA	General classifier of types of economic activity
EP	Educational program
SQF	Sectorial Qualifications framework
PS	Professional standard
PC	Professional competence
PM	Professional module
WG	Working Group
RoK	The Republic of Kazakhstan
TO	Training outcome
QMS	The quality management system
TVE	Technical and vocational education
TVE&PS	Technical and Vocational Education and Post-Secondary Education
DACUM	from the English. Developing Curriculum
ECVET	European Credit System for vocational education and training

PASSPORT OF THE EDUCATIONAL PROGRAM

Name (*specialty code and name*): 0816000-chemical technology and production (by types)

Name and code: 0816043 – «Technician-Technologist»

The purpose of the education program: training of highly qualified specialists for organization and technological support of production processes for chemical products.

Level of education: technical and vocational

Professional qualification: Middle-level Specialist

Skill levels on NQF/SQF: 2-3

Professional Area activity *: Chemical production

Type(s) of employment:

1. Operation and maintenance of technological equipment;
2. Quality control of raw materials and finished products;
3. Management of technological processes of inorganic substances production;
4. planning and organization of the personnel's work of the production unit;
5. implementation of execution-management activity for production tasks

realization.

Object(s) of professional activity: enterprises on processing of mineral raw materials, oil, gas, coal; production of inorganic and organic substances.

Program Features**:** The possibility to use dual forms of vocational training, credit system education.

Form of study: full-time

Training terms: 3 years 10 months.

Language of training Russian

The volume of credits/hours: 219 credits /6588 hours.

Requirements for students***:** persons with general secondary education

*Specifies the parameters of the SQF (methodical recommendations on the development and design of sectorial qualification frameworks, Astana, 2016).

** Specifies according to PS (methodical recommendations on the design and execution of professional standards, Astana, 2017)

***Specifies the system objects (objects), phenomena, processes, and technology that aims activities.

****Specifies the dual education/distance training/credit technology

***** Specifies the previous education: basic secondary/secondary/technical and vocational education

COMPETENCY PROFILE

<p>The aim of the training: training of qualified specialists in technical and vocational education to work in the sphere of technological support of production processes, products of chemical industry.</p>	<p>After the successful completion of the program, the trainee will be able to carry out management activities for maintaining performance of technological processes of manufacture of basic products of inorganic/organic synthesis in accordance with normative-technical and legal documentation.</p>	
<p>Section names, section, group, class and subclass according to NACE * (SAR)</p>	<p>Section: processing Section: manufacture of chemicals and chemical products Group: manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics and synthetic rubber in primary forms.</p>	
<p>Scope of competences (<i>on core labor standard or professional functions analysis profession</i>)**</p>	<ol style="list-style-type: none"> 1. process control the release of chemical products. 2. Monitoring and condition of technological equipment of chemical production. 3. carrying out control analyses of the technological process of the release of chemical products. 4. implementation of management activities within the plot of technological process of production of chemical products. 	
<p>List of competencies and modules in the context of an academic degree/qualifications/vocations</p>		
Competence Code	Competence (in line with labor functions and skill levels)	Modules
<p>General (Basic) competencies</p>		
BC1	<p>Application of professional vocabulary, draw up and execute business documents in the field of professional activity</p>	<p>BM 1. Application of professional vocabulary, the preparation and execution of business documents in the field of professional activity</p>

BC 2	Development and improvement physical qualities	BM 2. Development and improvement of physical qualities
BC3	Understand the legal framework, be aware of oneself and one's place in society, tolerate social, political, ethnic, religious and cultural differences	BM 3. Application of the foundations of social sciences for socialization and adaptation in society and the workforce.
BC4	Understand the basic patterns and mechanisms of functioning of the modern economic system	BM 4. Using of basic knowledge of the economy in professional activities
BC5	Understand the history, role and place of Kazakhstan in the world community	BM 5. Understanding the history, role and place of Kazakhstan in the world community
BC6	Use the laws of physics and apply information technology in professional activities	BM 6. Using of the laws of physics and the use of information technology in professional activities
Professional competence		
PC 1	Conduct the technological process of production of chemical products	PM 1. Conducting the technological process of production of chemical products
PC 2	Use the readings of instrumentation to determine the compliance of the processes of production of chemical products with the norms	PM 2. Using the testimony of instrumentation to determine the compliance of the processes of production of chemical products with the standards
PC 3	Follow the safety instructions of the process.	PM 3. Compliance with safety regulations
PC 4	Use process equipment to obtain chemical products	PM 4. Use of equipment for the production of chemical products
PC 5	Carry out adjustment and minor repair of equipment	PM 5. Implementation of the adjustment and minor equipment repair
PC 6	Ensure the requirements for the quality of the products	PM 6. Ensuring requirements for the quality of the products
PC 7	Ensure the fulfillment of plan tasks, the production of high quality products.	PM 7. Ensuring the fulfillment of plan tasks, production of high quality

		products
PC 8	Assess the results of the production activities of the unit on the basis of technical and economic indicators	PM 8. Evaluation of the results of production activities based on technical and economic indicators
PC 9	Plan and organize the work of subordinate personnel in the conduct of the technological process and equipment operation	PM 9. Planning and organization of work of subordinate personnel for the conduct of the technological process and equipment operation

* The general classification of economic activities (GCEA) is a document intended for classification and coding of all economic activities.

** A brief description of labor functions that allow you to achieve the main objectives of the specialty/profession. Number of functions depends on the complexity of the profession.

THE LIST OF MODULES AND LEARNING OUTCOMES

Module name	Learning outcomes (in accordance with the professional tasks)	Assessment Criteria of training outcomes	Module forming disciplines
Basic modules			
BM 1 Application of professional vocabulary, preparation and execution of business documents in the field of professional activity	LO1. To possess the grammar and terminology of the Kazakh (Russian) and foreign language for communication in the sphere of their professional activities	1. Possession of lexical and grammatical material in the specialty necessary for professional communication.	Professional Kazakh (Russian) language Professional foreign language Office work in the state language
		2. Use of terminology in the specialty.	
	LO2. To master the translation technique (with a dictionary) of professional-oriented texts	1. Reading and translation (with a dictionary) texts of professional orientation.	
	TO3. To work with organizational, administrative, information and reference documents using computer technologies	1. Drawing up in Kazakh (Russian) and foreign languages a resume, autobiography, description, statement, complaint, power of attorney, receipt	
		2. Compliance with the basic requirements for the text of the document	
		3. Creation of documents on the computer that meet modern requirements and established regulations	
BM 2 Development and improvement of physical qualities	LO 1. To strengthen health and abide by the principles of a healthy lifestyle.	1. Understanding the basics and culture of a healthy lifestyle	Physical Culture
		2. Characteristics of the physiological basis of the respiratory,	

		<p>circulatory and energy supply systems under muscle loads</p> <p>3. Performing a set of exercises for general physical training</p> <p>4. Compliance with the culture of a healthy lifestyle in everyday life.</p>	
	LO 2. To improve physical qualities and psycho-physiological abilities	<p>1. Compliance with the rules of team sports.</p> <p>2. Characteristics of the basics of physical activity and methods of its regulation.</p> <p>3. Mastering the technique of doing exercises.</p> <p>4. Application of learned game techniques and individual tactical tasks in an educational game.</p> <p>5. Performance of control standards and tests provided by the program.</p>	
	LO 3. To provide first aid for injuries and accidents.	<p>1. Understanding the causes of injuries during exercise, methods of injury prevention.</p> <p>2. Providing medical care for injuries.</p>	
BM 3 Application of the foundations of social sciences for socialization and adaptation in society and	LO 1. To orient in the most general philosophical questions.	<p>1. Possession of basic philosophical concepts.</p> <p>2. Understanding of the essence of the process of knowledge and different points of view on the process of knowledge in the history of philosophy.</p>	<p>Basic philosophy</p> <p>Culturology</p> <p>Fundamentals of law</p> <p>Fundamentals of sociology and political science</p>

the workforce		3. Characteristics of the concepts of "dialectics", "the laws of dialectics", "being", "matter", "movement", "space and time".
		4. Identification of the essence and the relationship of the main categories of philosophy.
		5. Understanding the characteristics of the scientific, philosophical and religious picture of the world.
	LO 2. To determine the correlation in the life of a person of such philosophical categories as freedom and responsibility, material and spiritual values.	1. Awareness of the degree of responsibility of the individual for the preservation of life, culture and the natural environment.
		2. Understanding the essence of social and ethical problems associated with the development and use of the achievements of science, engineering and technology.
		3. Formulation of own opinion about the ratio of material and spiritual values in human life.
4. Analysis of various points of view on the categories of truth and the meaning of life, the formulation of one's own point of view on these concepts.		
LO 3. Understand the role and place of culture of the peoples	1. Understanding the history of national culture, the values of	

of the Republic of Kazakhstan in world civilization	traditional Kazakh culture.
	2. Understanding the role and place of culture of the Republic of Kazakhstan in the world civilization.
	3. Characteristic of cultural achievements of independent Kazakhstan.
LO 4. To understand the moral values and norms that form tolerance and an active personal position.	1. Characteristic forms, types and history of different cultures and civilizations.
	2. Knowledge of history and understanding of the current state of the world and traditional religions.
	3. Understanding the traits of extremist, radical and terrorist ideology.
LO 5. To know the basic concepts of law and state-legal phenomena	1. Understanding of the essence and basic signs of law.
	2. Possession of concepts and respect for the principles of law and order.
LO 6. To possess information about the main branches of law	1. Understanding of the legal status in the formation of the identity of a citizen with the provisions of the Constitution of the Republic of Kazakhstan.
	2. Characteristics of administrative regulation methods.
	3. Understanding the need for liability for administrative and corruption offenses.
	4. Possession of the

	main provisions of city law and family law.
	5. Possession of information about the types of taxes.
	6. Understanding of criminal liability and the reasons for its occurrence.
LO 7. To protect rights in accordance with labor laws	1. Understanding of the rights and obligations of an employee under labor law.
	2. Differentiation of the material and disciplinary responsibility of the employee and the employer.
LO 8. To know basic concepts of sociology and political science	1. Owns basic political science concepts: power, political system, political regime, state, forms of government, forms of government, political parties, party systems, political elite, political leadership, geopolitics.
	2. Owns the basic sociological concepts: social relations, social phenomena, social processes, social progress.
	3. Correlation of common social processes and individual facts.
LO 9. To understand international political processes, geopolitical situation	1. Understanding the place and role of Kazakhstan in the modern world.

		2. Characteristics of the structure of the political system of the Republic of Kazakhstan.	
		3. Understanding of the nature and laws of the functioning of political culture.	
BM 4 Application of basic knowledge of economics in professional activities	LO1. To master the main issues in the field of economic theory	1. Understanding and explaining the basic principles of modern business etiquette	Fundamentals of Economics
		2. Establishing the relationship of image and etiquette	
		3. Observance of the principle of tolerance in international communication	
		4. Demonstration of business speech etiquette in various situations	
	LO2. To determine the forms and types of property, types of plans, and basic economic indicators of an enterprise.	1. Characteristics of the main stages and content of planning.	
		2. Perform the necessary economic calculations using mathematical methods.	
		3. Determination of the main economic indicators of the enterprise.	
	LO3. To understand the development trends of the world economy, the main objectives of the transition to a green economy	1. Characteristics of the trends of the world economy.	
		2. Understanding the main objectives of the transition of the state to a green economy	
		3. The use of basic methods for calculating	

		gross domestic product and gross national product.	
	LO4. To determine the possibility of success and the risk of entrepreneurship	1. Characteristics of goals, factors and conditions for the development of entrepreneurship.	
		2. Characteristics of modern organizational and legal forms of entrepreneurial activity in Kazakhstan.	
		3. Understanding the factors that determine the success of business activities.	
		4. Possession of the basics of a business plan.	
BM 5. Understanding the history, role and place of Kazakhstan in the world community	LO1. Understand major historical events	1. Knowledge of chronology and understanding of the essence of historical events.	History of Kazakhstan
		2. Disclosure of the role and place of the Kazakh people in the common Türkic community, in the system of the nomadic civilization, in the development of the historical and cultural community of the peoples of the Eurasian world.	
		3. Understanding the nature and purpose of political and social changes taking place in the Republic of Kazakhstan after independence.	

		4. Characteristics of the achievements of independent Kazakhstan.	
	LO2. To identify causal relationships of historical events.	1. Identification of basic facts, processes and phenomena reflecting the integrity and consistency of the history of Kazakhstan. 2. Establishing the connection between historical events.	
BM 6. Using the laws of physics and the application of information technologies in professional work	LO 1. To apply the basic laws of physics	1. Characteristics of physical phenomena and processes, principles of operation of devices and mechanisms using the conceptual apparatus of a school physics course (values, laws, models, concepts)	Physics I, II Mathematics I, II Information and communication technology
		2. Understanding the essence of methods of working with information of physical content.	
		3. Understanding the basic laws of physics	
	LO 2. To solve problems in the field of professional activity	1. Characteristics of mathematical material	
		2. Generalization of mathematical material	
		3. Understanding of mathematical thinking	
	LO 3. To apply information technology in professional activities	1. Understanding methods of automated information processing, network technologies for processing and transmitting information.	
		2. Understanding of interpolation: the process of collecting, transmitting, processing	

		and updating information; programming language; programming technology; computer graphics	
		3. Formation of resource information base for solving professional tasks	

Professional modules			
PM 1. Conducting the technological process of production of chemical products	LO1. To carry out technological operations for the preparation of raw materials, reagents.	1. Determination of types of raw materials, reagents, technology of production of chemical products and methods of its processing.	General chemical technology Organic chemistry/ Inorganic chemistry Drawing Processes and devices of chemical production Physico-chemical technology Analytical chemistry Construction materials Safety in the maintenance of the process General electrical engineering with basic electronics Automation of technological processes chemical production Applied Informatics
		2. Justification of technological parameters and instrumentation of the chemical-technological process of a specific production	
		3. Conducting technological operations for the preparation of raw materials, reagents	
	LO2. To perform safe operation of the section	1. Compliance with the parameters of the technological mode, in accordance with the approved standards and instructions of the management	
		2. Reading the flow chart of the serviced site.	
		3. Sampling according to the schedule of analytical control to determine the quality of the substances obtained.	
		4. Correction of the process mode according to the flow chart and control of the air pressure of the instrumentation and the flow rate of the	

		pumped product	
		5. Ensuring compliance with interdepartmental norms and State standards of products being pumped out from installation.	
PM 2. Using the testimony of instrumentation to determine the compliance of the processes of production of chemical products with the norms	LO 1. To read block diagrams of measuring circuits.	1. Understanding the essence and purpose of automation of production processes and principles of process control	Technology of production of inorganic synthesis / Technology of production of organic synthesis Chemical Plant Equipment Labor protection at chemical plants Chemical safety Personnel Management Fundamentals of law
		2. Classification of systems and control objects	
		3. Reading block diagrams of measuring circuits	
	LO 2. To assess the metrological features of instrumentation and automation equipment	1. Using various measurement methods	
		2. Knowledge of the purpose, installation location and functionality of primary, secondary measuring transducers	
		3. Fixation of communication signals in measuring circuits	
		4. Evaluation of the metrological characteristics of devices	
	LO 3. To carry out the control of the technological process according to the indications of instrumentation	1. Compliance with the norms of the process according to the approved regulations	
		2. Readings of instrumentation	
3. Possession of information on the list			

		of locks and alarms	
		4. Manual adjustment and control of automatic process adjustment	
PM 3. Compliance with the rules of the process safety	LO 1. To know general safety issues	1. Types of control and supervision of labor protection	Occupational safety and health Industrial ecology
		2. Compliance with laws and regulations of normative-technical documentation on labor protection	
		3. Compliance with working hours and rest time in accordance with the Labor Code of the Republic of Kazakhstan	
	LO 2. To obtain knowledge in issues of industrial injuries and occupational diseases	1. Possession of information about the occurrence of accidents and occupational diseases, hazardous and harmful production factors.	
		2. Possession of information about occupational diseases characteristic of workers serving technological installations.	
		3. Possession of information on general issues of investigation of accidents and occupational diseases, the composition of the commission, depending on the severity of the accident.	

	LO 3. To know safety regulations at a production facility	1. Assessment of the risk of work performed. 2. The use of personal protective equipment. 3. Compliance with the rules for the safe operation of equipment.	
	LO 4. To provide first aid to the victim	1. First aid for mechanical injuries. 2. First aid for poisoning. 3. First aid for thermal and chemical burns. 4. First aid in case of electric shock	
	LO 5. To assess the state of the ecology of the environment at an industrial facility	1. Possession of information about the main sources of anthropogenic impact on the environment. 2. Application of methods of preventing and trapping impurities. 3. Analysis of the environmental consequences of production activities.	
PM 4. Use of equipment for the production of chemical products	LO 1. To maintain the main equipment.	1. Classification of main and auxiliary equipment 2. Possession of information about the device and the principles of operation of the main equipment. 3. Service main equipment in compliance with the technological parameters of work	Technical analysis and production control Non-organic technology /organic substances Fundamentals of management in the workplace

LO 2. To maintain auxiliary equipment.	1. Possession of information about the purpose and principles of operation of pumps, compressors and heat exchange equipment
	2. Implementation of the start-up and installation of pumps and compressors.
	3. Monitoring the operation of heat exchange equipment
LO 3. To identify the cause of the failure of the serviced equipment	1. Possession of information about possible malfunctions in the equipment, how to prevent and eliminate them
	2. Implementation of a visual inspection of the equipment and identification of deviations of the technological mode of operation of the equipment being serviced by the control sensors
	3. Monitoring the state of fasteners and connections.
	4. Check the status of oil and cooling systems
LO 4. To carry out maintenance of equipment.	1. Compliance with the rules of technical operation of equipment.
	2. Tightening mounts and contacts.
	3. Perform lubrication work.
LO 5. Prepare equipment for	1. Performing start and stop process

	repair.	equipment.	
		2. Disassembly, revision, repair and assembly of stop valves.	
		3. Washing and cleaning of process equipment	
		4. Work on the issuance and receipt of equipment from scheduled preventive maintenance	
PM5. Implementation of the adjustment and minor repair of equipment	LO 1. To perform locksmith work.	1. Use of plumbing and measuring tools according to the instructions.	Locksmith practice
		2. Marking parts, scraping and grinding surfaces, threading and filing metal	
	LO 2. To carry out repair of pipe transport	1. Preparation and replacement of gaskets	
		2. Assembly and disassembly of the pipeline.	
		3. Installing the plugs	
		4. Tightening flange connections.	
		5. Elimination of leaks in the pipeline through the installation of clamps	
	LO 3. To carry out repair of valves	1. Elimination of gaps in valves.	
		2. Perform flushing and lapping parts.	
		3. The implementation of stuffing glands.	
		4. Installation and dismantling of valves, valves and other	

		fittings. 5. Check reinforcement for strength and density.	
	LO 4. To carry out the repair of technological equipment	1. Performing the washing of parts of assemblies and cleaning of cases. 2. Disassembly of equipment into components and parts. 3. Replacing the stuffing box studs. 4. Making bolts and studs fit 5. Assembly of parts in nodes and nodes in devices.	
PM 6. Ensuring quality requirements of products received	LO 1. To carry out the control of the technological process according to the results of analytical control.	1. Possession of information on the physical and chemical bases of the processes and methods of production analytical control 2. Sampling of raw materials, product and intermediate. 3. Regulation of process parameters in accordance with the testimony of laboratory studies 4. Logging of analytical process control	Optimization of chemical and technological processes Process control Applied Informatics (Information and Communication Technologies)
	LO 2. To assess the quality of products.	1. Compliance with the requirements of state standards for product quality. 2. Understanding the dependence of product quality stability on the correctness of the	

		organization of the production control infrastructure.	
		3. Distinction of functions and content of input control of raw materials, acceptance control of the finished product, operational control of the technological process	
		4. Preparation of documentation on quality management and standard methods of quality control of technological processes at production sites.	
	LO 3. To control the quality of raw materials and finished products.	1. Characteristics of the properties of raw materials, finished products, auxiliary materials.	
		2. Organization of process control, product quality and production accounting for instrumentation in accordance with the technological regulations.	
		3. Identification of the cause of a poor-quality product and measures taken to prevent marriage and liquidation within the framework of the quality management system	
PM7. Ensuring the implementation	LO 1. To draw up a process control chart	1. Possession of information on the classification,	Workshop on the technology of synthesis of

of planned tasks, production of high quality.		technology maintenance and operation of technological installations	inorganic / organic substances Research organization Fundamentals of the design of technological objects of chemical production
		2. Establishing the relationship of process mode and product quality	
		3. Control and regulation of parameters of technological processes	
	LO 2. To perform basic technological calculations	1. Calculation of expenditure ratios	
		2. Compilation of the material balance of the process	
		3. Calculation of the heat balance of the process	
		4. Calculation of the size of the main equipment	
	LO 3. To have the skills to control and regulate the operation of technological equipment.	1. The choice of technological equipment in accordance with the specifications	
		2. Regulation of the work of technological equipment.	
		3. Reading and mapping equipment and instrumental process flow diagrams	
		4. Preparation of the equipment for safe start-up, conclusion to the technological mode and stop.	
	LO 4. To	1. Compliance with the	

determine the operational properties of equipment	rules of technical operation of equipment.
	2. Possession of information on the maintenance of technical passports for equipment.
	3. Determination of depreciation of equipment.
	4. Participation in the preparation of plans for repair work.
LO 5. Prepare equipment for repair and monitor its work	1. Monitoring compliance with the rules for starting and stopping the main apparatuses and rules for safe operation of process equipment
	2. Identify the causes of major problems in the equipment, the organization of measures to prevent and eliminate them.
	3. Execution of start-up, output to the mode and stop of installation
LO 6. To comply with the basic provisions of the start and stop installation	1. Possession of information on the list of devices purged with an inert gas, the parameters and schemes of blowing devices and pipelines
	2. Perform a check on the permeability and purge of devices and pipelines
	3. Control of the pump sealing and cooling

		system.	
		4. Implementation of the start, output and stop of the section in accordance with the approved regulations	
PM8 Evaluation of the results of production activities based on technical and economic indicators	LO 1. To explain the production structure of the enterprise, the organization of the production cycle	1. Explanation of the basic principles of the economic system of the enterprise	Economy enterprises
		2. Distinguishing material, pipe and financial resources of the chemical industry	
		3. Charting the production structure of the enterprise	
	LO2. To determine the technical and economic indicators of production	1. Determination of indicators of the use of basic production assets, working capital savings, production costs	
		2. Determining the number of industrial personnel	
		3. Calculation of plant capacity and equipment downtime	
PM 9. Planning and organization of work of subordinate personnel in the conduct of the technological process and equipment operation	LO 1. To organize teamwork and maintain professional relationships with related units	1. Possession of information about the fundamentals of the economy of production	
		2. Compliance with the rules of professional ethics, fundamentals of management and marketing during the interview	
		3. The use of methods and means of labor management	
		4. Participation in the	

	planning of the organization.
LO 2. To ensure the fulfillment of the production target in terms of production volume and product quality.	1. Analysis of shop expenses
	2. Preparation of production tasks in accordance with the plans and schedules.
	3. Compliance with the basic requirements of the organization of labor.
	4. Preparation of an application for raw materials, materials, equipment, maintenance of emergency and current work.
	5. Conducting technological documentation
LO 3. To perform duties of the line manager of the shop	1. Possession of information about the work of individual departments of the enterprise.
	2. The management of the department and individual workers as a backup line manager.
LO 4. To writing a graduation project	1. Use of guidance on the development of technical documentation according to the approved list
	2. Development and execution of regulatory documentation in accordance with the approved list.
	3. Analysis of planning documentation

	4. Collection of material on final qualifying work	
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Specification of Basic Module 1

“Using of professional vocabulary, drafting of official papers in the field of professional activity”

Scope of competence	-
Title and code of the module	Application of professional vocabulary, the preparation of business papers in the field of professional activity
Purpose of the module	After studying this module, the student will be able to apply professional vocabulary, make business papers in the field of professional activity.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To master the grammar and terminology of the Kazakh (Russian) and foreign languages for communication in the sphere of their professional activities 2. To master the translation technique (with a dictionary) of professional-oriented texts 3. To work with organizational, administrative, information and reference documents using computer technologies.
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Basics of business Kazakh (Russian) and foreign language and professional vocabulary 2. Rules of speech etiquette 3. Participation in a professional conversation 4. Basics of office work 5. Methods of creation and functions, classification, carriers, purpose, components, component parts, rules for processing documents 6. To possess the lexical and grammatical minimum of the Kazakh (Russian) and foreign language, necessary for reading and translating (with a dictionary) texts of professional orientation 7. Knowledge of national culture, business culture of the country 8. Draw up official documents necessary in professional activities with the use of computer technology.
Prerequisites	School program: Kazakh (Russian) language, Foreign Language
Modules forming the discipline	Professional Kazakh (Russian) language Professional foreign language, Professionally-

	oriented foreign language Office work in the state language
Module type (mandatory, optional)	Mandatory
Workload (credits / academic hours)	6 credits / 180 hours
Duration of the module	3-5 semester
Form of training	Full-time
Education technology	dual / remote
Teaching methods.	lectures, practical classes, problem teaching methods, interactive teaching methods
Control Forms	Pass fail exam, exam
Required resources	Library Fund, Internet classes, typical educational, electronic educational resources (language laboratories)
Language of training	Russian, Kazakh
Post-requisites	PM 1 – PM 9

Specification of Basic Module 2
“Development and improvement of physical qualities”

Scope of competence	-
Name and code of the module	Development and improvement of physical qualities
Purpose of the module	After studying this module, the student will be able to develop and improve physical qualities.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To promote health and abide by the principles of a healthy lifestyle 2. To improve physical qualities and psychophysiological abilities 3. To provide first aid for injuries and accidents.
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Understanding the basics and culture of a healthy lifestyle 2. Characterization of the physiological bases of the activity of the respiratory, circulatory and energy supply systems under muscle loads 3. Performing a set of exercises for general physical training. 4. Compliance with the culture of a healthy lifestyle in everyday life 5. Compliance with the rules of team sports 6. Characteristics of the basics of physical activity and methods of its regulation 7. Mastering the technique of doing exercises 8. Application of the learned game techniques and individual tactical tasks in an educational game. 9. Implementation of control standards and tests provided by the program 10. Understanding the causes of injury during exercise 11. Provision of first aid for injuries. 12. Understanding injury prevention
Prerequisites	Valeology; Biology
Modules forming the discipline	Physical education and sport
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	6 credits / 180 hours

Duration of the module	3-7 semesters
Form of training	Full-time
Education technology	Modular
Form of organization of educational process. Teaching methods.	Lecture, independent work, practical lessons, labs, practice Oral questioning, testing, report, abstract, creative task
Control Forms	Pass fail exam, exam
Required resources	Sports hall, educational literature on the discipline of physical education and sport. Yu.I. Evseev. Physical education for university students. - Rostov-on-Don. -2003.
Language of instruction	Russian, Kazakh
Post-requisites	Life Safety Basics

Specification of Basic Module 3

“Application of the foundations of social sciences for socialization and adaptation in society and the workforce”

Scope of competence	-
Title and code of the module	Application of the basics of philosophical knowledge, social sciences for socialization and adaptation in society and the workforce
Purpose of the module	After studying this module, the student will be able to apply the basics of philosophical knowledge, social sciences for socialization and adaptation in society and the workforce.
Level of professional qualification	4
Learning outcomes by module	<p>LO 1. To orientate in the most general philosophical questions.</p> <p>LO 2. To determine the correlation in the life of a person of such philosophical categories as freedom and responsibility, material and spiritual values.</p> <p>LO 3. To understand the role and place of culture of the peoples of the Republic of Kazakhstan in world civilization.</p> <p>LO 4. To understand the moral values and norms that form tolerance and an active personal position.</p> <p>LO 5. To know the basic concepts of law and state-legal phenomena.</p> <p>LO 6. To possess information about the main branches of law</p> <p>LO 7. To protect rights in accordance with labor laws.</p> <p>LO 8. To possess basic concepts of sociology and political science</p>
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Knowing of basic philosophical concepts 2. Understanding the essence of the process of knowledge and different points of view on the process of knowledge in the history of philosophy 3. Characterization of the essence of the concepts "dialectic", "laws of dialectics", "being", "matter", "movement", "space and time" 4. Understanding the history of national culture, the values of traditional Kazakh culture 5. Understanding the role and place of culture of the peoples of the Republic of Kazakhstan in

	<p>world civilization</p> <p>6. Characteristics of the cultural achievements of independent Kazakhstan</p> <p>7. Knowing of basic political science concepts</p> <p>8. Knowing of basic sociological concepts</p> <p>9. Knowing of concepts of law and respect for the principles of law and order</p>
Prerequisites	<p>The World History;</p> <p>History of Kazakhstan;</p> <p>Ecology;</p> <p>Basics of economic theory</p>
Modules forming the discipline	<p>Basic philosophy</p> <p>Law basics,</p> <p>Basics of sociology,</p> <p>Basics of Political Science</p> <p>Culturology</p>
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	6 credits / 180 hours
Duration of the module	5 semester
Form of training	Full-time
Education technology	Modular
Form of organization of educational process.	Lecture, independent work, practical lessons, labs, practice
Teaching methods.	Oral questioning, testing, report, abstract, creative task
Control Forms	Pass fail exam
Required resources	<p>Personal computer, educational and methodical literature in the disciplines: Fundamentals of philosophy,</p> <p>Fundamentals of Law, Fundamentals of Sociology, Fundamentals of Political Science, Cultural Studies.</p> <p>Zelenkov A. I. Philosophy: an educational and methodical complex. - 2003.</p> <p>Mkrtchyan E.R. Basics of Sociology, Textbook, Volgograd, 2017</p>
Language of instruction	Russian, Kazakh
Post-requisites	<p>Philosophy;</p> <p>Political science;</p> <p>Sociology</p>

Specification of Basic Module 4

“Application of basic knowledge of the economy in professional activities”

Scope of competence	-
Title and code of the module	Application of basic knowledge of economics in professional activities
Purpose of the module	After studying this module, the student will understand the basic laws and mechanisms of the functioning of the modern economic system.
Level of professional qualification	4
Learning outcomes by module	<p>LO 1. To know the basic issues in the field of economic theory</p> <p>LO 2. To determine the forms and types of ownership, types of plans, the main economic indicators of the enterprise.</p> <p>LO 3. To understand the development trends of the world economy, the main objectives of the state's transition to a "green" economy.</p> <p>LO 4. To determine the possibility of success and risk business.</p>
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Knowing of economic terms, understands the laws and principles of a market economy 2. Possession of the basics of economics of production and consumption. 3. Characteristics of the tax policy of the state 4. Understanding the sources of inflation and its consequences. 5. Characteristics of trends in the global economy 6. Understanding the main objectives of the state's transition to a green economy 7. Application of basic methods for calculating gross domestic product and gross national product 8. Characteristics of goals, factors and conditions for the development of entrepreneurship 9. Characteristics of modern organizational and legal forms of entrepreneurial activity in Kazakhstan 10. Understanding the factors that determine the success of business activities.
Prerequisites	Maths;

	History of Kazakhstan; Man and society; Basics of state and law.
Modules forming the discipline	Fundamentals of Economics Fundamentals of law
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	4 credits / 120 hours
Duration of the module	4 semester
Form of training	Full-time
Education technology	modular
Form of organization of educational process. Teaching methods	Lecture, independent work, practical lessons, labs, practice The oral interrogation, testing, report, summary, creative task
Control Forms	Pass fail exam
Required resources	Personal computer, educational and methodical literature in the disciplines of Basics of Economics, Fundamentals of Law. N.I. Zhidkov Fundamentals of Economics for students of technical specialties. - 2009. K.S. Birzhanov, K. B. Ibraeva. Fundamentals of law of the Republic of Kazakhstan. - 2013.
Language of instruction	Russian, Kazakh
Post-requisites	Microeconomics; Macroeconomics; World economy and international relations; State regulation of the economy; Marketing;

Specification of Basic Module 5
“Understanding the history, role and place of Kazakhstan in the world community”

Scope of competence	-
Title and code of the module	Understanding the history, role and place of Kazakhstan in the world community
Purpose of the module	After studying this module, the student will understand the history, role and place of Kazakhstan in the world community.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To understand the main historical events 2. To determine the causal relationships of historical events. 3. To obtain knowledge on the development of national identity
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Understanding of the chronology and understanding of the essence of historical events from antiquity to the present 2. Understanding the nature and purpose of political and social changes taking place in the Republic of Kazakhstan after independence 3. Characteristics of the achievements of independent Kazakhstan 4. Determination of the main facts, processes and phenomena that reflect and characterize the integrity and consistency of the history of Kazakhstan 5. Establishing links between historical events 6. Ability to work with historical sources 7. The role and place of the Kazakh people in the common Turkic community, in the system of nomadic civilization, in the development of the historical and cultural community of the peoples of the Eurasian world 8. Demonstration of spatial thinking, the ability to analyze historical material 9. Characteristics of Kazakhstan in the system of foreign political relations of the modern world

Prerequisites	School course History of Kazakhstan
Module forming disciplines	History of Kazakhstan
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	4 credits / 120 hours
Duration of the module	3 semesters
Form of training	Full-time
Education technology	Modular
Form of organization of educational process.	Lecture, independent work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Control Forms	Pass fail exam, exam
Required resources	Personal computer, educational and methodical literature on the discipline History of Kazakhstan. A.Abdakimov History of Kazakhstan. - Almaty, 2002 ZH.B. Abylhozhin Essays on the socio-economic history of Kazakhstan XX century. - Almaty, 1997.
Language of training	Russian, Kazakh
Post-requisites	Sociology

Specification of Basic Module 6
“The use of the laws of physics and the use of information technology in professional activities”

Scope of competence	-
Title and code of the module	Using the laws of physics and the application of information technologies in professional work
Purpose of the module	After studying this module, the student will be able to use the laws of physics and apply information technologies in their professional activities.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To apply the basic laws of physics 2. To solve problems in the field of professional activity 3. To apply information technology in professional activities
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Characteristics of physical phenomena and processes, principles of operation of devices and mechanisms using the conceptual apparatus of a school physics course (values, laws, models, concepts) 2. Understanding the essence of the methods of working with information of physical content 3. Understanding the basic laws of building physics 4. Characteristics of mathematical material 5. Generalization of mathematical material 6. Understanding Mathematical Thinking 7. Understanding methods of automated information processing, network technologies for processing and transmitting information 8. Understanding interpolation: the process of collecting, transmitting, processing and updating information; programming language; programming technology; computer graphics 9. Formation of resource and information base for solving professional tasks
Prerequisites	Physics, computer science, school mathematics;
Module forming disciplines	Physics I, II

	Mathematics I, II Information and communication technology
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	4 credits / 120 hours
Duration of the module	5-6 semester
Form of training	Full-time
Education technology	modular
Form of organization of educational process.	Lecture, independent work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Control Forms	Pass fail exam
Required resources	Personal computer, educational literature on the disciplines of Physics I, II, Mathematics I, II, Information and Communication Technologies. I.P.Deshko, S.N. Kovalev, K.G. Kryazhenkov, V.A. Mordvinov, N.I.Trifonov, S.V. Tulinov, V. Tsytkin Information and Communication Technologies: A Manual, 2005. - P.147
Language of instruction	Russian, Kazakh
Post-requisites	Fundamentals of technical mechanics, Drawing.

Specification of Professional Module 1
“Maintenance of technological process of chemical products production”

Scope of competence	Control of the technological process of production of chemical products.
Name and code of the module	Conducting the technological process of production of chemical products
Purpose of the module	After studying this module, the student will be able to conduct the technological process of chemical production.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To carry out technological operations for the preparation of raw materials, reagents. 2. To perform normal operation of the section.
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Determination of types of raw materials, reagents, technology of production of chemical products and methods of its processing. 2. Justification of technological parameters and instrumentation of the chemical-technological process of a specific production 3. Carrying out technological operations for the preparation of raw materials, reagents 4. Compliance with the parameters of the technological mode, in accordance with the approved standards and instructions of the management. 5. Reading the technological scheme of the serviced site. 6. Sampling according to the schedule of analytical control to determine the quality of the substances obtained. 7. Correction of the process mode according to the flow chart and control of the air pressure of the instrumentation and the flow rate of the pumped product 8. Ensuring compliance with interdepartmental norms and State standards for products being pumped out from installation.
Prerequisites	Chemistry Physics
Modules forming the discipline	Processes and apparatuses of the chemical industry Inorganic chemistry

	Organic chemistry General chemical technology Chemical technology of inorganic substances Drawing Learning practice
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	18 credits / 540 hours
Duration of the module	3 semester
Form of training	Full-time
Education technology	Modular
Form of organization of educational process	Lecture, independent work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Control Forms	Pass fail exam, exam
Required resources	Personal computer, educational and methodical literature in the disciplines, diagrams, drawings, GOSTs, educational films, reference books literature: Shevchenko T.M., Tikhomirova A.V. Chemical technology of inorganic substances. The main production. Tutorial. - Kemerovo. KuzGTU. 2012 Melnikov E. Ya. Technology of inorganic substances and mineral fertilizers. M.: Chemistry., 1983 Sokolov R. S. Chemical technology. M.: "High School", 2000
Language of instruction	Russian, Kazakh
Post-requisites	The module is the base for the study of the course of special disciplines and the implementation of final qualifying work

Specification of Professional Module 2

“Application of the instrumentation parameters to determine whether a process release of chemical production is in compliance with the standards”

Scope of competence	Control of the technological process of production of chemical products.
Title and code of the module	Using the testimony of instrumentation to determine the compliance of the processes of production of chemical products with the standards
Purpose of the module	After studying this module, the student will be able to use the readings of the instrumentation to determine the compliance of the chemical production processes with the standards.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To read the block diagrams of measuring devices. 2. To assess metrological features of instrumentation and automation equipment. 3. To carry out the control of the technological process according to the indications of instrumentation.
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Understanding the nature and purpose of automation of production processes. 2. Possession of information on general principles of process management. 3. Classification of systems and control objects. 4. Using various measurement methods. 5. Possession of information on the appointment, installation location and functionality of primary, secondary measuring transducers. 6. Fixation of communication signals in measuring circuits. 7. Oceka metrological characteristics of devices. 8. Compliance with the norms of the technological process according to the approved regulations. 9. Readings of instrumentation. 10. Possession of information on the list of locks and alarms. 11. Performs manual adjustment of the process.

	12. Carries out the control of automatic adjustment of technological process.
Prerequisites	Chemistry Physics Mathematics
Modules forming the discipline	Basics of standardization, metrology and product quality management. Automated process control systems Processes and apparatuses of the chemical industry Chemical technology of inorganic substances Drawing Engineering and Computer Graphics
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	10 credits / 300 hours
Duration of the module	3 semester
Form of training	Full-time
Education technology	Modular
Form of organization of educational process.	Lecture, independent work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Control Forms	Pass fail exam, exam
Required resources	Personal computer, educational and methodical literature in the disciplines, diagrams, drawings, GOSTs, educational films, reference books Shkatov E. F., Shuvalov V. V. Osnovy of automation of technological processes of chemical production. - M.: Chemistry, 1988 Shuvalov V.V., Ogandzhanov G. A., Golubyatnikov V. A. Automation of production processes in the chemical industry. - M., Chemistry, 1991 Litsif I.M. Standardization, Metrology and Certification. - M.: Yurayt, 2005
Language of instruction	Russian, Kazakh
Post-requisites	The module is the base for the study of the course of special disciplines and the implementation of final qualifying work

Specification of Professional Module 3
“Compliance with safety rules of the process”

Scope of competence	Control of the technological process of production of chemical products.
Name and code of the module	Compliance with the rules of the process safety
Purpose of the module	After studying this module, the student will be able to follow the rules of safety of the process.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To know general safety issues. 2. To be aware of the issues of industrial injuries. 3. To know the safety issues at the production facility. 4. To provide first aid to the victim. 5. To assess the state of ecology of the environment at an industrial facility.
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Compliance with laws and regulations of normative-technical documentation on labor protection 2. Compliance with working hours and rest time in accordance with the Labor Code of the Republic of Kazakhstan. 3. Possession of information on the types of control and supervision of labor protection. 4. Possession of information about the occurrence of accidents and occupational diseases, dangerous and harmful production factors. 5. Possession of information about occupational diseases characteristic of workers serving technological installations. 6. Possession of information on general issues of investigation of accidents and occupational diseases, the composition of the commission, depending on the severity of the accident. 7. Assessment of the risk of work performed. 8. Use of personal protective equipment. 9. Compliance with the rules for the safe operation of equipment. 10. First aid for mechanical injuries. 11. Providing first aid for poisoning. 12. First aid for thermal burns.

	<p>13. First aid for chemical burns.</p> <p>14. Providing first medical aid in case of electric shock.</p> <p>15. Possession of information about the main sources of anthropogenic impact on the environment.</p> <p>16. Applies methods of preventing and trapping impurities.</p> <p>17. Analysis of the environmental effects of production activities.</p>
Prerequisites	<p>Chemistry</p> <p>Physics</p> <p>Mathematics</p>
Modules forming the discipline	<p>Basics of standardization, metrology and product quality management.</p> <p>Automated process control systems</p> <p>Processes and apparatuses of the chemical industry</p> <p>Chemical technology of inorganic substances</p> <p>Drawing</p> <p>Engineering and Computer Graphics</p>
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	2 credits / 60 hours
Duration of the module	3 semester
Form of training	Full-time
Education technology	Modular
Form of organization of educational process	Lecture, independent work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Control Forms	Pass fail exam, exam
Required resources	<p>Personal computer, educational and methodical literature in the disciplines, diagrams, drawings, GOSTs, educational films, reference books</p> <p>Shkatov E. F., Shuvalov V. V. Osnovy of automation of technological processes of chemical production. - M.: Chemistry, 1988</p> <p>Shuvalov V.V., Ogandzhanov G. A., Golubyatnikov V. A. Automation of production processes in the chemical industry. - M.,</p>

	Chemistry, 1991 Litsif I.M. Standardization, Metrology and Certification. - M.: Yurayt, 2005
Language of instruction	Russian, Kazakh
Post-requisites	PM 4 – PM 9

Specification of Professional Module 4

"Application of equipment in the process of producing chemical products"

Scope of competence	Monitoring the work and the state of technological equipment of chemical production
Name and code of the module	Use of equipment for the production of chemical products
The purpose of the module	After studying this module, the student will be able to use the equipment of the processes of obtaining chemical products
Level of professional qualification	4
Training outcomes by module	<ol style="list-style-type: none"> 1. To maintain the main equipment. 2. To maintain auxiliary equipment. 3. To identify the cause of the problem serviced equipment 4. To carry out operational maintenance of the equipment. 5. To prepare equipment for repair.
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Classification of the main and auxiliary equipment. 2. Possession of information about the device and the principles of operation of the main equipment. 3. Compliance with the technological parameters of the main equipment. 4. Action in case of emergency situations in accordance with the emergency response plan. 5. Possession of information about the purpose and principles of operation of pumps and compressors. 6. Implementation of the start-up and installation of pumps and compressors. 7. Possession of information on the purpose and principles of operation of heat exchange equipment 8. Monitoring the operation of heat exchangers. 9. Possession of information about possible malfunctions in the equipment, how to prevent and eliminate them 10. Implementation of visual inspection of equipment. 11. Detection of deviations of the technological mode of operation of the equipment serviced by the control sensors

	<p>12. Monitoring the state of fasteners and connections.</p> <p>13. Check the status of oil and cooling systems.</p> <p>14. Compliance with the rules of technical operation of equipment.</p> <p>15. Tightening mounts and contacts.</p> <p>16. Perform lubrication work.</p> <p>17. Performing start and stop process equipment.</p> <p>18. Disassembly, revision, repair and assembly of stop valves.</p> <p>19. Implementation of the washing and cleaning process equipment.</p> <p>20. Conducting degreasing parts and eliminating unbalance.</p> <p>21. Work on the issue and receipt of equipment from scheduled preventive maintenance.</p> <p>22. Keeping logs of technological equipment mileage.</p>
Prerequisites	<p>Chemistry</p> <p>Physics</p> <p>Mathematics</p>
Module forming disciplines	<p>Technical analysis and production control</p> <p>Inorganic / Organic Technology</p> <p>Fundamentals of production management</p>
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	4 credits / 120 hours
The duration of the module	3 semester
Form of training	Full-time
Education technology	modular
The form of organization of educational process.	Lecture, independent work, practical lessons, labs, practice
Teaching methods.	Oral interaction, testing, report, summary, creative task
Control Forms	Pass fail exam, exam
Required resources	<p>Personal computer, educational and methodical literature in the disciplines, diagrams, drawings, GOSTs, educational films, reference books</p> <p>Shkatov E. F., Shuvalov V. V. Osnovy of automation of technological processes of</p>

	<p>chemical production. - M.: Chemistry, 1988 Shuvalov V.V., Ogandzhanov G. A., Golubyatnikov V. A. Automation of production processes in the chemical industry. - M., Chemistry, 1991 Litsif I.M. Standardization, Metrology and Certification. - M.: Yurayt, 2005</p>
Language of training	Russian, Kazakh
Post-requisites	PM 5 – PM 9

Specification of Professional Module 5
“Implementation of adjustment and minor repairs of equipment”

Scope of competence	Supervision over work and a condition of processing equipment of chemical production.
Name and code of the module	Implementation of the adjustment and minor repair of equipment
Purpose of the module	After studying this module, the tutor will be able to carry out adjustment and minor repairs of equipment.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To perform locksmith work. 2. To repair pipe transport 3. To carry out repair of valves 4. To carry out the repair of technological equipment.
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Possession of information on the physical and chemical bases of the processes. 2. Sampling of raw materials, product and intermediate. 3. Presentation of production analytical control methods. 4. Logging analytical control of the process. 5. Regulation of process parameters in accordance with the testimony of laboratory research. 6. Compliance with the requirements of state standards for product quality. 7. Understanding the dependence of product quality stability on the correctness of the organization of the production control infrastructure. 8. Distinction of functions and content of input control of raw materials, acceptance control of the finished product, operational control of the process. 9. Preparation of documentation on quality management and standard methods of quality control of technological processes at production sites. 10. Characteristics of the properties of raw materials, finished products, auxiliary materials. 11. Organization of process control, product

	<p>quality and production accounting.</p> <p>12. Monitoring compliance with the requirements for raw materials, materials and finished products, the quality of technological operations.</p> <p>13. Analysis of product quality based on the properties and composition of the feedstock.</p> <p>14. The quality control of raw materials, finished product, walking process of instrumentation in accordance with the technological regulations.</p> <p>15. Identifies the causes of poor-quality product and takes measures to prevent marriage and liquidation within the framework of the quality management system.</p>
Prerequisites	<p>Technical analysis and production control Inorganic / Organic Technology Fundamentals of production management</p>
Module forming disciplines	Locksmith practice
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	14 credits/ 420 hours
The duration of the module	semester
Form of training	Full-time
Education technology	Modular
The form of organization of educational process. Teaching methods.	<p>Lecture, independent work, practical.</p> <p>Oral questioning, testing, presentation, report, message, interview, essay, creative task, colloquium. project activity, case study, term paper</p>
Control Forms	Pass fail exam, exam
Required resources	Personal computer software.
Language of training	Russian, Kazakh
Post-requisites	PM 6 – PM 9

Specification of Professional Module 6
“Ensuring quality requirements of products received”

Scope of competence	Conducting control analysis of the process of production of chemical products.
Name and code of the module	Ensuring requirements for the quality of the products
Purpose of the module	After studying this module, the tutor will be able to meet the requirements for the quality of the products.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To carry out the control of the technological process according to the results of analytical control. 2. To evaluate the quality of products. 3. To control the quality of raw materials and finished products.
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Knowing of information on the physical and chemical bases of the processes. 2. Sampling of raw materials, product and intermediate. 3. Presentation of production analytical control methods. 4. Logging analytical control of the process. 5. Regulation of process parameters in accordance with the testimony of laboratory research. 6. Compliance with the requirements of state standards for product quality. 7. Understanding the dependence of product quality stability on the correctness of the organization of the production control infrastructure. 8. Distinction of functions and content of input control of raw materials, acceptance control of the finished product, operational control of the technological process. 9. Preparation of documentation on quality management and standard methods of quality control of technological processes at production sites. 10. Characteristics of the properties of raw materials, finished products, auxiliary materials.

	<p>11. Organization of process control, product quality and production accounting.</p> <p>12. Monitoring compliance with the requirements for raw materials, materials and finished products, the quality of technological operations.</p> <p>13. Analysis of product quality based on the properties and composition of the feedstock.</p> <p>14. Quality control of raw materials, finished product, walking process of instrumentation in accordance with the technological regulations.</p> <p>15. Identification of the causes of poor-quality product and takes measures to prevent marriage and liquidation within the framework of the quality management system.</p>
Prerequisites	<p>Technical analysis and production control Inorganic / Organic Technology Fundamentals of production management</p>
Modules forming the discipline	<p>Optimization of chemical and technological processes Process control Applied Informatics (Information and Communication Technologies)</p>
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	4 credit / 120 hours
Duration of the module	semester
Form of training	Full-time
Education technology	Modular/dual
Form of organization of educational process. Teaching methods.	<p>Lecture, independent work, practical.</p> <p>Oral questioning, testing, presentation, report, report, interviews, essays, creative task, colloquium. project activity, case task, term paper</p>
Control Forms	Pass fail exam, exam
Required resources	Personal computer, software.
Language of training	Russian, Kazakh
Post-requisites	PM 6 – PM 9

Specification of Professional Module 7

“To ensure the fulfillment of plan tasks, the production of high quality products”

Scope of competence	Conducting control analyzes of the process of production of chemical products.
Title and code of the module	Ensuring the fulfillment of targets, production of high quality
Purpose of the module	After studying this module, the tutor will be able to ensure the fulfillment of planned tasks and the production of high quality products.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. Draw up a process control chart 2. Perform basic technological calculations 3. To have the skills to control and regulate the operation of technological equipment. 4. To determine the operational properties of the equipment 5 Prepare equipment for repair and monitor its work. 6. Comply with the basic provisions of the start and stop installation
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Knowing of information on the classification, technology, maintenance and operation of technological installations 2. Knowing of information on standardized indicators of the process 3. Establishing the relationship of the process mode and product quality 4. Control and regulation of parameters of technological processes. 5. Calculation of expenditure ratios 6. Drawing up the material balance of the process 7. Calculation of the heat balance of the process 8. Calculation of the size of the main equipment 9. The choice of technological equipment in accordance with the specifications. 10. Regulation of the process equipment. 11. Reading and mapping equipment 12. Drawing up instrumental schemes of technological processes. 13. Preparation of equipment for safe start-up, conclusion to the technological mode and stop.

	<p>14. Observation and reading of instrumentation.</p> <p>15. Compliance with the rules of technical operation of equipment.</p> <p>16. Possession of information on the maintenance of technical passports for equipment.</p> <p>17. Determination of depreciation of equipment.</p> <p>18. Participation in the preparation of repair plans.</p> <p>19. Monitoring compliance with the rules of start and stop the main devices.</p> <p>20. Identifying the causes of major problems in the equipment, the organization of measures to prevent and eliminate them.</p> <p>21. Starting up, putting on mode and stopping the installation.</p> <p>22. Monitoring compliance with the rules for safe operation of process equipment</p> <p>23. Possession of information on the list of devices purged with an inert gas and the parameters of the purge.</p> <p>24. Orientation in the schemes of purging devices and pipelines.</p> <p>25. The implementation of checks on the permeability and purging devices and pipelines.</p> <p>26. Monitoring of the pump sealing and cooling system.</p> <p>27. Implementation of the start and stop of the section in accordance with the approved regulations.</p> <p>28. Implementation of the withdrawal section mode.</p>
Prerequisites	Technical analysis and production control Inorganic / Organic Technology
Modules forming the discipline	Workshop on the technology of synthesis of inorganic / organic substances Research organization Fundamentals of the design of technological objects of chemical production
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	6 credits/ 180 hours
Duration of the module	semester

Form of training	Full-time
Education technology	Modular/dual
Form of organization of educational process. Teaching methods.	Lecture, independent work, practical classes. Oral interaction, testing, presentation, report, post, interviews, essays, creative task, colloquium, project work, case study, coursework.
Control Forms	Pass fail exam, exam
Required resources	Personal computer software.
Language of training	Russian, Kazakh
Post-requisites	PM 8 – PM 9

Specification of Professional Module 8
"Evaluation of the results of the production activities of the division on the basis of technical and economic indicators"

Scope of competence	Management activities in the framework of the chemical production process section
Name and code of the module	Evaluation of the results of production activities based on technical and economic indicators
Purpose of the module	After studying this module, the trainee will be able to assess the results of the division's production activities based on technical and economic indicators.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To explain the production structure of the enterprise, the organization of the production cycle 2. To determine the technical and economic indicators of production
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. Explaining the basic principles of building the economic system of the enterprise 2. Distinguishing material, pipe and financial resources of the chemical industry 3. Drawing up a diagram of the production structure of the enterprise 4. Identification of indicators of the use of basic production assets 5. Calculation of the production capacity of the installation and equipment downtime 6. Identification of savings in working capital 7. Determination of the number of industrial personnel 8. Determination of production costs
Prerequisites	<p>Workshop on the technology of synthesis of inorganic / organic substances</p> <p>Research organization</p> <p>Fundamentals of the design of technological objects of chemical production</p>
Module forming disciplines	Economy enterprises
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	9 credits / 270 hours
Duration of the module	1 semester
Form of training	Full-time

Education technology	Modular/dual
Form of organization of educational process. Teaching methods	Lecture, independent work, practical classes. Oral interaction, testing, presentation, report, post, interviews, essays, creative task, colloquium, project work, case study, coursework.
Control Forms	Pass fail exam, exam
Required resources	Personal computer, software.
Language of training	Russian, Kazakh
Post-requisites	PM 9

Specification of Professional Module 9
“Planning and organization of the work of subordinate staff on conducting of technological process and equipment maintenance”

Scope of competence	Implementation of management activities in the framework of the technological process of the production of chemical products.
Title and code of the module	Planning and organization of work of subordinate personnel in the conduct of the technological process and equipment operation
Purpose of the module	After studying this module, the trainer will be able to plan and organize the work of subordinate personnel in the conduct of the technological process and equipment operation.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To organize the work of the team and maintain professional relationships with related units 2. To ensure the implementation of the production task in terms of production and product quality 3. To perform duties of the line manager 4. To plan and organize the work of subordinate personnel in the conduct of the technological process and equipment operation
Summary of content(sections, themes)	<ol style="list-style-type: none"> 1. The use of methods and means of labor management 2. Compliance with the rules of the basics of management and marketing during the interview 3. Compliance with professional ethics and the rights of workers 4. Participation in the planning of the organization. 5. Possession of information about the fundamentals of the economy of production. 6. Collecting and using the necessary economic information 7. Compliance with the basic requirements of the organization of labor. 8. Drawing up production targets in accordance with plans and schedules. 9. Analysis of the estimate of shop expenses. 10. Preparation of an application for raw

	<p>materials, materials, equipment, maintenance of emergency and current work.</p> <p>11. Keeping technological orders journal.</p> <p>12. Keeping records of consumed raw materials, materials, fuel and energy resources.</p> <p>12. Possession of information about the work of individual business units.</p> <p>13. The management of the departments of the shop and individual workers as a backup line manager.</p> <p>14. Use of technical documentation development guidelines according to the approved list.</p> <p>15. Development and execution of regulatory documentation in accordance with the approved list.</p> <p>16. Analysis of planning documentation</p> <p>17. Collection of material on final qualifying work</p>
Prerequisites	<p>Optimization of chemical and technological processes</p> <p>Process control</p> <p>Applied Informatics (Information and Communication Technologies)</p>
Module forming disciplines	<p>Workshop on the technology of synthesis of inorganic / organic substances</p> <p>Research organization</p> <p>Fundamentals of the design of technological objects of chemical production</p>
Module type (mandatory, optional)	Mandatory
Workload (credits RK / academic hours)	15 credits/ 450 hours
Duration of the module	semester
Form of training	Full-time
Education technology	Modular/dual
Form of organization of educational process. Teaching methods.	<p>Lecture, independent work, practical classes.</p> <p>Oral interaction, testing, presentation, report, post, interviews, essays, creative task, colloquium, project work, case study, coursework.</p>
Control Forms	Pass fail exam, exam

Required resources	Personal computer, software.
Language of instruction	Russian, Kazakh
Post-requisites	PM 1 – PM 8

EDUCATIONAL PROCESS PLAN

Code and the education profile: 0800000 - Petroleum and chemical production
Specialty: 0816000 - Chemical technology and production (by type)
Qualification: 0816043 - "Technician-technologist"

Form of training: Full-time
 Standard term of training: 3 year 10 months on the basis
 of the basic secondary education

Code module	The name cycles disciplines/modules, practices	Credit Of The REPUBLIC Of KAZAKHSTAN	Credit ECTS	Exam	The amount of training time (hours)				Distribution of semester	
					TOTAL	From them:				
						Theoretical training	Practical training *	Industrial training		Individual training
GE D	General discipline	48	+	+	1448	1448			1-4	
BM	Basic modules	30			900	480	-	360	60	3-8
BM 1	Application of professional vocabulary, preparation of business papers in the field of professional activity	6	+	+	180	90	-	60	30	3-5
BM 2	Development and improvement of physical qualities	6	+	+	180	-	-	180		3-8

BM 3	Application of the foundations of social sciences for socialization and adaptation in society and the workforce	6	+		180	180	-	-	-	1-8
BM 4	Application of basic knowledge of economics in professional activities	4	+		120	60	-	60	-	5-6
BM 5	Understanding the history, role and place of Kazakhstan in the world community	4	+	+	120	120	-	-	-	3-6
BM 6	Using the laws of physics and the application of information technologies in professional work	4	+		120	30	-	60	30	3-4
PM	Professional modules on working qualifications (including industrial training and professional practice)	48	+	+	1440	360	720	270	90	3-8
PM 1	Conducting the technological process of production of chemical products	18	+	+	540	120	300	90	30	3-8
PM 2	Using the testimony of instrumentation to determine the compliance of the processes of production of chemical products with the standards	10	+	+	300	90	150	30	30	3-8
PM 3	Compliance with safety regulations	2	+	+	60	30	-	30	-	3-8
PM 4	Use of equipment for the production of chemical products	4	+	+	120	30	60	30	-	3-8
PM 5	Implementation of the adjustment and minor repair of equipment	14	+	+	420	90	210	90	30	3-8
PM	Professional modules for mid-level specialist qualifications (including in-service training and professional practice)	35	+	+	1050	330	420	210	90	3-8

PM 6	Ensuring requirements for the quality of the products	4	+	+	120	60	30	30	-	3-8
PM 7	Ensuring the fulfillment of targets, production of high quality	6	+	+	180	90	60	30	-	3-8
PM 8	Evaluation of the results of production activities based on technical and economic indicators	9	+	+	270	90	90	60	30	3-8
PM 9	Planning and organization of technological process and equipment operation	15	+	+	450	90	240	90	60	3-8
	Subtotal:	161			4838	2618	1140	840	240	
PP	Pre-diploma practice	10			300		300			8
GP	Graduation project	9			270	180			90	8
IC 1	Intermediate certification	10			300	300				1-8
FC 2	Final certification	2			60	60				8
	Total compulsory education	192			5768	3158	1440	840	330	
C	Consultation	13			400	400				1-8
O	Optional classes	14			420	420				1-8
	Total:	219			6588	3978	1440	840	330	

Note:

* Forms of control (number of coursework, examinations), study subjects (semester distribution) are approximate and may vary depending on the forms of training, the specificities of local specialties and other circumstances in accordance with the needs of employers.

* In accordance with GCEA, TVE educational institutions can modify up to 50% of the training time for mastering training material for modules, up to 50% on each module and up to 60% (up to 80% with dual training) of training and professional practice with preserving the total hours on compulsory education.