

**Ministry of Science and Higher Education of Republic of Kazakhstan
Karaganda University of the name of academician E.A. Buketov**

«APPROVED»

By the decision of the Board
NLC «Karagandy University of the name of
academician E.A. Buketov»

Protocol no. 8 from «21» 05 2024 y.
prof. N.O.Dulatbekov.

«APPROVED»

By the decision of the Board of Directors of
NLC «Karagandy University of the name of
academician E.A. Buketov»

Protocol no. 5 from «21» 06 2024 y.

EDUCATIONAL PROGRAM

7M01504 - Chemistry

Level: Master's

Karaganda
2024

APPROVAL FORM

EDUCATIONAL PROGRAM "7M015-Teacher training in natural science subjects"

«AGREED»

Principal of KSU "Specialized Boarding School named after N.Nurmakov"

Sultanov S.A.

« 17 » 2024 г.

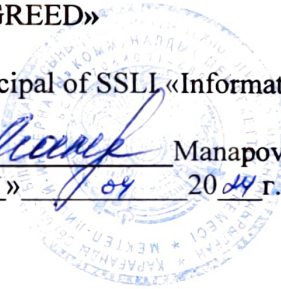


«AGREED»

Principal of SSLI «Information Technologies»

Manapova A.A.

« 18 » 2024 г.



«AGREED»

Principal of NIS of Chemistry and Biology in Karaganda city

Yakupov R.M.

2024 г.



The educational program in the direction of preparation "7M015-Chemistry" is developed on the basis of:

- Law of the Republic of Kazakhstan dated July 27, 2007 No. 319-III "On Education"
- Law of the Republic of Kazakhstan dated July 11, 1997 No. 151-I. "About languages in the Republic of Kazakhstan"
- The State compulsory standard of postgraduate education of the Republic of Kazakhstan, approved by the Order of the Ministry of Education and Science of the Republic of Kazakhstan dated July 20, 2022 No. 2
- The National Qualifications Framework dated March 16, 2016 by the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations.
- Order of the Ministry of Education and Science of the Republic of Kazakhstan "On approval of the Rules for the organization of the educational process in credit technology" dated April 20, 2011 No. 152
- Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 569 dated October 13, 2018 "On approval of the Classifier of areas of training with higher and postgraduate education"
- the Professional standard "Teacher", approved by Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 500 dated December 15, 2022.
- Professional standard for teachers (teaching staff) of the organization of higher and (or) postgraduate education, approved by Order of the Minister of Science and Higher Education of the Republic of Kazakhstan No. 591 dated November 20, 2023.

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- 1. Code and name of the educational program:** «7M01504-Chemistry»
- 2. Code and classification of the field of education, area of education:** 7M01 Pedagogical sciences, 7M015 Teacher training in natural science subjects
- 3. Group of educational programs:** «M013 Teacher training in chemistry
- 4. Volume of the credits:** 120
- 5. Education form:** full time
- 6. Language of education:** Russian
- 7. Academic degree:** Master of Education in the educational program «7M01504-Chemistry»
- 8. EP type:** Acting EP
- 9. Level on ISCE:** 7
- 10. Level on NQF:** 7
- 11. Level on SQF:** 7
- 12. EP distinctive features:**
 - University partner (JEP):
 - University partner (DDEP):
- 13. Appendix to the state license to class educational activities:** KZ83LAA00018495 No.016 from 28.07.2020
- 14. The name of the accreditation body and the validity period of the accreditation EP:** IAQAE. 28.05.2022-27.05.2027 years.
- 15. The purpose of the educational program:** Preparation of a qualified chemistry teacher with knowledge of the English language, possessing fundamental and applied knowledge, research skills for the implementation of scientific, pedagogical and professional-practical activities..
- 16. Qualification characteristics of the graduate**
 - a) List of graduate positions of the graduate.** A graduate of magistracy is awarded the degree "Master of Education" in the educational program "7M015-Chemistry". A graduate of the educational program "7M015-Chemistry" receives the following positions: "Teacher. University lecturer", researcher, "Teacher. College Teacher", "Teacher. Secondary school teacher"
Chemistry" is: educational organizations, scientific institutions. The objects of professional activity of masters in the educational program "7M015-Chemistry" are: higher education institutions, scientific institutions, secondary schools, grammar schools, lyceums, colleges, regardless of ownership and departmental subordination.
 - b) Types of professional activity of the graduate:**
 - educational (pedagogical, educative);
 - science-research;
 - organizational and managerial ("subject-subject" interaction, management in education).
 - r) Functions of the graduate's professional activity:**
 - educational;
 - educating;
 - research;
 - socio-communicative.

17. Formulation of learning outcomes based on competencies

Type of competencies	Learning outcomes code	Outcomes
Behavioral skills and personal qualities: (Soft skills)	LO1	Applies knowledge of general and theoretical chemistry, fundamental, applied mathematics and information technology to analyse and synthesize phenomena and processes.
	LO2	Possesses a system of knowledge about fundamental chemical laws and theories, the chemical essence of phenomena and processes in nature and technology.
Digital competencies: (Digital skills)	LO3	Knows the conceptual and theoretical foundations of chemistry, its place in the general system of sciences and values, the history of development and the current state
Professional competencies: (Hard skills)	LO4	Implements analytical and technological solutions in the field of experimental and theoretical chemistry.
	LO5	Knows and understands the principles of democracy, justice, honesty, respect for the personality of the student, his rights and freedoms; substantiates the modern paradigm of higher education, its content; defines the driving forces and principles of the high school education process.
	LO6	Owns the skills of organizing and conducting a chemical experiment (laboratory, demonstration, computer).
	LO7	Knows the main factors of the impact of industrial facilities and environmental monitoring.
	LO8	Applies knowledge of theoretical and experimental fundamentals of chemistry and chemistry teaching technologies, masters the methods of developing subject skills of the students, masters the techniques of generating interest in chemistry and using knowledge of chemistry in everyday life.
	LO9	Understands the values of personality, language and communication, applies the skills of cooperation, the ability to resolve conflicts; reveals the features of modern didactic concepts in higher education; demonstrates knowledge in the field of modern educational technologies; fluent in foreign languages at a level that allows effective interaction in the professional and academic environment.
	LO10	Knows the current state and development trends in the chemistry of supramolecular compounds, acyclic and cyclic conjugated systems. Basic concepts and terms of supramolecular compounds, acyclic and cyclic conjugated systems.

18. Determination of modules of disciplines in accordance with the outcomes of learning

Learning outcomes Code	Name of module	Name of discipline	Volume (ECTS)
LO1, LO2	Philosophical and historical aspects of social and humanitarian knowledge	History and philosophy of science	4
LO1, LO2		Higher school pedagogy	4
LO1, LO2		Psychology of management	4
LO1, LO2		Pedagogical practice	4
LO1, LO2	Professional Languages	Foreign language (professional)	4
LO1, LO2		Professional foreign terminology in chemistry	5
LO1, LO2		Foreign language (professional)	4
LO3, LO4	Basics of scientific research and commercialization	Commercialization of the results of scientific and technical activities	5
LO3, LO4		Organization and planning of scientific research in the field of chemical sciences	
LO3, LO4		Innovation in Chemistry	5
LO3, LO4		Current issues in chemistry	
LO5, LO6	Methodology and modern technologies of teaching chemistry	Modern methodological foundations of teaching general and inorganic chemistry	6
LO5, LO6		Modern technologies of teaching chemistry in universities	5
LO5, LO6		Methodology natural-science research	5
LO7, LO8	Actual problems of modern chemistry	Chemistry of conjugated systems	5
LO7, LO8		Chemistry of acyclic and cyclic conjugated systems	
LO7, LO8		Chemistry of supramolecular compounds	4
LO7, LO8		Supramolecular chemistry	
LO7, LO8		Polycondensation (in English)	4
LO7, LO8		Modern direction of organic chemistry (in English)	
LO7, LO8		Research practice	12
LO9, LO10		Actual problems of physical chemistry and ecology	Statistical thermodynamics (in English)
LO9, LO10	Computational methods in chemistry (in English)		
LO9, LO10	Aspects of study environmental issues (in English)		4

LO9, LO10		The circulation of substances in the ecosystem and biosphere (in English)	
LO9, LO10		Chemistry of semiconductor materials	4
LO9, LO10		Chemistry of functional materials	
	Research work	Research work of a master's student, including internship and completion of a master's thesis (NIRM)	24
	Final attestation	Preparation and defence of a master's thesis	8

19. Matrix of achievability of educational outcomes

NN	Name of discipline	Brief description of the discipline (30-40 words)	Quantity of credits	The formed educational outcomes (codes)										
				LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	
Cycle of basic disciplines University component														
D1	History and philosophy of science	It is studied with the aim of forming knowledge about the significance of scientific knowledge in its tendency to development and sociocultural profile. Questions about the philosophy, methodology of science, science as a cognitive activity and tradition are considered	4	+	+									
D2	Higher school pedagogy	Studied to form ideas about the modern paradigm of higher education and the theory of scientific activity in higher education. The issues of pedagogy, education of professionals-specialists, professional skills of teaching in educational organizations, pedagogical control and evaluation of knowledge in higher education are considered.	4	+	+									
D3	Psychology of management	It is studied with the aim of forming knowledge about the psychological laws of managerial activity, skills in analysis of socio-psychological principles, the characteristics of the psychology of management, the personal characteristics of	4	+	+									

		the leader.												
D4	Foreign language (professional)	The course is taken for developing intercultural and communicative competence in the process of foreign language education at the level of basic sufficiency of Common European competence. The course is de-signed to study vocabulary and foreign language features; formation of the ability for intercultural communication, skills of argumentation in a foreign language and understanding of linguistic and cultural characteristics of their target language country.	4	+	+									
Cycle of basic disciplines Component of choice														
D5	Professional foreign terminology in chemistry	The main objectives of this course are the study of terminology in English of the chemical direction, the possession of basic concepts and definitions, the application of practical skills in communication in English as part of teaching chemistry. The course is designed to prepare students who understand the fundamental principles, terminologies of inorganic chemical technology, and subject-language content.	5	+	+									
	Theory and practice of translation in chemistry	The primary goals of the course are to investigate linguistic characteristics of speech activity and various models of translation of chemical texts in English. This course looks at the fundamental translation techniques used in chemistry. Following completion of the course, the master's student must demonstrate their abilities to apply basic chemistry knowledge in practice while translating, solving issues, and passing future disciplines of the chemical profile in professional activity.		+	+									
D6	Commercialization of the results of scientific and technical activities	It is studied in order to form skills for the commercial application of intellectual activity results and the introduction of scientific developments and technologies into production, the preparation of scientific projects for	5			+	+							

		funding, as well as for interaction in the knowledge-intensive high-tech sector.												
	Organization and planning of scientific research in the field of chemical sciences	It is studied in order to form the stages of research work, the foundations of scientific knowledge, the accumulation and processing of scientific and technical information, the organization of work in scientific libraries and libraries of research institutes, the processing of the data obtained using modern research methods. The design of the results of scientific work, the writing of a scientific article or a brief information message is considered.				+	+							
D7	Innovation in Chemistry	It is studied in order to form the basic terms and concepts of chemical innovation, innovation in basic chemistry and petrochemistry. Innovative ideas in the field of industrial waste disposal, innovative methods in organic chemistry, innovative technologies in the synthesis of inorganic substances are considered.	5			+	+							
	Current issues in chemistry	The discipline is the basis for the study of a new approach to chemistry as a science capable of ensuring the production and consumption of chemical products in such a way as to reduce the maximum damage caused to nature at all stages of the chemical process, from energy consumption to waste disposal. The course examines the main strategic directions of modern chemistry				+	+							
Cycle of profile disciplines University component														
D8	Modern methodological foundations of teaching general and inorganic chemistry	The purpose of the formation of a system-structural approach in the teaching of general and inorganic chemistry, the principles of university didactics, research methods in the field of methods of general and inorganic chemistry are studied. The system of content and construction of university education (tasks, specialist model) is considered.	6					+	+					
D9	Modern technologies	It is studied in order to create conditions for	5					+	+					

	of teaching chemistry in universities	mastering all knowledge about pedagogical technologies. The definition of the concepts of "technology", "pedagogical technology" is being formed; - disclosure of the meaning of pedagogical technologies of traditional and new learning. Provides future teachers with the necessary knowledge and skills to work in higher educational institutions, vocational schools											
D10	Methodology natural-science research	It is studied in order to create conditions for mastering all knowledge about pedagogical technologies. The definition of the concepts of "technology", "pedagogical technology" is being formed; - disclosure of the meaning of pedagogical technologies of traditional and new learning. Provides future teachers with the necessary knowledge and skills to work in higher educational institutions, vocational schools.	5					+	+				
Cycle of profile disciplines Component of choice													
D11	Chemistry of conjugated systems	In order to form conjugate systems, the concepts of conjugations, the nature of the delocalized chemical bond of conjugate systems, types of conjugate systems, hyperconjugation, resonance rules, resonance effect, steric resonance difficulty are studied. The concept of conjugate systems containing aromatic sextet, non-aromatic sextet, antiaromatic, alternative and non-alternative hydrocarbons, etc. is being formed.	4							+	+		
	Chemistry of acyclic and cyclic conjugated systems	It is studied in order to consider acyclic and cyclic conjugated systems. The nature of the delocalized chemical bond of acyclic and cyclic conjugated systems, types of conjugated systems, resonance rules, resonance effect, steric difficulty of resonance in conjugated systems, aromaticity of cyclic conjugated systems are explained.								+	+		

D12	Chemistry of supramolecular compounds	It is studied in order to consider the current conditions and trends in the development of the chemistry of supramolecular compounds. The basic concepts and terms of supramolecular compounds are formed: "host-guest", "receptor-substrate", "chelate and macrocyclic effects", "pre-organization and complementarity", ion-ion interactions, ion-dipole interactions, hydrogen bonding, cation- π interactions, π - π stacking interactions, Van der Waals interactions, dense packaging in a solid state, hydrophobic interactions.	4								+	+			
	Supramolecular chemistry	It is studied in order to form the current state and trends in the development of supramolecular chemistry. The main types of non-covalent interactions are considered: ion-ion interactions, ion-dipole interactions, hydrogen bonding, cation- π interactions, π - π -stacking interactions, Van der Waals interactions.										+	+		
D13	Polycondensation (in English)	It is studied in order to explain the relationship between the structure of polycondensation polymers and their behavior during processing and under operating conditions. A fundamental basis is being created for further study of the basics of engineering and polymer processing. The main directions of the modern development of the chemistry of the processes of step polymerization, its use in various industries are explained	4									+	+		
	Modern direction of organic chemistry (in English)	In order to form a theoretical concept of the mechanisms of complex reactions with the use of modern research methods and equipment, the problems of synthesis of new materials used in electronics, namely liquid crystal systems, supramolecular systems in medicine, various bio-, electrochemical sensors, biologically active materials and supplements are studied.											+	+	
D14	Statistical	It is studied in order to form students'	4											+	+

	Thermodynamics (in English)	knowledge of statistical thermodynamics, the use of statistical methods in various fields of chemistry, physics and engineering. The macroscopic properties of condensed systems - solids, liquids and solutions, polymer systems, gas plasma, hydrodynamics, propagation and scattering of waves in condensed media, studies of surface phenomena are considered.												
	Computational methods in chemistry (in English)	It is studied in order to conduct quantum-chemical calculations of the electronic structure of molecules and calculate the geometric and spectral parameters of molecules and physicochemical properties of substances, such as molecular orbitals, electronic and infrared spectra, etc. Some theoretical aspects of quantum-chemical calculations are considered and examples are analyzed that allow you to quickly get used to the appropriate computational methods and programs.											+	+
D15	Aspects of study environmental issues (in English)	In order to form the main environmental problems, the chemical composition, the chemistry of the appearance of acid rain, the greenhouse effect, stratospheric and atmospheric ozone are studied. The mechanisms of the appearance of chemical and photochemical smog, problems of pollution of the world ocean, methods of cleaning the hydrosphere, atmosphere from anthropogenic pollution are considered.	4										+	+
	The circulation of substances in the ecosystem and biosphere (in English)	It is studied in order to form the concept of the circulation of substances in the ecosystem as an aspect of the existence of life on Earth, biogeochemical cycles, basic biogenic chemical elements, organic and inorganic phases of biogeochemical processes in the environment. The cycle of nitrogen, carbon and other elements,											+	+

		nitrification and denitrification, incomplete closure of cycles on the scale of geological time, the appearance of minerals are considered.												
D16	Chemistry of semiconductor materials	It is studied in order to form knowledge about semiconductor materials, general information about semiconductors; classification of semiconductors; intrinsic conductivity of semiconductors; impurity conductivity of semiconductors. The practical application of organic semiconductors, polymers with conjugated bonds, OLED and OPV technologies, technology for producing OLED displays and organic solar cells, etc. is considered.	5										+	+
	Chemistry of functional materials	It is studied in order to form knowledge about functional materials for organic electronics, general information about semiconductors; classification of semiconductors, intrinsic conductivity of semiconductors; impurity conductivity of semiconductors. Organic functional materials are considered: characteristics of individual groups of organic semiconductors; electrical conductivity of organic semiconductors; electrical conductivity of low molecular weight organic semiconductors; the mechanism of electrical conductivity.												+

20. Coordination of the planned educational outcomes with the methods of teaching and evaluation within the module

Learning outcomes	Planned learning outcomes for the module	Teaching methods	Assessment methods
LO1	Knows and understands the principles of democracy, justice, honesty, respect for the student's personality, his rights and freedoms; substantiates the modern paradigm of higher education, its content; determines the driving forces and principles of the learning process in higher education.	interactive lectures and seminars	Test, colloquium, preparation of speeches and writing of abstracts

LO2	Understands the values of personality, language and communication, applies cooperation skills, and the ability to resolve conflicts; identifies the features of modern didactic concepts in higher education; demonstrates knowledge in the field of modern educational technologies; is fluent in foreign languages at a level that allows effective interaction in professional and scientific environments.	interactive lectures and seminars, project method	Project defense, test, colloquium, report
LO3	Knows the conceptual and theoretical foundations of chemistry, its place in the general system of sciences and values, the history of development and the current state	Discussion, case methods, dispute	Presentations, essay writing
LO4	Possesses a system of knowledge about fundamental chemical laws and theories, the chemical essence of phenomena and processes in nature and technology	Practical lessons, seminars, training games	Test, program development, preparation of information on specific issues.
LO5	Applies knowledge of the theoretical and experimental foundations of chemistry and chemistry teaching technologies, knows the methods of formation of subject skills and abilities of students, knows the techniques of forming an interest in chemistry and using knowledge in chemistry in everyday life	Practical lessons, seminars, trainings, project method	Test, program development, preparation of information on specific issues, presentations
LO6	Possesses the skills of organizing and staging a chemical experiment (laboratory, demonstration, computer)	interactive lectures, practical lessons seminars, training, project	Project protection, written work
LO7	Applies knowledge of general and theoretical chemistry, fundamental, applied mathematics and information technology to analyze and synthesize phenomena and processes	Practical lessons, seminars, trainings	Project protection, written work
LO8	Knows the current state and development trends in the chemistry of supramolecular compounds, acyclic and cyclic conjugated systems. Basic concepts and terms of supramolecular compounds, acyclic and cyclic conjugated systems.	interactive lectures, seminars, experimental workshops	Test, colloquium, laboratory journals
LO9	Implements analytical and technological solutions in the field of experimental and theoretical chemistry.	practical lessons, seminars, trainings, pedagogical practice	Development of training lessons, report on pedagogical practice
LO10	Knows the main factors of the impact of industrial facilities and environmental monitoring	practical lessons, seminars, training pedagogical, practice	Written work, development of evaluation criteria for specific topics of the school course in chemistry, tests

21. Criteria for assessing the achievability of learning outcomes

LO codes	Criteria
LO1	Knows modern problems of the history and philosophy of science, current modern problems of the development of higher education, modern achievements of science and advanced technology in scientific research.
	Is able to apply the basic principles of the organization of training and education; choose and apply methods of teaching and upbringing in various pedagogical situations, and apply pedagogical technologies for conducting all forms of the educational process at the university
	Possesses an integral system of scientific knowledge about the world, the ability to navigate the basic values of being, life, and culture and the willingness to rely on them in professional activities. He has the conceptual and methodological apparatus of modern history and philosophy of science; the basics of skills for analyzing educational situations; methods for diagnosing learning and upbringing; methods for organizing and planning a scientific and pedagogical experiment.
LO2	Knows the basic phonetic, lexical and grammatical concepts of a foreign language necessary for communication, reading and translation of foreign texts of professional orientation, allowing effective interaction in the scientific environment
	Is able to review foreign literary sources, use foreign terms when preparing a scientific report, and present the results of his research orally and in writing at a professional level.
	Possesses a culture of thinking, methods of searching, analyzing and processing English-language scientific and technical information in the study and development of technological processes, and the use of new equipment.
LO3	Knows: the peculiarities of the system of legal relations in the field of intellectual property protection and the regularities of the transfer and commercialization of the results of scientific research.
	Is able to: analyze the processes taking place in the field of technological exchange, predict their possible transformations in the short and long term; collect and analyze data necessary to solve economic tasks
	Possesses: methodology of economic research; modern methods of calculation and analysis of socio-economic indicators characterizing economic processes in the field of transfer and implementation of high-tech developments; modern methods of collection, processing and analysis of scientific and technical data.
LO4	Knows: the main mechanisms of technology transfer implementation; approaches to studying the attractiveness of participation in a high-tech project for a strategic investor and technology partner; specifics of technology support at all stages of technology transfer.
	Is able to: analyze the initial data necessary for calculating economic and socio-economic indicators characterizing the state and prospects of technology market development; build theoretical and econometric models, analyze and interpret the results obtained based on the description of economic processes and phenomena;
	Possesses: skills in independent work, self-organization and organization of research activities; manages the mechanism of interaction between developers and implementers of innovative developments; applies innovative methods of managing the process of transfer and commercialization of research results
LO5	Knows: the main modern means of evaluating learning outcomes, the methodological foundations of their application; the main methods of scientific research; the modern educational model of teaching BL, including online; methods and techniques of conducting classes using elements of research work
	Is able to: effectively organize the educational process in BL format in English, including online; independently, determine

	the effectiveness and methodology of the use of learning outcomes assessment tools in structuring the educational process; apply research planning methods and data processing techniques
	Possesses: skills to apply methods of organizing work related to research and project activities of students, discussions and other problematic teaching methods; modern information and communication technologies in the educational process
LO6	Knows: basic concepts, basic laws and theoretical foundations for teaching inorganic chemistry in high school and university.
	Is able to: apply modern methods of teaching chemistry in research and professional activity
	Possesses the skills of organizing and staging a chemical experiment (laboratory, demonstration, computer)
LO7	Knows: phenomena, basic concepts, basic laws and their experimental and theoretical basis from various fields of chemistry
	Is able to: apply in research and professional activity the basic mathematical methods used for modelling and analysis of chemical processes; achievements and problems of modern chemistry
	Possesses to carry out scientific work and observations on chemical processes, to use an apparatus for collecting experimental data and to work using physico-chemical equipment
LO8	Knows: the current state and development trends in the chemistry of supramolecular compounds, acyclic and cyclic conjugated systems. Basic concepts and terms of supramolecular compounds, acyclic and cyclic conjugated systems.
	Is able to: apply in the practices of conjugated systems: resonance rules; resonant effect; steric obstruction of resonance in conjugated systems.
	Possesses to carry out scientific work and observations with main classes of organic supramolecular structures, etc.
LO9	Knows: the basic concepts of statistical thermodynamics and its place in science; the basic laws (principles) of static thermodynamics; the relationship of statistical physics with thermodynamics; conditions of thermodynamic stability of the system
	Is able to: use the mathematical apparatus of static thermodynamics; analyze the behavior of the simplest systems; use the studied methods in fluctuation phenomena
	Possesses: skills in the mathematical apparatus of thermodynamics and statistical physics; the use of knowledge for the analysis of the simplest systems
LO10	Knows: the main factors of the impact of industrial facilities and environmental monitoring
	Is able to: analyze the effects of industrial facilities and environmental monitoring
	Possesses: the skills to monitor the state of the environment

22. The graduate model of the educational program


Graduate Attributes:

- High professionalism in the field of education and chemistry.
- Emotional intelligence.
- Adaptability to global challenges.
- Leadership.
- Entrepreneurial thinking.
- Global citizenship.

- Understanding the importance of the principles and culture of academic integrity.

Types of competencies	Description of competencies
1. Behavioral skills and personal qualities (Soft skills)	Knows the principles of democracy, justice, and honesty; respect for the student's personality, rights and freedoms; makes judgments and makes decisions to achieve specific goals; Understands the values of personality, language and communication; cooperation skills, ability to resolve conflicts; is ready to be responsible for the results of his professional activity.
2. Digital competencies (Digital skills):	Conducts classes using optimal means, forms, methods and techniques of education and training, as well as modern educational technologies, including ICT, stimulating interest in knowledge and cooperation, including e-learning.
3. Professional competencies(Hard skills)	Knows the conceptual and theoretical foundations of chemistry, its place in the general system of sciences and values, the history of development and the current state; Owns a system of knowledge about fundamental chemical laws and theories, the chemical essence of phenomena and processes in nature and technology; Applies knowledge of theoretical and experimental foundations of chemistry and chemistry teaching technologies, owns methods of formation of subject skills and skills of students, knows the techniques of forming interest in chemistry and using knowledge in the field of chemistry in everyday life; Possesses the skills of organizing and staging a chemical experiment (laboratory, demonstration, computer); Applies knowledge of general and theoretical chemistry, fundamental, applied mathematics and information technology to analyze and synthesize phenomena and processes; Implements analytical and technological solutions in the field of experimental and theoretical chemistry; Owns a wide range of strategies for teaching, teaching and behavior management of students, uses a suitable learning strategy for a specific person.

Compiled by:

Candidate of chemical sciences, Associate Professor, Head of the Department  Mukusheva G.K.

Candidate of Chemical Sciences, Professor of the Department  Nurmaganbetova M.S.

PhD doctor, Assistant Professor of the Department  Sadykov T.M.

2nd year graduate student of the OP "Chemistry"  Nikash G.S.

Notes.

The educational program was reviewed by the Faculty Council from 24.04.2024. protocol No. 10

The educational program was reviewed at the meeting of the Academic Council from 29.04.2024 protocol No. 5

The educational program was reviewed and approved at a meeting of the University's Management Board from 24.05.2024. protocol No. 8

Member of the Board -Vice-Rector for Academic Affairs

Director of the Department for Academic Work

Dean of the Faculty







M.M.Umurkulova

T.M.Hasenova

M.K.Ibraev

EDUCATIONAL PROGRAM DEVELOPMENT PLAN
«7M01504-Chemistry»

The purpose of the Plan is to contribute to improving the quality of the conditions for the implementation of the educational program, taking into account the current requirements of the labor market and the achievements of modern science.

Target indicators

№	Indicators	Unit of measurement	2024 (infact)	2024-2025 (plan)	2025-2026 (plan)	2026-2027 (plan)
1	Human resources development					
1.1	Increase in the number of teachers with academic degrees	Number of people	3	1	1	1
1.2	Advanced training in the teaching profile	Number of people	3	2	2	3
1.3	Involvement of practitioners in teaching	Number of people	4	2	2	2
2	Promotion of the EP in the ratings					
2.1	IQAA	Position	2	2	1	1
2.2	IAAR	Position	4	3	2	2
2.3	Atameken	Position	3	3	2	2
3.	Development of educational and scientific-methodical literature, electronic resources					
3.1	Textbooks	Number			1	
3.2	Training manuals	Number	3	1	2	1
3.3	Methodological recommendations/instructions	Number				
3.4	Electronic textbook	Number	1		2	
3.5	Video/audio lectures	Number	2	1	1	1
4.	Development of educational and laboratory facilities	Number				
4.1	Purchase of software products	Number				1
4.2	Purchase of equipment	Number		1	1	1
5.	Updating the content of the EP					
5.1	Updating the learning outcomes and the list of	Year			+	

	disciplines taking into account the requirements of the labor market, scientific achievements, professional standards					
5.2	Introduction to the EP of academic disciplines in foreign languages*	Year	+	+	+	+
5.3	Introduction of new teaching methods	Year	+	+	+	+
5.4	Opening of joint/two-degree program on the basis of the EP	Year				

Head of the Department of Inorganic and Technical Chemistry

G.K. Mukusheva