ҚАЗАҚСТАН РЕСПУБЛИКАСЫ ҒЫЛЫМ ЖӘНЕ ЖОҒАРЫ БІЛІМ МИНИСТРЛІГІ	МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ РЕСПУБЛИКИ КАЗАХСТАН	MINISTRY OF SCIENCE AND HIGHER EDUCATION OF REPUBLIC OF KAZAKHSTAN

SOUTH KAZAKHSTAN STATE PEDAGOGICAL UNIVERSITY

ОҢТҮСТІК ҚАЗАҚСТАН МЕМЛЕКЕТТІК ПЕДАГОГИКАЛЫҚ УНИВЕРСИТЕТІ	ЮЖНО-КАЗАХСТАНСКИЙ ГОСУДАРСТВЕННЫЙ ПЕДАГОГИЧЕСКИЙ УНИВЕРСИТЕТ	SOUTH KAZAKHSTAN STATE PEDAGOGICAL UNIVERSITY
Университетінің Ғылыми кеңесінде бекітілген, Оңтүстік Қазақстан мемлекеттік педагогикалық университетінің Басқарма төрағасы-Ректор	Утверждено на Ученом совете университета, председатель Правления-Ректор Южно-Казахстанского государственного педагогического университета	Approved by the University Academic Council, Chairman of the Board- Rector of the South Kazakhstan State Pedagogical University

_____Г.Д. Сугирбаева

Хаттама № 1, «31.08» 2022ж. Протокол № 1 ,«31.08»2022 г. Protocol № 1 «31.08»2022

БІЛІМ БЕРУ БАҒДАРЛАМАСЫ
6В01504 ХИМИЯ МҰҒАЛІМІН ДАЯРЛАУ

ОБРАЗОВАТЕЛЬНАЯ ПРОГРАММА
6В01504 ПОДГОТОВКА УЧИТЕЛЯ ХИМИИ

EDUCATIONAL PROGRAM
6B01504 TEACHER TRAINING OF CHEMISTRY

Шымкент 2022

ҚР жоғары білім беруді басқарудың ортақ жүйесінде
«Қабылданды» мәртебесі «02» 11 2022 ж. берілген.
Тіркеу № 6В01500303

В единной системе управления высшим образованиием РК
присвоен статус «Одобрена» «02»11 2022 г.
Регистрационный № 6В01500303

In the Kazakhstan Republic higher education unified management system the status «Approved» was assigned «02»11 2022
Registration № 6В01500303

EDUCATIONAL PROGRAM

6B01504 TEACHER TRAINING OF CHEMISTRY

Code and Classification of the field of education:	6B01 Pedagogical Sciences
Code and classification of training course:	6B015 Teacher training in natural science subjects
Awarded degree:	Bachelor of Education in the educational program 6B01504 Teacher training of Chemistry
Type of program:	Bachelor, the 6th level NQF/ SQF / ISCE
Total amount of credits:	240 Academic credits / 240 ECTS

The educational program was reviewed at the of the Council of the faculty natural science recommended for approval by the Acagemic Council of the University.

Protocol *No* 1 «27.08» *2022*

The educational program was approved by the decision of the Academic Council of the University and put action.

Protocol *No* 1 «31.08» *2022*

Agreed:

Member of the Board-Vice-Rector for Academic Affairs _____ Kudysheva A.A.

Head of the Academic Affairs Department _____ Berdaliev D.T.

Dean of science Faculty _____ Saulembayev A.T.

Methodist chemistry
Education Department of Shymkent _____ Medetbekova M.A.

NIS, Director of Chemical and Biological
direction of Shymkent _____ Buksukbayev K. S.

NIS, Director of Physics and Mathematics
direction of Shymkent _____ Ismailova I. K.

Director of the Lyceum school No. 15
named after D.I.Mendeleev _____ Sarzhanova Zh. S.

The director of the Lyceum School No. 7
named after Spataeva _____ Almakhanovna R. A.

Director of the specialized trilingual boarding
school no.2 _____ Sauranbayev S. Zh.

Director of the communal state
institution of "general education
secondary school №4 named H. Dosmuhamedova " _____ Mankeeva D. S.

Chairman of the Public Association " Zhas Galym – zhastar " _____ Toltebay A.Zh.

The Working Group on the development of the educational program:

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Abbreviations:

NQF - National Qualifications Framework
IQF - Industry Qualifications Framework
ISCE - International Standard Classification of Education
EP - Educational Program
WC - Working curriculum
CED - Catalogue of elective disciplines
KC - Key competencies
LO - Learning Outcomes
ICT - Information and communication technologies
IC - Interim control
CC – Current control
FG - The final grade
GED - General educational disciplines
BD - Basic disciplines
SD - Specialized disciplines

CONTENT

INTRODUCTION

This educational program (hereinafter - EP) is a normative document of a conceptual nature, based on the goals and values of university education, containing general information about the professional activities of graduates, aims and objectives of OP of competence graduate model, the expected learning outcomes and policies of their evaluation of methods and methods of organization of educational process on the content of the program.

The main directions of OP:

- implementation of the educational policy of the University;
- the introduction of the trilingual education through the organization of educational process in the Kazakh, Russian and English languages;
- improving the quality of the learning process on the basis of competence approach;
- the willingness of students to educate themselves throughout their lives;
- formation of the outlook of students, develop their creativity, communication, critical thinking, research and information capabilities.

EP is the basis for the development of the following documents:

- Catalog of elective disciplines (CED);
- Academic calendar of the educational process;
- Individualized Education Plan (IEP);
- working curriculum (WC);
- Working program of educational disciplines (Syllabus);
- educational complex disciplines (ECD);
- the expected results in the disciplines of learning;
- criteria for assessing the disciplines of learning outcomes;
- documents orrganizatsii all types of professional practice, as well as other documents necessary for the educational process.

1 Passport educational program

1.1 Sphere of professional activity of the graduate

Bachelor of Education in EP "Preparation of teachers of chemistry" carries out his professional activities in the field of education.

1.2 Objects of professional activity of graduates:

- basic and specialized schools;
- specialized schools;
- the organization of technical and vocational post-secondary education.

1.3 Types of professional activity of graduates:

- training;
- bringing up;
- methodical;
- research;
- social and communicative.

1.4 Tasks of professional activity of the graduate

Educational:

- training and development of students;
- the organization of educational process in professional activities;
- design and management of the pedagogical process;
- diagnosis, correction and prediction of the results of educational activities.

Nurturing:

- the involvement of students in the system of social values;
- implementation of educational work in accordance with the laws, the laws, the principles of the educational process, educational mechanisms;
- planning extracurricular educational work;
- addressing specific educational objectives;
- the use of various forms and methods of training and education of students in extracurricular activities;
- establishment of links with groups of students, subject teachers and parents.

Guidelines:

- implementation of methodological support of the educational process;
- planning the content of education at different levels;
- identification of methods for the organization and implementation of the educational process;
- the use of new educational technologies in the learning process.

research:

- study the level of mastering the content of education, the study of the educational environment;
- study of scientific and methodical literature;
- analysis and generalization of the advanced pedagogical experience in the field of education;
- conducting of pedagogical experiment, the introduction of its results in the educational process.

Social and communicative:

- the implementation of cooperation with the professional community and all interested education stakeholders;

- the formation of a multicultural identity;

- creation of favorable conditions for education and development of students, providing them with educational support.

2 FEATURES OF THE EDUCATIONAL PROGRAM

Subdivision of higher education, "Preparation of the teacher of chemistry" was developed in accordance with the European Qualifications Framework, National Qualifications Framework, the Dublin descriptors, Industry frame of qualifications, professional teacher standards to meet the requirements of the regional labor market and employers.

OP determines goals, expected results, conditions and techniques of the educational process, the realization of quality assessment preparation graduate in this area, the contents of the working curriculum.

3 PURPOSE AND VALUES EDUCATION PROGRAM

3.1 The purpose and objectives of the educational program

The main objective of OP is defined in accordance with the objectives of the Strategic Plan and the development of the University's mission.

Purpose Educational Program: Preparation of teachers of chemistry in accordance with the requirements of the labor market and the National qualification system.

***Tasks* of the educational program**:

- formation of core competencies needed for effective implementation of the professional activities of students;
- the formation of social responsibility training based on interpersonal values and professional ethics;
- bringing the level of quality of education in line with the requirements of national and international standards on the basis of motivation of training to professional development, self-realization;
- the formation of students' professional knowledge and practical skills based on the updated content of education;
- providing training of highly educated professionals who are actively involved in the modernization of society on the basis of language trinity, functional literacy, healthy lifestyle.

3.2 Values Education Program

The core values defined in the contents of OP:

- Kazakhstan patriotism and civic responsibility;
- honesty;
- respect;
- cooperation;
- openness.

4 GRADUATE MODEL

1. Subject knowledge: has a deep and complete understanding of their subject area, applies knowledge in professional activities

2. Organizational and methodological skills: uses innovative technologies in planning, organization and management of professional activities, shows critical thinking and creativity in solving complex problems.

3. Research skills: conducts scientific and methodological work, introduces students to research work.

4. Leadership and entrepreneurial skills: able to work in a team, is active in the process of renewal of society.

5. Cultural competence: has the ability to be a cultural and tolerant citizen of his country.

6. The ability to learn throughout life: coordinating their talents and interests in accordance with the needs of society.

7. Information skills: understands the essence of the information society, uses ICT in professional activities.

5 EXPECTED RESULTS training on educational programs

Learning outcomes of EP: Upon successful completion of this OP student must:

LO1 – formulates the laws of chemistry based on meta-subject ideas in this field;

LO2 – applies theoretical knowledge in practice, based on systematic thinking and a critical approach to conclusions and proofs of chemical statements, solving problems;

LO3 – uses research methods and academic writing when conducting scientific papers in chemistry;

LO4 - organizes the educational process in accordance with the personal interests of students using ICT in the study of the discipline;

LO5 - analyzes ways to solve problems based on the use of modeling in cognitive, professional and scientific research;

LO6 - classifies innovative technologies in accordance with the goals and objectives of training and individual characteristics of students;

LO7 - plans to use technologies of criteria assessment, diagnostics, development of short-term curricula in the educational process;

LO8 - demonstrates communication skills in interpersonal communication, teamwork skills and a culture of academic integrity

LO9 - integrates interdisciplinary knowledge in the formation of personal development of students in lifelong learning;

LO10 -evaluates the creativity of solving problems arising in the practice of using technologies and inclusive education in conflict situations.

6 Learning outcomes assessment policy

The technology of criteria-based assessment is used for all types of students' educational achievements control (everyday, midterm and final). The assessment is carried out according to the letter-point system showed at the table below

Students' educational achievements point-rating and letter evaluating system, their conversion into the traditional grading scale, ECTS

Evluation by letter system	Digital equivalent	Points (% content)	Evaluation according to the traditional system
A	4,0	95-100	excellent
A-	3,67	90-94	

B+	3,33	85-89	excellent
B	3,0	80-84	
B-	2,67	75-79	
C+	2,33	70-74	
C	2,0	65-69	satisfactory
C-	1,67	60-64	
D+	1,33	55-59	
D-	1,0	50-54	
FX	0,5	25-49	unsatisfactory
F	0	0-24	

The semester long students' educational achievements evaluation is carried out 3 times during one semester every 5 weeks. In each period of the current control, the teaching staff evaluates students at practical, laboratory, seminar, SSW (SSWT/SSW) and other classes, the total score of each final week of the current control is automatically displayed in the Univer system

The final ranking score for the semester is the sum of 20% of the total sum of the three final weeks of control. It makes up 60% of the final assessment of the student, and he gains the remaining 40% on the exam.

The student will be admitted to the exam only if he scores at least 30 points (passing point 0.2 * (CC1 + CC2 + CC3) ≥ 30 points) from the current control

The result of the interm attestation is calculated by the following formula:

the current control 1 (**CC1**)≤100
the current control 2 (**CC2**))≤100
the current control 3(**CC3**)≤100
Exam (**E**))≤100

Final assessment (FA) = 0,2*(CC1+CC2+CC3)+0,4*E

Consistency of learning outcomes and assessment methods

learning outcomes	assessment methods
LO 1,2,3, 5,6,7,8,10	activity in the classroom
LO 1, 2,3,8,9,10	Essay
LO 1,3,4, 5,8,10	Group presentation
LO 1,2,3,8,9,10	Project preparation (group work)
LO 2,3,8,9,10	Individual task
LO 1,2,3, 5,6,7,8,9	Tasks for laboratory work
LO 5,6,7,8,9,10	Portfolio
LO 5,6,7,8,9,10	Practice report
LO 1-10	Intermediate final control
LO 1-10	Final attestation

7. Ways and methods of organization of educational process

Organization of educational process is carried out on credit technology based on the choice of studying the discipline, order the study subjects / modules.

Tasks of the organization of educational process:

- unification of knowledge;
- creation of conditions for maximum individualization of instruction;
- strengthening the role and effectiveness of independent work of students;
- Identification of educational achievements of students on the basis of an efficient and transparent procedures for their control.

Training opportunities on credit technology:

- the introduction of academic credits system to assess the labor costs of students and teachers in each discipline;
- student participation in the formation of the individual curriculum;
- the choice of subjects and modules in the catalog of elective courses;
- the freedom to choose teacher training;
- the choice of the educational trajectory of students with the help of advisors;
- the use of interactive teaching methods;
- academic freedom in the formation of educational programs;
- providing of training necessary teaching and learning materials;
- the use of effective methods of control of educational achievements of students;
- the use of score-rating system of evaluation of educational achievements of each discipline, and other forms of self-study.

The methods and technologies of training:

- ❖ reflexive techniques considered as a central object of study;
- ❖ competence-based approach to learning;
- ❖ role-playing games;
- ❖ educational discussions;
- ❖ Case Study;
- ❖ design methods
- ❖ gamification;
- ❖ inverted learning

The types of teaching methods and technologies used are selected by the teacher independently. Integrated training makes it possible to conduct classes with extensive use of interdisciplinary connections. An integrated approach in teaching chemistry is necessary for the formation of a holistic worldview and worldview, the unification and mutual influence of educational and research practice of students. The research practice is aimed at expanding and consolidating the theoretical and practical knowledge acquired by students in the learning process, acquiring and improving practical skills.

Tasks for the development of students' research skills:

the ability to see problems;

- the ability of skills to put forward hypotheses;
- the ability of skills to ask questions,
- the ability of skills to define concepts;
- ability to classify skills.

Types of methods and technologies of training to choose the teachers themselves.

Adaptive technologies used for students with special educational needs (OOP).

For students with special educational needs (OOP), the following forms of organization of the educational process and knowledge control are provided:

for the visually impaired, the opportunity is provided:

- the use of educational and handouts printed in enlarged font;
- use of reference notes for recording lectures.

for the deaf and hard of hearing, the opportunity is provided:

- take a comfortable seat in the audience;

- the use of visual reference schemes in lectures to facilitate the understanding of the material;

- preferential performance of educational tasks in writing;

- increasing the time for the analysis of educational material.

The main form of organization of the educational process in groups with OOP is integrated learning, i.e. all students study in mixed groups for adaptation in society. For students with special educational needs, it is planned to provide teaching aids in printed and electronic forms in agreement with the teacher leading the classes.

Students of the PLO are given the opportunity of distance learning, if their health condition worsens, having the conclusion of a medical advisory commission.

Methods for achieving learning outcomes	**Learning outcome**									
	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10
Lecture	+		+						+	
Seminar	+	+	+	+	+	+	+			
Design method	+	+	+	+	+				+	+
Case study		+	+	+		+				+
Debate	+	+	+		+		+	+	+	
Socratic method					+			+	+	+
Game technology				+	+	+	+	+		+
Training method				+	+	+	+	+		+
Gamification				+	+	+	+	+		+
Inverted learning	+	+	+	+	+				+	+

internal quality assurance system aimed at improving the quality of educational services:

- in the field of quality assurance policies;
- development and approval of programs;
- studentorientirovannoe learning, teaching and assessment;
- acceptance of students, achievement, recognition and certification;
- Teaching Staff;
- training resources and a support system of students;
- information management;
- informing the public;
- continuous monitoring and periodic assessment OP;
- periodic external quality assurance.

Professional practice

Professional practice is a required component of study the student.

In accordance with the specific OP organizes the following practices:

- training;
- language;
- teaching;
- pre-diploma.

The purpose of the training practice - the acquisition of primary professional competences, including the consolidation and deepening of theoretical knowledge acquired during the training, laying the foundations of research, paperwork and working with business correspondence, acquisition of practical skills and work skills.

Teaching practice is organized for all students, is conducted in accordance with the characteristics and direction of the OP, is considered at a meeting of the department and is reflected in the program of practice.

The purpose of language practice is an the formation of students' skills of interpretation and translation, business communication skills and networking, including native speakers.

Language practice is conducted for students engaged in training with knowledge of languages, in English and of multilingual groups.

The purpose of teaching practice - consolidation and deepening of knowledge of general scientific, cultural, psychological and pedagogical, methodical and special disciplines, as well as the formation on the basis of theoretical knowledge of pedagogical skills and competences.

Undergraduate practice carried out on senior year for students of all specialties who perform graduate work. Manual pre-diploma practical exercises supervisor of the thesis.

8 CONTENT OF THE EDUCATIONAL PROGRAM

8.1 Correspondence of the results of training in the educational program of the graduate model

The learning outcomes of the educational program are determined in accordance with the graduate model

Matrix for correlating the results of training in the EP as a whole with the graduate model

	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10
GM 1					+			+		
GM 2								+		
GM 3						+				
GM 4	+		+	+						
GM 5	+	+	+				+			+
GM 6									+	
GM 7				+	+			+		

8.2 Information about the modules

№	Module names	Module Results (ROM)	Component of the module	Brief description of the module	Cycle	Credits	Elements of the graduate model
1	**General education disciplines**	**ROM1 –** to evaluate the surrounding reality on the basis of ideological principles. **ROM2 –** show a civil position. **ROM3 –** use methods of scientific cognition. **ROM 4-** assess situations of social and professional interpersonal communication. **ROM5 –** solve problems that arise in professional communication. **ROM6 –** interpret your thoughts in oral and written speech with the help of linguistic means **ROM7 –** to use ICT in professional activities. **ROM8 –** apply methods and means of physical culture as the basis of a healthy lifestyle.	History of Kazakhstan Philosophy Socio-political knowledge: Cultural Studies, Psychology Socio-political knowledge: Sociology, Political Science Kazakh (Russian) language Foreign language Information and communication technologies (in English.language) Physical Culture 1. Methods of scientific research, 2. Fundamentals of law and anti-corruption culture, 3. Economics and fundamentals of entrepreneurship, 4. Ecology and life safety	The module is aimed at: - formation of the ideological, civil and moral positions of the future specialist; - - increasing its competitiveness on the basis of mastering information and communication technologies; - development of the ability to communicate in the state, Russian and foreign languages; - - promotion of a healthy lifestyle, self-improvement and professional success; - - mastering competencies in the field of economics and law, the basics of anti-corruption culture and the principles of academic integrity, ecology and safety of life, entrepreneurship skills, leadership, and receptivity to innovation.	ОО Д	56	1, 2, 7

2	**Pedagogical and psychological training**	**ROM1 –** choose the methodology of pedagogical analysis. **ROM2 –** summarize the results of the study. **ROM3 –** to apply psychological and pedagogical knowledge in new conditions. **ROM4 –** to use domestic and foreign experience of educational work **ROM5 –** use professional communication skills and the ability to work in a team **ROM6 –** to solve problems related to the age-specific development of students. **ROM7 –** to put into practice methods of teaching and educating children with special educational needs.	Physiological development of schoolchildren Age psychology Pedagogy and methods of educational work Special pedagogical technologies in inclusive education	The module considers: - the essence of anatomical, physiological, psychological characteristics of children and adolescents, aspects of personality formation based on the preservation and promotion of health; - actual problems of methodology, stages of development of pedagogical science, the concept of a holistic pedagogical process; - - methods, forms, means of educational work in modern pedagogy; - - specifics of the organization and design of inclusive education, psychological and pedagogical support of children with special educational needs (OOP), features of the use of information and communication technologies (ICT) in inclusive education.	БД	17	1, 2, 3, 4 7
3	**Methodical preparation**	**ROM 1 -** Uses innovative methods and technologies in the process of teaching chemistry. **ROM 2 -** is able to argue thoughts in solving professional problems in the educational process **ROM 3-**Plans training using various learning strategies**.** **ROM 4-**demonstrates the skills of conducting an experiment while teaching chemistry; **ROM 5-** is able to integrate interdisciplinary knowledge in the formation of personal development of students. **ROM 6-** uses technologies of criteria	Methods of teaching chemistry-biology Modern assessment technologies	The subject of chemistry teaching methodology, goals and objectives, principles, methods, forms and content of chemistry teaching at school, formation of concepts, substantiation of theory, problem solving training, organization and conduct of lessons and extracurricular activities, specialized and distance learning, practical application of knowledge and issues of individual sections of chemistry are considered. The ways of practical application of chemical research, analysis of conclusions, evaluation, argumentation of the place and role of chemistry in real life, integration of interdisciplinary	ПД, БД	21	2,4,5,6 ,7

		assessment, diagnostics, development of short-term curricula; **ROM 7-** uses various communication, training and evaluation strategies in training.	Innovative technologies for teaching chemistry and biology The use of computer technology in teaching chemistry	knowledge, provision of information culture are described.			
4	**Professional practice**	**ROM 1 -** Uses innovative methods and technologies in the process of teaching chemistry. **ROM 2 -** is able to argue thoughts in solving professional problems in the educational process **ROM 3-**Plans training using various learning strategies. **ROM 4 -** uses innovative technologies in accordance with the goals and objectives of training and individual characteristics of students. **ROM 5-** Plans training using various learning strategies. **ROM 6-** can think critically to solve specific problems	Educational practice Psychological and pedagogical practice Pedagogical practice Pedagogical practice Pre-graduate practice	It describes the development of lesson plans, the integration of interdisciplinary knowledge, the provision of information culture, various communication, educational and evaluation strategies in teaching, ways of applying innovative methods.	БД, ПД	25	2,4,5,6,7
5	General chemistry	**ROM 1-**demonstrates knowledge and understanding of mathematics, physics and theoretical foundations of inorganic chemistry. **ROM 2-** Determines the chemical elements in the periodic table. **ROM 3-** Uses the basic laws and theo-	Introduction to the specialty	The theoretical foundations of the future specialty, its place in society and the means of its development, the disclosure to students of the prospects of mastering the academic subject, the co-action of preparing first-year students for practice are considered.			

		ries of chemistry in practice. **ROM 4-** Analyzes the sequence of stages of an experiment in chemistry and solves problems by various methods. **ROM 5-**uses ICT, digital educational resources in teaching the discipline; **ROM 6-** uses professional communica-tion skills and the ability to work in a team.	Inorganic chemistry	The basic concepts of chemistry, stoichiometric laws, the basic principles of atomic-molecular theory, the significance of Mendeleev's periodic law at the present stage, chemical bonding, general laws of chemical processes, calculations for the preparation of solutions of various concentrations are considered. The ways of applying knowledge in practice, analyzing the solution of the problem, argumentation of the place and role of the subject in real life, ways of integrating interdisciplinary knowledge are described.	ПД	19	4, 5, 7,2,6
			Chemistry of elements				
6	Chemistry of analytical and organic compounds	**ROM1 –** demonstrates basic knowledge and understanding of chemical sciences; **ROM 2–** uses knowledge and understanding in determining the quality of substances, when detecting individual elements, ions that are part of the compound under study. **ROM3 –** has the skills to conduct quantitative and qualitative analysis, systematizes and evaluates the results obtained. **ROM4 –** uses research methods and academic writing in the field under study. **ROM 5–** collect the results of experiments and research to analyze the characteristic features of chemical processes. **ROM6 –** uses ICT, digital educational resources in teaching the discipline;	Analytical chemistry 1	Various methods and devices for the study of chemical compounds, composition, properties of ions of elements are considered; methods of scientific research of chemistry, representatives of certain classes of coordination compounds gain knowledge and ideas about the nomenclature, parameters of chemical bonds in a molecule, geometric configuration.	ПД	30	4,5,7, 2,6
			Analytical chemistry 2	The determination of the quantitative composition of solvents in chemical compounds, various components in solid samples, experimental work, titration, work on specific devices is considered. It describes the application of modern methods for the study of chemical compounds, raw materials and industrial products, the analysis of the solution of the problem, the justification of the role and place of the subject in real life, the			

				integration of interdisciplinary knowledge, ways of providing information culture.			
			Organic Chemistry 1 Organic Chemistry 2	The main classes, chemical properties of aliphatic, cyclic organic compounds, the importance of Butlerov's theory of structure, the technology of obtaining nitrogen, phosphorus, potassium with fertilizers are considered. The application of theoretical data in practice, argumentation of the role and place of chemistry in science and communication in the performance of related project work, demonstration of information culture, integration of interdisciplinary knowledge are described.			
7	Biology of plants, animals and humans	**ROM 1**-shows knowledge about the structure and vital activity of cells and organ systems in the body; **ROM 2**-has knowledge of the structure, species composition, origin of plants and animals; **ROM 3**-understands the structure and activities of the organs; **ROM 4**-analyzes questions about the current state of plants and animals**;** **ROM 5**-argues the role and importance of disciplines in science; **ROM 6**-analyzes and summarizes the results of a scientific project; **ROM 7**-integrates interdisciplinary knowledge and evaluates knowledge in the field of modern biology.	Cell Biology Zoology Botany	Structural features and vital activity of cells, diversity, phylogeny, distribution of plant and animal life, practical knowledge of the main taxa; physiological processes occurring in the plant organism, biochemical and molecular foundations of vital activity, complex functions and mechanisms of movement, vital processes of or-human humanism, the functions of a living organism, the mechanisms of their implementation, relationships, adaptation to the external environment, the emergence of personality in the process of evolution; The module is aimed at understanding the current state and problems of the megasystem of the kingdom of man, plants and animals.	ПД	15	4,5,7, 2,6

8	Physic colloidal chemistry and molecular biology	**ROM 1-** develops skills to use knowledge in a conscious way. **ROM 2-** forms the student's personal development.integrates interdisciplinary knowledge in the formation of personal development of students. **ROM 2-** uses constructive dialogue when discussing issues in the field of new achievements in the chemistry of elements, chemical ecology; **ROM 3-** performs chemical synthesis, mathematical processing of analysis results. **ROM 4-** compares the results of the study with chemical and environmental standards. **ROM 5-** analyzes the findings, applying chemical research in practice **ROM 6-** assesses the impact of various chemical processes on human life and the environment.	Physical and colloidal chemistry	The rate of chemical reaction, chemical balance, laws of thermodynamics, electrolyte solutions, electrolysis, corrosion of metals, surface phenomena in dispersion systems, theory of formation, coagulation are considered. The ways of applying knowledge in practice are described on the basis of a critical approach to the development of sound ideas of physicolloid chemistry, analysis of the solution of the problem, argumentation of the place, role of chemistry in real life, integration of interdisciplinary knowledge.	БД	12	
			Molecular biology	Molecular biology is the study of the molecular foundations of the vital activity of an organism, the main directions of research, the mechanisms of storing genetic information, their implementation and dissemination. The modern achievements of molecular biology and prospects for its development, modeling in scientific research, the use of innovative technologies, the assessment of the creativity of problem solving and the practical application of knowledge are characterized.			

9	inor 1. Chemistry teacher	**ROM 1-** defines the classification of raw materials of chemical production, methods of preparation of raw materials **ROM 2-** understands the physico-chemical basics of typical processes of chemical technology and nanotechnology **ROM 3-** reads the technological schemes of production. **ROM 4 -** defines the physico-chemical basis of the petrochemical process **ROM 5-** understands the theoretical foundations and basic terms of polymer chemistry. **ROM 6-** analyzes the methods of processing the results of the experiment. **ROM 7 -** argues the place and role of chemistry in real life. **ROM 8-** uses professional communication skills and the ability to work in a team	Solutions to typical chemical problems Biochemistry Chemical ecology	To consider the basic algorithms for solving chemical problems, knowledge of the basic laws of fundamental chemistry, scientific principles of the chemical industry, general problems of chemical technology, natural, artificial methods for obtaining transformations of chemical compounds that make up living organisms; structure, properties of biological compounds - proteins, nucleic acids, carbohydrates, lipids. Chemical ecology studies the processes that determine the composition, structure and chemical properties of the environment. Formally, it is based on knowledge of biochemistry, analytical chemistry, surface chemistry and sorption, photochemistry, catalysis, etc., simultaneously including the study of the distribution, metabolism and distribution of pollutants in environmental objects of both natural and anthropogenic nature. It also includes the study of the role of the Earth's biota in the formation of cycles of elements.	БД	18	4,5,7, 2,6
10	Minor 2. Biology Teacher	**ROM 1**-shows knowledge about the structure and vital activity of cells and organ systems in the body; **ROM 2**-has knowledge of the structure, species composition, origin of plants and animals; **ROM 3**-understands the structure and	Plant physiology Genetics	The spread of the plant and animal world, the practical significance of the main taxa; physiological processes occurring in the plant organism, biochemical and molecular foundations of vital activity, complex functions and mechanisms of movement, vital processes of the human organ, functions of			

		activities of the organs; **ROM 4-**analyzes questions about the current state of plants and animals; **ROM 5-**argues the role and importance of disciplines in science; **ROM 6-**analyzes and summarizes the results of a scientific project; **ROM 7-**integrates interdisciplinary knowledge and evaluates knowledge in the field of modern biology.	Microbiology and virology	the living organ, mechanisms of their implementation, relationships, adaptation to the external environment the emergence of personality in the process of evolution; The module is aimed at understanding the current state and problems of the megasystem of the human, plant and animal kingdom.	БД	18	4,5,7, 2,6

8.3 Information about the disciplines

Appendix 2.2

№	Name of discipline	Short description of discipline (30-50 word)	Credits	The formed educational outcomes (codes)									
				ON 1	ON 2	ON 3	ON 4	ON 5	ON 6	ON 7	ON 8	ON 9	ON 10
CYCLE OF GENERAL EDUCATION DISCIPLINES University Component / Optional component													
1	Methods of scientific research	The purpose of studying the discipline is the formation of students' skills in the structural presentation of their own ideas, the ability to work with various scientific and scientific information sources, taking into account the specifics of academic discourse. The discipline forms students' writing culture, critical thinking skills and linguistic and pragmatic compe-	5								+	+	+

		tencies, improves written language culture through the language in which it adheres, gives an idea of the principles and culture of academic integrity.				+		+					
2	Fundamentals of law and anti-corruption culture	Considered the basic concepts and links of the legal system and legislation of the Republic of Kazakhstan, state and constitutional construction, the foundations of anti-corruption culture, the principles of academic integrity											
3	Ecology and life safety	The discipline provides knowledge about the observation and prediction of changes in the state of the environment. Examines the causes of changes in natural stability, unity and structure of the natural system and measures to protect the environment. He gets acquainted with the work of the civil defense organization, the peculiarities of lesions and toxic substances. The ways of consolidating the place and role of discipline in real life, integration of interdisciplinary knowledge are described.	5			+		+			+	+	+
4	Economics and fundamentals of entrepreneurship	The basic concepts of economic and business sectors and the links between them are considered. The methods and techniques of analysis and application of legislative and conceptual documents in mastering entrepreneurial, leadership and innovative skills are described.	5			+		+			+	+	+
CYCLE OF BASIC DISCIPLINES University component													
5	Physiological development of students	On the basis of the laws of physiological development of pupils deals with the anatomical and physiological characteristics of children and adolescents, identity formation, preservation and promotion of health. Describes methods and techniques to identify and develop students' abilities, modeling in cognitive research, study of the role and place of the object in a particular life, the integration of multi-disciplinary knowledge, the way of	3						+		+	+	+

		information culture.											
6	Age psychology	In the process of teaching the discipline using various methods of psychological research, age-related features of the mental development of school-age children are identified and considered. And also methods of formation of mental properties of pupils of initial classes, teenagers and youthful age are defined.	4		+						+	+	
7	Pedagogy and methodology of educational work	The knowledge and understanding of the educational process based on metasubject ideas of pedagogical science, the use of forms, methods, means of educational work in practice are considered.	5						+	+	+	+	+
8	Special pedagogical technologies in inclusive education	It is aimed at expanding knowledge about the methods and forms, principles and factors of implementation in educational organizations in the implementation of inclusive education programs, psychological and pedagogical problems of teaching and developing students in conditions of inclusion, organizing the educational environment; designing professional development and individual educational trajectory; modern technologies for the development of OOP; features of the practical activity of the teacher in the space of inclusion.	5						+		+	+	+
9	Theoretical bases of inorganic chemistry	The basic concepts of chemistry, stoichiometric laws, the basic principles of the atomic-molecular theory, the value of the periodic law of Mendeleev at the present stage, chemical communication, general laws of chemical processes, calculations for the preparation of solutions of different concentrations. Analysis of the solution of the problem that has arisen in the chemical language, the reasoning of the role and place of the subject in real life, the way of integrating interdisciplinary knowledge.	7	+	+		+			+		+	+
10	Introduction to the specialty	The introduction to the specialty forms a system of knowledge about the general principles of the functioning of higher education, its regulatory framework, the	5	+	+		+				+	+	+

		organization of the educational process in universities, also introduces students to the theoretical foundations of the future specialty, its place in society and the means of its development, reveals to students the prospects of mastering the subject.											
11	the use of computer technology in teaching chemistry	The use of computer technologies in teaching chemistry is due to the fact that computer technologies provide inexhaustible opportunities for teaching students at a qualitatively new level. They provide ample opportunities for the development of students' personality and the realization of their abilities. Computer technologies significantly enhance the motivation of studying chemistry, increase the level of individualization of learning, intensify the learning process, etc.	5					+		+		+	+
12	Modern assesment technologies	The subject provides information on modern assessment technologies, considers the use of modern models of assessment of student performance, methods of organization of assessment systems, methods of differential assessment, basics of diagnostics, basics of school education and management, and self-assessment.	6							+	+	+	+
13	Innovative technologies for teaching chemistry	To characterize modern innovative pedagogical technologies in teaching chemistry, biology at school and their features in implementation.To show the scale of variability of innovative technologies in teaching chemistry and discuss issues of psychological barriers in innovation; To choose topics in chemistry for consideration that will be applied in the process of future pedagogical activity; to compare innovative technologies in the field of education in the Republic of Kazakhstan and developed foreign countries; analyze a variety of technology options that are the most effective and suitable in achieving the goals and objectives of the disclosed topic in chemistry.	5				+	+	+	+			+
CYCLE OF BASIC DISCIPLINES													

Component of choice													
14	Chemistry elements in the periodic table	Compounds of chemical elements of the periodic system: the charge of the nucleus, the electronic formula of the atom, valence, chemical bond, oxidation state, radius, electrostaticity, chemical properties, characteristics of change in group and period, problem solving. The article describes the application of theoretical knowledge in practice, substantiation of the role, place of chemistry in science, demonstration of professional communication in the implementation of project work, the integration of interdisciplinary knowledge.	6	+	+		+		+			+	+
15	Solving typical problems in chemistry	The school chemistry textbook deals with the methods and techniques for solving chemical problems, ways of drawing up objectives and assess their application in practice, the way the criteria for both didactic materials. Describes the practical application of theoretical knowledge in solving problems, the use of e-learning materials, communication in the implementation of project activities, information culture and integration of interdisciplinary knowledge.	6		+			+		+		+	+
16	Analytical Chemistry 1	The properties and qualitative characteristics of ions of elements of the periodic system and their chemical compounds are considered. On the basis of this knowledge, students characterize the use of modern methods of scientific research of chemical compounds, raw materials and industrial products, analysis of the problem, the argumentation of the role and place of the subject in a particular life, the integration of interdisciplinary knowledge, the development of information culture.	6		+		+	+		+		+	
17	Analytical Chemistry 2	It provides for the determination of the quantitative composition of solvents in chemical compounds, various components in solid samples, experimental work,	7										

		titration, work on specific devices . The article describes modern methods of research of chemical compounds, raw materials, industrial products, analysis of problem solving, argumentation of the role and place of the subject in a particular life, the integration of interdisciplinary knowledge, ways of providing information culture.			+		+	+		+		+	
18	Organic chemistry 1	Classification of organic compounds,Butlerov's theory of chemical structure, nomenclature, isomerism, chemical properties of different classes, reaction mechanisms, application are considered. Describe ways to apply knowledge in practice based on critical reflection of the reactionary conclusions of the analysis of the solution of the problem, argumentation of the place and role of chemistry in real life, the integration of interdisciplinary knowledge.	7			+		+		+		+	+
19	Organic chemistry 2	Considering general regularities nomenclature isomerism, transformation methods, reaction mechanisms linking structure, chemical properties of the compounds with cyclic aliphatic organic compounds. Describes ways of applying knowledge in practice, based on a critical review of reactionary conclusions, analysis, solving the problem, place the arguments and the role of chemistry in real life, the integration of interdisciplinary knowledge.	5			+		+		+		+	+
20	Mechanisms of organic reactions	This discipline is the second part of organic chemistry and examines the mechanisms of the most characteristic reactions of organic chemistry. Knowledge and understanding of the reaction mechanism allows students to predict not only the course of the process, but also the structure of the final products; successfully plan and carry out the synthesis of the target compound. The study of the discipline is the development of the basic mechanisms of organic reactions. Consid-	4			+		+		+		+	+

		eration of the main approaches and directions in the knowledge of reaction mechanisms, identification of the role of the structure of organic compounds, the effects of the environment and other factors on the direction of the reaction.											
21	Physical chemistry	Physical chemistry is the main theoretical foundation of modern chemistry, using theoretical methods of such important branches of physics as quantum mechanics, statistical physics and thermodynamics, nonlinear dynamics, field theory, etc. It includes the doctrine of the structure of matter, including: the structure of molecules, chemical thermodynamics, chemical kinetics and catalysis.	5		+	+		+					+
22	Colloidal chemistry	Surface phenomena in dispersion systems, theory of formation, coagulation are considered. The ways of applying knowledge in practice on the basis of a critical approach to develop sound ideas of colloidal chemistry, analysis of problem solving, argumentation of the place and role of chemistry in real life, integration of interdisciplinary knowledge are described.	5		+		+			+		+	+
23	Biochemistry	Biochemistry regards chemical composition of living organisms, chemical processes that support them, the structure and properties of biological compounds, chemical transformation in the body, the physicochemical basis of its activity. Describes the practical application of biochemical analysis fundamentals, the rationale for the role and place of discipline in life.	6	+	+	+					+	+	+
Cycle majors University component / elective component													
24	Methods of teaching chemistry	Subject examines the goals and objectives, principles, methods, forms and content of teaching chemistry in school, questions of formation of concepts, learning to	6				+		+	+		+	+

		solve problems, organize and conduct classes and extracurricular activities, school education, the practical application of knowledge. Describes ways to develop a lesson plan, the integration of interdisciplinary knowledge, information culture, the use of innovative methods of inclusive education.											
25	Chemical ecology	Considering the chemical circulation in the environment, pollution prevention way, the principles of "green chemistry", waste-free and low-waste technologies, a variety of organisms living in the atmosphere, the hydrosphere, soil environment, a way of preservation. Describes the practical application of chemical and environmental research, analysis, conclusions, argument place and role of chemistry in real life, the integration of interdisciplinary knowledge, the way of information culture.	6		+	+	+			+			
Minor 1. The researcher – analyst													
26	Chemistry of d- and f-elements	The characteristics d - and f-elements of the periodic system, distribution in nature, chemical properties, application. Based on the information, describes the practical application of their ideas and other knowledge in the drawing up of motivated thinking and problem solving, analysis of the solution to the problem, study the role of chemistry in real life, the integration of interdisciplinary knowledge.	6	+	+		+	+		+			
27	Chemistry of solutions	Th e characteristics d - and f-elements of the periodic system, distribution in nature, chemical properties, application. Based on the information, describes the practical application of their ideas and other knowledge in the drawing up of motivated thinking and problem solving, analysis of the solution to the problem, study the role of chemistry in real life, the integration of in-	6		+			+		+		+	

		terdisciplinary knowledge.											
Minor 2. Chemist - Technologist													
28	Applied of Chemistry	Applied Chemistry is a reflection of the needs and problems of modern society, the individual, the study of the fundamental laws of chemistry, chemical methods and chemicals in idustry, agriculture and daily life. Describes the use of modeling in cognitive research, the analysis solution of the problem, study the role of the object in a particular life, the integration of interdisciplinary knowledge, the way of information culture.	6					+	+	+		+	+
29	Chemical technology and Nanotechnology	Applied Chemistry is a reflection of the needs and problems of modern society, the individual, the study of the fundamental laws of chemistry, chemical methods and chemicals in idustry, agriculture and daily life. Describes the use of modeling in cognitive research, the analysis solution of the problem, study the role of the object in a particular life, the integration of interdisciplinary knowledge, the way of information culture.	6					+	+	+		+	+
30	Catalysis	The process of catalysis is considered, i.e. selective acceleration of one of the possible thermodynamically resolved directions of a chemical reaction under the action of a catalyst(s). Both physical and chemical laws of catalytic action are studied. Thus, without knowledge of the chemical essence (i.e., "chemistry") of catalysis, a scientifically based selection of the type and chemical composition of the catalyst is impossible.	6					+	+	+		+	+
31	Laws of chemical processes	The basic laws of chemical reactions, the thermal effect of the reaction, chemical equilibrium, reaction rate, and catalysts are studied. Modeling in cognitive-	6										

		scientific research, analysis of problem solving, substantiation of the role of the subject in concrete life, integration of interdisciplinary knowledge, ways of providing information culture are described.		+	+			+		+			

8.4 Working curriculum of the educational program