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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
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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

6B01507 ХИМИЯ-БИОЛОГИЯ
МУҒАЛІМІН ДАЯРЛАУ

ОБРАЗОВАТЕЛЬНАЯ
ПРОГРАММА

6B01507 ПОДГОТОВКА УЧИТЕЛЯ
ХИМИИ-БИОЛОГИИ

EDUCATIONAL
PROGRAM

6B01507 TEACHER TRAINING OF
CHEMISTRY-BIOLOGY

Шымкент 2022

ҚР жоғары білім беруді басқарудың ортақ жүйесінде
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В единной системе управления высшим образованием РК
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EDUCATIONAL PROGRAM

6B01507 TEACHER TRAINING OF CHEMISTRY-BIOLOGY

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 6B01507 Teacher training of Chemistry-Biology
Type of program:	Bachelor, the 6 th 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 Academic 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

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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

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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- biology" 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- biology" 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 and biology 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 and biological statements, solving problems;

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

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 equiv- alent	Points (% con- tent)	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 $0.2 * (CC1 + CC2 + CC3) \geq 30$ 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
I.O 1.2.3. 5.6.7.8.10	activity in the classroom
I.O 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)
I.O.2.3.8.9.10	Individual task
I.O 1.2.3. 5.6.7.8.9	Tasks for laboratory work
I.O 5.6.7.8.9.10	Portfolio
I.O 5.6.7.8.9.10	Practice report
I.O 1-10	Intermediate final control
I.O 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 ROMitoring 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 Сведения о модулях

№	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	<p>ROM1 – to evaluate the surrounding reality on the basis of ideological principles.</p> <p>ROM2 – show a civil position.</p> <p>ROM3 – use methods of scientific cognition.</p> <p>ROM 4- assess situations of social and professional interpersonal communication.</p> <p>ROM5 – solve problems that arise in professional communication.</p> <p>ROM6 – interpret your thoughts in oral and written speech with the help of linguistic means</p> <p>ROM7 – to use ICT in professional activities.</p> <p>ROM8 – apply methods and means of physical culture as the basis of a healthy lifestyle.</p>	<p>History of Kazakhstan</p> <p>Philosophy</p> <p>Socio-political knowledge: Cultural Studies, Psychology</p> <p>Socio-political knowledge: Sociology, Political Science</p> <p>Kazakh (Russian) language</p> <p>Foreign language</p> <p>Information and communication technologies (in English.language)</p> <p>Physical Culture</p> <p>1. Methods of scientific research,</p> <p>2. Fundamentals of law and anti-corruption culture,</p> <p>3. Economics and fundamentals of entrepreneurship,</p> <p>4. Ecology and life safety</p>	<p>The module is aimed at:</p> <ul style="list-style-type: none"> - 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	<p>ROM1 – choose the methodology of pedagogical analysis.</p> <p>ROM2 – summarize the results of the study.</p> <p>ROM3 – to apply psychological and pedagogical knowledge in new conditions.</p> <p>ROM4 – to use domestic and foreign experience of educational work</p> <p>ROM5 – use professional communication skills and the ability to work in a team</p> <p>ROM6 – to solve problems related to the age-specific development of students.</p> <p>ROM7 – to put into practice methods of teaching and educating children with special educational needs.</p>	<p>Physiological development of schoolchildren</p> <hr/> <p>Age psychology</p> <hr/> <p>Pedagogy and methods of educational work</p> <hr/> <p>Special pedagogical technologies in inclusive education</p>	<p>The module considers:</p> <ul style="list-style-type: none"> - 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	<p>ROM 1 - Uses innovative methods and technologies in the process of teaching chemistry.</p> <p>ROM 2 - is able to argue thoughts in solving professional problems in the educational process</p> <p>ROM 3-Plans training using various learning strategies.</p> <p>ROM 4-demonstrates the skills of conducting an experiment while teaching chemistry;</p> <p>ROM 5- is able to integrate interdisci-</p>	<p>Methods of teaching chemistry-biology</p> <hr/> <p>Modern assessment technologies</p> <hr/> <p>Innovative technologies for teaching chemistry and biology</p> <hr/> <p>The use of computer technology in teaching chemistry</p>	<p>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</p>	ПД, БД	21	2,4,5,6 ,7

		<p>plinary knowledge in the formation of personal development of students. ROM 6- uses technologies of criteria assessment, diagnostics, development of short-term curricula; ROM 7- uses various communication, training and evaluation strategies in training.</p>		<p>of conclusions, evaluation, argumentation of the place and role of chemistry in real life, integration of interdisciplinary knowledge, provision of information culture are described.</p>			
4	Professional practice	<p>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</p>	<p>Educational practice Psychological and pedagogical practice Pedagogical practice Pedagogical practice Pre-graduate practice</p>	<p>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.</p>	БД, ПД	25	2,4,5,6 ,7
5	General chemistry	<p>ROM 1-demonstrates knowledge and understanding of mathematics, physics and theoretical foundations of inorganic chemistry.</p>	<p>Introduction to the specialty</p>	<p>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</p>			

	<p>ROM 2- Determines the chemical elements in the periodic table.</p> <p>ROM 3- Uses the basic laws and theories of chemistry in practice.</p> <p>ROM 4- Analyzes the sequence of stages of an experiment in chemistry and solves problems by various methods.</p> <p>ROM 5-uses ICT, digital educational resources in teaching the discipline;</p> <p>ROM 6- uses professional communication skills and the ability to work in a team.</p>		academic subject, the co-action of preparing first-year students for practice are considered.	ПД	19	4, 5, 7,2,6
		Inorganic chemistry	The basic concepts of chemistry, stoichiometric laws, basic principles of atomic-molecular theory, the significance of periodic Mendeleev's 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.			
		Chemistry of elements	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.			

6	Chemistry of analytical and organic compounds	<p>ROM1 – demonstrates basic knowledge and understanding of chemical sciences;</p> <p>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.</p> <p>ROM3 – has the skills to conduct quantitative and qualitative analysis, systematizes and evaluates the results obtained.</p> <p>ROM4 – uses research methods and academic writing in the field under study.</p> <p>ROM 5– collect the results of experiments and research to analyze the characteristic features of chemical processes.</p> <p>ROM6 – uses ICT, digital educational resources in teaching the discipline;</p>	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	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				

			Organic Chemistry 2	the performance of related project work, demonstration of information culture, integration of interdisciplinary knowledge are described.			
7	Biology of plants, animals and humans	<p>ROM 1-shows knowledge about the structure and vital activity of cells and organ systems in the body;</p> <p>ROM 2-has knowledge of the structure, species composition, origin of plants and animals;</p> <p>ROM 3-understands the structure and activities of the organs;</p> <p>ROM 4-analyzes questions about the current state of plants and animals;</p> <p>ROM 5-argues the role and importance of disciplines in science;</p> <p>ROM 6-analyzes and summarizes the results of a scientific project;</p> <p>ROM 7-integrates interdisciplinary knowledge and evaluates knowledge in the field of modern biology.</p>	<p>Cell Biology</p> <p>Zoology</p> <p>Botany</p>	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	<p>ROM 1- develops skills to use knowledge in a conscious way.</p> <p>ROM 2- forms the student's personal development.integrates interdisciplinary knowledge in the formation of personal development of students.</p> <p>ROM 2- uses constructive dialogue when discussing issues in the field of new achievements in the chemistry of elements, chemical ecology;</p> <p>ROM 3- performs chemical synthesis,</p>	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	БД	12	

		<p>mathematical processing of analysis results.</p> <p>ROM 4- compares the results of the study with chemical and environmental standards.</p> <p>ROM 5- analyzes the findings, applying chemical research in practice</p> <p>ROM 6- assesses the impact of various chemical processes on human life and the environment.</p>		<p>of the place, role of chemistry in real life, integration of interdisciplinary knowledge.</p>			
			Molecular biology	<p>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.</p>			
9	inor 1. Chemistry teacher	<p>ROM 1- defines the classification of raw materials of chemical production, methods of preparation of raw materials</p> <p>ROM 2- understands the physico-chemical basics of typical processes of</p>	<p>Solutions to typical chemical problems</p>	<p>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,</p>			
			Biochemistry				

		<p>chemical technology and nanotechnology</p> <p>ROM 3- reads the technological schemes of production.</p> <p>ROM 4 - defines the physico-chemical basis of the petrochemical process</p> <p>ROM 5- understands the theoretical foundations and basic terms of polymer chemistry.</p> <p>ROM 6- analyzes the methods of processing the results of the experiment.</p> <p>ROM 7 - argues the place and role of chemistry in real life.</p> <p>ROM 8- uses professional communication skills and the ability to work in a team</p>	Chemical ecology	<p>natural, artificial methods for obtaining transformations of chemical compounds that make up living organisms; structure, properties of biological compounds - proteins, nucleic acids, carbohydrates, lipids.</p> <p>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</p>	БД	18	4,5,7, 2,6
10	Minor 2. Biology Teacher	<p>ROM 1-shows knowledge about the structure and vital activity of cells and organ systems in the body;</p> <p>ROM 2-has knowledge of the structure, species composition, origin of plants and animals;</p> <p>ROM 3-understands the structure and activities of the organs;</p> <p>ROM 4-analyzes questions about the current state of plants and animals;</p> <p>ROM 5-argues the role and importance of disciplines in science;</p> <p>ROM 6-analyzes and summarizes the</p>	<p>Plant physiology</p> <p>Genetics</p> <p>Microbiology and virology</p>	<p>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 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</p>	БД	18	4,5,7, 2,6

	psychological development of schoolchildren	development of students, issues relating to the anatomical, physiological and psychological characteristics of children and adolescents, the formation of personality, the preservation and strengthening of health are considered. It describes the methods and techniques for identifying and developing the abilities of students, strengthening the relationship between the teacher and the student, organizing work on the protection of children's health, physical culture, and labor training.												
3	Pedagogy and methods of educational work	On the basis of pedagogical science, its goals, objectives, categories, structure, methodological foundations, main stages of development, concepts of the pedagogical process, forms, methods, and means of educational work are considered. Actual problems of pedagogical science, modern concepts of education in the Republic of Kazakhstan, the educational system of the school and class, and diagnostics of educational work are described.	5							+		+	+	+
4	Special pedagogical technologies in inclusive education Special pedagogical technologies in inclusive education	The basic concepts of an inclusive education system, features of inclusive education in educational activities, modern models of psychological and pedagogical support of the educational process in an inclusive education and the ways of its implementation are considered.	5							+		+	+	+
5	Theoretical foundations 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.	9	+	+	+							+	
6	Cell Biology	The content of the discipline students characterize the basic	6	+				+				+	+	

		laws of cell structure and physiology, the formation of ideas about the system and the classification of the main tissues in the body, the reasoning of the role and place of cell biology in science and communication in the implementation of related design works culture, integration of interdisciplinary knowledge.											
7	1. Physiology of plants 2. Human and animal physiology	Includes an overview of the vital processes of the human body and its individual parts: cells, tissues, organs and functional systems. The functions of a living organism, the mechanisms for their implementation, relationships, regulation and adaptation to the external environment are considered. Ways of practical use of the knowledge gained and results of research work, arguing the role and place in science, manifestations of communication and information culture are described. Interdisciplinary knowledge integrated.	6	+	+							+	
8	New approaches to teaching and evaluating Chemistry, Biology in school	The article considers modern scientifically based content, methods, means of teaching methods, innovative technologies of teaching and assessment, and methods of creative assessment of the effectiveness of their application. Describes in the organization of training ways of criterion assessment, diagnosis, preparation of short-term lesson plans, application of feedback technologies through ICT, communication in the implementation of design work, the provision of information culture, the integration of interdisciplinary knowledge.	6						+	+	+	+	+

		theoretical knowledge in solving problems, the use of digital educational resources (DER), communication in the implementation of design works, information culture and the integration of interdisciplinary knowledge are described.											
	2. Chemistry Olympiad Tasks	In the framework of the topic addressed in school chemistry, methods, techniques for solving non-standard complicated olympiad problems, compilation methods and evaluation criteria, and ways of their use in practice as didactic materials are considered. The ways of practical application of theoretical knowledge in solving problems, the use of the DER, communication skills in the implementation of design works, information culture and the integration of interdisciplinary knowledge are described.		+	+				+			+	+
1 2	1 analytical chemistry 1	The properties and qualitative characteristics of the ions of the periodic system and their chemical compounds are considered. Based on the knowledge gained, students characterize the use of modern methods of scientific research of chemical compounds, raw materials and industrial products, analysis of problem solving, arguing the role and place of the subject in a particular life, the integration of intersubject knowledge, the development of information culture.											
	2. Experiments Inorganic Chemistry	Provides for the use of laboratory glassware, equipment, the practical application of safety rules, conducting a qualitative reaction to inorganic substances, carrying out calculations using chemical formulas and reaction equations. Describes the use of modern methods of research of chemical compounds, raw materials, industrial products, analysis of problem solving, arguing the place and role of the subject in a particular life, the integration of intersubject knowledge, the development of information culture.	6									+	+

1 3	1. analytical chemistry 2	It is envisaged to determine the quantitative composition of solvents in chemical compounds, various components in solid samples, experimental work, titration, work on specific devices. Modern methods of research of chemical compounds, raw materials, industrial products, analysis of problem solving, arguing the role and place of the subject in a particular life, the integration of interdisciplinary knowledge, ways of providing information culture are described.	6		+	+							+	+
	2. Chemistry of coordination compounds	It is envisaged to determine the quantitative composition of solvents in chemical compounds, various components in solid samples, experimental work, titration, work on specific devices. Modern methods of research of chemical compounds, raw materials, industrial products, analysis of problem solving, arguing the role and place of the subject in a particular life, the integration of interdisciplinary knowledge, ways of providing information culture are described.				+	+							+
1 4	1. Organic chemistry 1	The classification of organic compounds, the theory of the chemical structure of Butlerov, the nomenclature, isomerism, chemical properties of various classes, reaction mechanisms, and application are considered. Ways of applying knowledge in practice are described on the basis of critical thinking about reactionary conclusions, analyzing problem solving, arguing the place and role of chemistry in real life, and integrating intersubject knowledge.	6	+	+	+	+							+
	1. Chemistry of the HMC	We consider the classification of polymers, basic concepts, the role of polymers in the national economy, the properties and characteristics of macromolecules, the fundamentals of the synthesis of polymers and synthetic materials, the physical state of polymers, the thermomechanical curves of amorphous polymers, the dissolution features, polymeric hydrogels. Analysis of the synthesized compounds, the substantiation of the role and place of chemistry in real life, the path of		+	+	+	+							+

		integration of interdisciplinary knowledge.											
1 5	1. Organic Chemistry 2	It considers general patterns, nomenclature, isomerism, transformation methods, reaction mechanisms linking the structure, chemical properties of cyclic compounds with aliphatic organic compounds. Ways of applying knowledge in practice are described on the basis of critical thinking about reactionary conclusions, analyzing problem solving, arguing the place and role of chemistry in real life, and integrating intersubject knowledge.	7	+	+	+	+						+
	2. Chemistry of natural compounds	Considers natural ways and methods of artificial extraction of chemical compounds that are part of living organisms. In the development of reasonable conclusions of the reaction describes the ways of applying knowledge in practice on the basis of critical systems thinking, analysis of problem solving, argumentation of the place and role of chemistry in real life, the integration of interdisciplinary knowledge.		+	+	+	+						+
1 6	1. Biochemistry	Biochemistry determines the chemical composition of living organisms, chemical processes that provide vital functions, structure, properties of proteins, nucleic acids, carbohydrates, lipids, chemical transformation in the organism, physico-chemical basis of life. Describes the application of theoretical knowledge in practice, the analysis solution of the problem, argumentation of the role and place of chemistry in real life, the way of integration of interdisciplinary knowledge.	6	+	+	+	+						+
	2. Bioorganic chemistry	Treated protein matters, coenzymes, enzymes, vitamins, carbohydrates, nucleic acids, lipids, amino acids, sugars, nucleotides and nucleosides, structure, properties, physiological role of the most important biomolecules, metabolism. Describes the application of theoretical		+	+	+	+						+

		knowledge in practice, the analysis solution of the problem, the rationale for the role and place of chemistry in real life, the way of integration of interdisciplinary knowledge.											
1 7	1. Zoology	The subject considers the diversity of the animal world, phylogeny, organization, ecology, and the practical significance of the main taxa. The course describes the formation of a materialistic natural-scientific worldview, the current state and problems of the megasystem of the animal kingdom, the ability to apply knowledge in practice based on systematic thinking and a critical approach to analyzing knowledge and research results, the ability to demonstrate communication and information culture.	5		+	+						+	
	2. Helminthology	The discipline forms knowledge about parasitic helminths, their morphophysiological features, distribution in nature, harm and significance in the life of humans and animals. The subject is characterized by the justification of the place and role in science and communication in the performance of related project work, the demonstration of information culture, the integration of interdisciplinary knowledge.					+				+	+	
1 8	1. Botany	The structure, development, classification, distribution of plants, the meaning of nature, taxonomic categories, patterns and processes of formation in the process of personality development and evolution are considered. The article describes the current state and problems of the plant world, methods of a critical approach to the analysis of knowledge and research results, the ability to apply knowledge in practice based on system thinking, demonstrate communication and information culture.	6	+	+	+						+	
	2 Geobotany	Geobotany provides for the structure of phytocenoses, biotic relationships within them, features of the internal environment, development, history and classification of phytocenoses.			+	+		+				+	+

		Geobotany determines the ecological features, chemical composition and practical significance of the relationship of vegetation cover with the physical and geographical environment, primarily with the soil. The ways of argumentation of the place and role of the subject in a particular life, integration of interdisciplinary knowledge, demonstration of information culture are described.											
Цикл профилирующих дисциплин Вузовский компонент/Компонент по выбору													
20	Methods of teaching disciplines	Subject examines the goals and objectives, principles, methods, forms and content of teaching chemistry in school, questions of formation of concepts, learning to 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.	6							+	+	+	+
21	1. Methods of distance learning in chemistry 2. Individual methods of teaching chemistry	The main classes of inorganic compounds, the periodic system, valence, oxidation state, chemical reactions, the theory of electrolytic dissociation, chemical elements, their compounds, and ways of applying distance learning in practice are considered methodically. The task solution describes the evaluation criteria, communication skills in the implementation of project work, demonstration of information culture, and the use of innovative methods of inclusive education.	6	+	+					+	+		+
22	Molecular Biology	Molecular biology is the study of the molecular foundations of the vital activity of an organism, the main areas of research, the mechanisms of storing genetic information, their implementation and dissemination. The modern achievements of molecular	6	+	+	+						+	+

		biology and the 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.											
23	Bioinformatics	Developing a program of methods for the analysis of biological data. They are focused on obtaining knowledge about the methods of carrying out the process of automation of processing, accurate, effective examination of biological data. It describes the practical application of data in teaching bioinformatics, the justification of the role and place of biology in science, communication in the performance of related project work, the demonstration of information culture, the integration of interdisciplinary knowledge.	6		+		+					+	+
26	1. Microbiology and virology	The purpose of the course "Microbiology and Virology" is to familiarize students with the world of microorganisms and their main properties, to determine the general biological significance of achievements in the field of microbiology, to determine the relationship of microbiology with other biological fields. The ways of argumentation of the place and role of the subject in a particular life, integration of interdisciplinary knowledge, demonstration of information culture are described.	6		+		+					+	+
	2. General microbiology	The purpose of the course is to familiarize students with the world of microorganisms, their diversity, distribution, environmental impact and their main properties, to determine the general biological significance of achievements in the field of microbiology, to determine the relationship of microbiology with other biological fields. The ways of argumentation of the place and role of the subject in a particular life, integration of interdisciplinary knowledge, demonstration of information culture are described.			+		+					+	+

		scientific research, analysis of problem solving, argumentation of the place and role of chemistry in real life are described.											
	Research methods and academic letter	The purpose of studying the discipline " Methods of research in chemistry and academic letter " is to develop students ' skills of structural presentation of their own ideas, mastering ways of working 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 competence, improves written language culture through the language of which they are native speakers, and provides an idea of the principles and culture of academic honesty.	6	+	+	+	+						+

8.4 Рабочий учебный план образовательной программы