NJSC SHAKARIM UNIVERSITY OF SEMEY

EDUCATIONAL PROGRAM

6B01 - Pedagogical sciences
(Code and classifcation of the feld of education)

6B015 - Teacher training in natural science subjects
(Code and classifcation of the direction of training)

0114
(Code in the International Standard Classifcation of Education)

B012 - Chemistry teacher training
(Code and classifcation of the educational program group)

6B01509 - Chemistry-Biology
(Code and name of the educational program)

Bachelor
(Level of preparation)

Semey

Educational program

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(Code and classification of the field of education)

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Bachelor
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Semey 2023

PREFACE

Developed

The educational program 6B01509 - Chemistry-Biology in the direction of preparation 6B015 - Teacher training in natural science subjects on the basis of the State Compulsory Standards of Higher and Postgraduate Education approved by the Order of the Ministry of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No 2 (as amended by the order) was developed by the Academic Committee dated 20.02.2023 No 66).

Members of the Academic Committee	Full name	Academic degree, academic title, position	Signature
Head of the Academic Committee	Mukayev Zhandos	Dean of the Faculty of Natural Sciences and Mathematics	
Educational program manager	Ontagarova Dinar	Natural sciences are scientific subjects senior teacher of the department,candidate of pedagogic sciences	
Member of the AC	Sharipkhan Dinara	Municipal state institution "Middle School of General educationNº27",chemistry teacher	
Member of the AC	Kaliev Amangeldy	Municipal state institution "Middle School of General educationNº4",chemistry teacher	
Member of the AC	Sapakova Aigul	Natural sciences are scientific subjects senior teacher of the department,candidate of biological sciences	
Member of the AC	Argyngazieva Azhar	HB-001 group student, 3rd year	
Member of the AC	Bakytova Aida	HB-001 group student, 3rd year	

Reviewing

Full name of the reviewer	Position, place of work	Signature
Sataeva Aigul	MSI "Secondary school № 16 named after T. Amanov", director of the school	

Reviewed

At the meeting of the Quality Assurance Commission
Natural and Mathematical of the faculty
Recommended to be for approved
by the Academic Council of the University
Record No 4/1, april 4, 2023 y.
Chairman of the Commission Zheldybayeva B.S.

Agreed

Head of the education department of the city of Semey Bulabaev B.Z.

Approved at the meeting of the Academic Council of the University Protocol No. 8 "25" April 2023.

Approved

at the meeting of the Academic Council of the University
Protocol № 1 "01" of September 2023
Chairman of the Academic Council of the University Orynbekov D.R.

Content

1.Introduction

1.1.General data

The Department of Natural Sciences of the Faculty of Natural Mathematics provides training in the educational program "6B01509 Chemistry-Biology".

Bachelor`s degree programs in the educational program "6B01509 _chemistry- Biology" are conducted in full-time education on the basis of general secondary education, in distance learning – on the basis of higher education. The duration of full-time training is 4 years, distance learning-2 years.

The educational program provides for the education of a student with special educational needs in the conditions of a higher educational institution, as well as his socialization and integration into society.

1.2.Completion criteria

The main criterion for the completion of the educational process in the preparation of bachelors is the acquisition of at least 205 credits of theoretical training, as well as at least 27 credits of practice, not 8 credits for the preparation of diplomas. Total 240 credits.

1.3.Typical study duration: 4 year

2.PASSPORT OF THE EDUCATIONAL PROGRAM

2.1.EP purpose	Training a highly qualified competent teacher with interdisciplinary, practical and research, social and communication skills, focused on professional activities in the field of chemical and biological education.
2.2.Map of the training profile within the educational program	
Code and classification of the field of education	6B01 - Pedagogical sciences
Code and classification of the direction of training	6B015 - Teacher training in natural science subjects
Code in the International Standard Classification of Education	0114
Code and classification of the educational program group	B012 - Chemistry teacher training
Code and name of the educational program	6B01509 - Chemistry-Biology
2.3.Qualification characteristics of the graduate	
Degree awarded / qualification	Bachelor of education in the educational program
Name of the profession / list of positions of a specialist	□ teacher of chemistry and biology лаб laboratory assistant in educational organizations and research institutions □ the educational master должностные officials in educational organizations (Director of a general education institution, deputy directors for educational work, etc □ methodologist in educational organizations; специалист specialist in the field of pedagogical sciences; in research institutions
OQF qualification level (industry qualification framework)	6
Area of professional activity	□ research institutions; □ middle schools, and secondary professional education institutions; □ state educational management bodies; organizations of various forms of ownership that use methods of teaching chemistry in their work.
Object of professional activity	□ research institutions; □ middle schools, and secondary professional education institutions; □ state educational management bodies; organizations of various forms of ownership that use methods of teaching chemistry in their work.
Types of professional activity	□ apply modern pedagogical technologies in teaching chemistry; □ plan and carry out research work in the field of pedagogical sciences; □ conducting scientific and pedagogical activities in general education organizations; □ organizational and management; □ social and pedagogical; учебно educational.
Graduate Model	Learning outcomes for a bachelor in EP 6B01509 - "Chemistry-Biology" (6 qualification level NQF)_according to the Dublin Descriptors of the first level assume the ability to:

	1. Demonstrate socio-cultural, economic-legal, environmental knowledge, communication skills, apply information technologies, taking into account modern trends in the development of society. 2. Apply modern teaching technologies and criteria-based assessment, taking into account the individual, physiological and psychological characteristics of students. 3. Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications. 4. Apply educational resources, modern media and information technology in the educational process 5. Link educational material on all issues of the school and university programs of chemical and biological disciplines for everyday professional activities and continuing education in the magistracy. 6. To systematize the theoretical material on fundamental disciplines with independent search, analysis, and selection of the necessary information, its transformation, preservation and transmission. 7. Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, and the level organization of wildlife. 8. Present the results of experimental research work in the form of a report, scientific report, message, conclusions. 9. Integrate the main provisions, concepts and laws in the field of chemistry and related natural sciences when explaining theoretical and practical tasks. 10. Use natural science terms for professional purposes. Acquired competencies expressed in achieved learning outcomes ▯ Able to master the skills of planning and conducting a chemical experiment, synthetic and analytical methods for obtaining and studying chemicals and reactions, - Able to perform standard operations according to the proposed methods ▯ Able to master the skills of using modern equipment in conducting scientific research ▯ Able to master the system of fundamental chemical concepts ▯ Able to apply the acquired knowledge of the theoretical foundations of the fundamental sections of chemistry in the analysis of the results obtained and solving professional problems ▯ Able to receive and process the results of scientific experiments using modern computer technologies ▯ Able to present the results of research in the form of brief reports and presentations ▯ Able to master the methods of safe handling of chemical materials, taking into account their physical and chemical properties ▯ Able to apply the principles of building pedagogical activity in educational institutions

	▯ Able to plan, organize and analyze the results of their pedagogical activities Personal qualities of a graduate - ability to solve complex problems; - critical thinking; - creative thinking; - skill to work in team; - the ability to recognize their own and other people`s emotions, manage them; - the ability to form judgments and make decisions; - Negotiation; - switching from one task to another.

3.Modules and content of the educational program

Module 1. Fundamentals of social and humanitarian knowledge

Foreign language

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	26985 (3013628)
Course	1
Term	1
Credits count	5
Practical and seminar classes	45hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

The content of the discipline «Foreign language» assumes the formation of students` intercultural and communicative competencies at B1 level. The discipline is aimed at mastering the knowledge, skills and abilities that allow using a foreign language in interpersonal communication and professional activity. All types of speech activity are taught, such as reading, writing, listening and production of texts of level complexity with a certain degree of grammatical and lexical correctness.

Purpose of studying of the discipline

Formation of intercultural and communicative competence of students in the process of foreign language education at a sufficient level (A2, pan-European competence) and the level of basic sufficiency (B1, pan-European competence). Depending on the level of training, the student at the time of completion of the course reaches the B1 level of the pan-European competence if the language level of the student at the start is higher than the A2 level of the pan-European competence.

Learning Outcomes

ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites

School course

Postrequisites

Foreign language

Kazakh language

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	26986 (3013630)
Course	1
Term	1
Credits count	5
Practical and seminar classes	45hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at deepening the acquired knowledge of students in the framework of the school curriculum, as well as the use of language and speech means based on a full understanding of vocabulary and grammatical system of knowledge; the formation of socio-humanitarian worldview of students within the framework of the national idea of spiritual revival; free expression of mobile thought as a means of speech communication and in the process of communication; awareness of the national culture of the people, the ability to distinguish features of national cognition.

Purpose of studying of the discipline

Forms through phraseological units the recognition of national culture, its meaning as a linguistic unit related to spiritual culture; skills of identifying facts of national and cultural significance in the formation of Kazakh phraseology.

Learning Outcomes

ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites

School course

Postrequisites

Kazakh language

Russian language

Discipline cycle	General educational disciplines

Discipline component	Compulsory component
SubjectID	26987 (3013632)
Course	1
Term	1
Credits count	5
Practical and seminar classes	45hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline is intended for the development of the language personality of the student, who is able to carry out cognitive and communicative activities in Russian in the areas of interpersonal, social, professional, intercultural communication; for teaching students practical mastery of the Russian language in various areas of communication and various situations, mastering the specifics of functional semantic types and genres of functional styles of speech, enriching the vocabulary with special vocabulary, forming and improving the skills of monologue and dialogic speech.

Purpose of studying of the discipline
The purpose of the program is to form the socio-humanitarian worldview of students in the context of the national idea of spiritual modernization, involving the development on the basis of national consciousness and cultural code of the qualities of internationalism, tolerant attitude to world cultures and languages as translators of world-class knowledge, advanced modern technologies, the use and transfer of which can ensure the modernization of the country and personal career growth of future specialists.

Learning Outcomes
ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites
School course

Postrequisites
Russian language

Physical Culture

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	26988 (3013648)
Course	1
Term	1
Credits count	2
Practical and seminar classes	60hours
Total	60hours
Knowledge control form	Differentiated attestation

Short description of discipline
It provides for the joint cooperation of a teacher and a student in the process of physical education throughout the training in the context of the requirements for the level of mastering the discipline, preparing students for participation in mass sports competitions; forms motivational and value attitudes towards physical culture and the need for systematic physical exercises and sports; gives basic knowledge about the use of physical culture and sports in the development of vital physical qualities.

Purpose of studying of the discipline
The purpose of the program is the formation of social and personal competencies of students and the ability to purposefully use the means and methods of physical culture, ensuring the preservation, strengthening of health to prepare for professional activities; to the persistent transfer of physical exertion, neuropsychic stress and adverse factors in future work.

Learning Outcomes
ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites
School course

Postrequisites
Physical Culture

The module of socio-political knowledge (sociology, political science, cultural studies, psychology)

Discipline cycle	Basic disciplines
Discipline component	Compulsory component
SubjectID	27269 (3013720)
Course	1
Term	1
Credits count	8
Lections	30hours
Practical and seminar classes	45hours

Independent work of a student under the guidance of a teacher	55hours
Independent work of the student	110hours
Total	240hours
Knowledge control form	Examination

Short description of discipline
The module of socio-political knowledge involves the study of four scientific disciplines – sociology, political science, cultural studies, psychology, each of which has its own subject, terminology and research methods. Interactions between these scientific disciplines are carried out on the basis of the principles of information complementarity; integrativity; methodological integrity of research approaches of these disciplines; generality of the methodology of learning, result-oriented; unified system representation of the typology of learning outcomes as formed abilities.

Purpose of studying of the discipline
Formation of social and humanitarian worldview of students in the context of solving the problems of modernization of public consciousness, defined by the state program "Looking into the Future: Modernization of Public Consciousness".

Learning Outcomes
ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites
School course

Postrequisites
Philosophy

Kazakh language

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	27276 (3013631)
Course	1
Term	2
Credits count	5
Practical and seminar classes	45hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at expanding language literacy, free communication with the environment and mental and ideological skills of the student, understanding the role of language in the process of mastering world- class knowledge through the formation of a future specialist`s worldview based on national consciousness and cultural code, improving the knowledge of the state language by future specialists, increasing the scope of use of the Kazakh language by specialists.

Purpose of studying of the discipline
Ensuring high- quality mastery of the Kazakh language as a means of social, intercultural, professional communication through the formation of communicative competencies at all levels of language use.

Learning Outcomes
ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites
Kazakh language Russian language

Postrequisites
Basic and profile disciplines of the EP

Foreign language

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	27275 (3013629)
Course	1
Term	2
Credits count	5
Practical and seminar classes	45hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The content of the discipline «Foreign language» assumes the formation of students`linguo- cultural, socio- cultural, cognitive and communicative competencies at B2 level. The discipline is aimed at deep and extended study of productive and receptive language material. As a result, the student must be able to understand all types of speech activity in accordance with the requirements of B2 level and master the subject content of the discipline and speech.

Purpose of studying of the discipline
Formation of linguo- culturological, socio- cultural, cognitive and communicative competence of students in the process of foreign language education at the B2 level, pan-European competence. Depending on the level of training, the student at the time of completing the course reaches the level B2 of the pan-European competence, if the language level of the student at the start is higher than the level B1 of the pan-European competence.
Learning Outcomes
ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.
Prerequisites
Foreign language
Postrequisites
Basic and profile disciplines of the EP Information and communication technology

Bases of economics, law and ecological knowledge

Discipline cycle	General educational disciplines
Discipline component	University component
SubjectID	27280 (3013722)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The integrated discipline includes the main issues and principles in the field of fundamentals of law and anti- corruption culture, economics, entrepreneurship and leadership, ecology and life safety. Features of the use of regulatory legal acts, the ability to use the business, ethical, social, economic, entrepreneurial and environmental standards of society. Specifics of environmental-legal, economic, entrepreneurial relations, leadership qualities and principles of combating corruption.
Purpose of studying of the discipline
It consists in studying the basic patterns of the functioning of living organisms, the biosphere as a whole and the mechanisms of their sustainable development under the conditions of anthropogenic impact and emergency situations; in understanding the concept of corruption, the legitimacy of the fight against it, the content of the state penal policy; in the formation of students` basic fundamental stable knowledge on the basics of economic theory, in instilling the skills and abilities of economic thinking; in introducing students to the theory and practice of entrepreneurship, to the basics of creating their own business; in the formation of theoretical knowledge and practical skills for the development and improvement of leadership qualities.
Learning Outcomes
ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.
Prerequisites
School course
Postrequisites
Basic and profile disciplines of the EP

Russian language

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	27278 (3013633)
Course	1
Term	2
Credits count	5
Practical and seminar classes	45hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline is intended for the development of the language personality of the student, who is able to carry out cognitive and communicative activities in Russian in the areas of interpersonal, social, professional, intercultural communication; to teach the scientific style of speech as a language of specialty, the creation of secondary texts, the formation of skills for the production of oral and written speech in accordance with the communicative goal and the professional sphere of communication, instilling the skills of speech etiquette, business rhetoric.
Purpose of studying of the discipline
The purpose of the program is to form the socio-humanitarian worldview of students in the context of the national idea of spiritual modernization, involving the development on the basis of national consciousness and cultural code of the qualities of internationalism,

tolerant attitude to world cultures and languages as translators of world-class knowledge, advanced modern technologies, the use and transfer of which can ensure the modernization of the country and personal career growth of future specialists.

Learning Outcomes

ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites

Kazakh language

Postrequisites

Basic and profile disciplines of the EP

Physical Culture

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	27279 (3013649)
Course	1
Term	2
Credits count	2
Practical and seminar classes	60hours
Total	60hours
Knowledge control form	Differentiated attestation

Short description of discipline

It provides for the joint cooperation of a teacher and a student in the process of physical education throughout the training in the context of the requirements for the level of mastering the discipline, the ability to exercise control and self-control in the process of classes, gaining knowledge on health promotion, hardening and increasing the body`s resistance to the effects of adverse factors of labor activity, mastering methods of selection of physical exercises and sports.

Purpose of studying of the discipline

The purpose of the program is the formation of social and personal competencies of students and the ability to purposefully use the means and methods of physical culture, ensuring the preservation, strengthening of health to prepare for professional activities; to the persistent transfer of physical exertion, neuropsychic stress and adverse factors in future work.

Learning Outcomes

ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites

Physical Culture

Postrequisites

Physical Culture

History of Kazakhstan

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	27297 (3013716)
Course	2
Term	1
Credits count	5
Lections	30hours
Practical and seminar classes	15hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Qualification examination

Short description of discipline

The main stages of the history of Kazakhstan are studied with: nomadic statehood, Turkic civilization, the era of colonialism, the Soviet period, independence. The driving forces, trends, patterns of historical development are analyzed; problems: ethnogenesis of the Kazakh people, the formation of statehood, national liberation movements, demographic development. The skills of analyzing historical events and facts, working with historical literature are being formed.

Purpose of studying of the discipline

The purpose of the discipline is to provide objective knowledge about the main stages of the development of the history of Kazakhstan from ancient times to the present.

Learning Outcomes

ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites

School course

Postrequisites

Philosophy

Physical Culture

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	27294 (3013650)
Course	2
Term	1
Credits count	2
Practical and seminar classes	60hours
Total	60hours
Knowledge control form	Differentiated attestation

Short description of discipline

Provides for the joint cooperation of the teacher and the student in the process of physical education throughout the training in the context of the requirements for the level of mastering the discipline; increasing the level of physical fitness and developing physical qualities; mastering the technique of sports; education of discipline, collectivism, comradely mutual assistance; education of mental stability, development and improvement of basic motor qualities - endurance, strength, speed, dexterity, flexibility.

Purpose of studying of the discipline

The purpose of the program is the formation of social and personal competencies of students and the ability to purposefully use the means and methods of physical culture, ensuring the preservation, strengthening of health to prepare for professional activities; to the persistent transfer of physical exertion, neuropsychic stress and adverse factors in future work.

Learning Outcomes

ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites

Physical Culture

Postrequisites

Physical Culture

Information and communication technology

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	27324 (3013721)
Course	2
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	15hours
Laboratory works	15hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at mastering the conceptual foundations of the architecture of computer systems, operating systems and networks by students; formation of the ability to critically understand the role and signifcance of modern information and communication technologies in the era of digital globalization, new "digital" thinking, knowledge about the concepts of developing network and web applications, skills in using modern information and communication technologies in various felds of professional activity, scientifc and practical work, for self-educational and other purposes.

Purpose of studying of the discipline

Formation of the ability to critically evaluate and analyze processes, methods of searching, storing and processing information, methods of collecting and transmitting information through digital technologies.

Learning Outcomes

ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Physical Culture

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	27323 (3013651)
Course	2
Term	2

Credits count	2
Practical and seminar classes	60hours
Total	60hours
Knowledge control form	Differentiated attestation

Short description of discipline
Provides for the joint cooperation of the teacher and the student in the process of physical education throughout the training in the context of the requirements for the level of mastering the discipline; acquisition of versatile abilities and skills for the development of physical abilities, socio-cultural experience and socio-cultural values of physical culture and sports; development of communication skills, thinking, self-development, the formation of experience in the implementation of sports and recreational and training programs.

Purpose of studying of the discipline
The purpose of the program is the formation of social and personal competencies of students and the ability to purposefully use the means and methods of physical culture, ensuring the preservation, strengthening of health to prepare for professional activities; to the persistent transfer of physical exertion, neuropsychic stress and adverse factors in future work.

Learning Outcomes
ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites
Physical Culture

Postrequisites
Basic and profile disciplines of the EP

World of Abai

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27331 (3013705)
Course	2
Term	2
Credits count	3
Lections	15hours
Practical and seminar classes	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying historical facts, the philosophical and artistic foundations of the works of Abay Kunanbaev, Shakarim Kudaiberdiev, which form worldview and aesthetic values, the student`s ability to express his opinion, practical skills and perception of such human qualities as morality, honesty, artistic character. The genius of the writers of Kazakh literature and the role of M. Auezov in the study and popularization of Abai`s heritage, the significance of his works for history, literature and science are determined.

Purpose of studying of the discipline
Formation of the meaning of philosophical and ideological being, understanding of the problems raised in the works of Abai Kunanbayuly, Shakarim Kudaiberdiuly, Mukhtar Auezov and application of the acquired knowledge in the practice of everyday life.

Learning Outcomes
ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites
The module of socio-political knowledge (sociology, political science, cultural studies, psychology)

Postrequisites
Basic and profile disciplines of the EP

Philosophy

Discipline cycle	General educational disciplines
Discipline component	Compulsory component
SubjectID	27556 (3013667)
Course	3
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at developing students` openness of consciousness, understanding their own national code and self-

consciousness, spiritual modernization, competitiveness, realism and pragmatism, independent critical thinking, the cult of knowledge and education, a holistic view of philosophy as a special form of understanding the world, mastering key worldview concepts, as well as the development and strengthening of the values of tolerance, intercultural dialogue and a culture of peace.

Purpose of studying of the discipline

Formation in students of a holistic view of philosophy as a special form of knowledge of the world, its main sections, problems and methods of studying them in the context of future professional activities.

Learning Outcomes

ON 1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Prerequisites

The module of socio-political knowledge (sociology, political science, cultural studies, psychology)

Postrequisites

Basic and profile disciplines of the EP

Module 2. Psychological-pedagogical and methodological training of personnel

Introduction to the profession of teacher of chemistry and biology

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27264 (3013709)
Course	1
Term	1
Credits count	3
Lections	15hours
Practical and seminar classes	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline

This discipline develops knowledge, skills of organizing educational work and improves the pedagogical skills of students. Ensures the effective use of pedagogical approaches and methodological materials on the subject. Students form ideas about the main features of the image of a teacher of chemistry and biology, about the need for continuous education and self-education.

Purpose of studying of the discipline

Understand the goals of chemical and biological education, patterns and principles of content selection, means of form and methods for their implementation

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.

ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.

ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

School course

Postrequisites

Pedagogical practice (psychological and pedagogical)

Age psychology and physiology

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27259 (3013707)
Course	1
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

The course allows you to form an idea of human anatomy and physiology, the specifics and features of age-related development, the patterns of higher nervous activity and functional features of the human nervous system are considered. Forms students` systematic understanding of mental and physiological development in ontogenesis, the main patterns of development and neoplasms of age, the most important mental features of the emerging personality of the child on the basis of taking into account psychophysiological norms.

Purpose of studying of the discipline

Formation of students` ideas about the diversity of approaches to the development of correct, scientific knowledge, mental and physiological development of a person in ontogenesis on the most important issues of psychology and physiological development in the aspect of cultural development. To equip students with theoretical and practical knowledge that contributes to strengthening their professional psychological, pedagogical and physiological training, in- depth study of the section of psychological and physiological knowledge.

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

School course

Postrequisites

Pedagogical practice (psychological and pedagogical)

Pedagogy

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27293 (3013708)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

The content of the discipline is aimed at forming students` holistic understanding of the theoretical and methodological foundations of pedagogical science and the essence of professional pedagogical activity. Studying the course allows you to form the necessary knowledge about the content, principles, forms and methods of organizing a holistic pedagogical process in an educational environment. The study of the course forms the necessary competencies for the successful implementation of modern approaches in teaching and learning.

Purpose of studying of the discipline

Pedagogy as an academic discipline aims to form students` knowledge about the object and subject of pedagogy, its functions, categorical apparatus, methodology of science. The study of the course provides for the formation of the necessary competencies in the design and evaluation of the pedagogical process in the conditions of an educational institution.The content of the discipline topics allows you to acquire knowledge and skills in the selection and successful application of forms, means, methods of teaching and upbringing.

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Educational practice

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27287 (3013655)
Course	1
Term	2
Credits count	2
Study practics	60hours
Total	60hours
Knowledge control form	Total mark on practice

Short description of discipline

Educational practice is aimed at studying animals in natural conditions and identifying the main patterns of their ecology. Has an idea of the inseparable connection between the form and function of living organisms, makes observations of living organisms in nature and in the laboratory, demonstrates scientific concepts and research methods in modern biology, the skills of naturalistic work and environmental protection.

Purpose of studying of the discipline
The main purpose of mastering the discipline is to familiarize students with the diversity of animals and plants of various landscapes in natural conditions and to give students an idea of the basic methods of field biological research, processing and storage of materials.
Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.
Prerequisites
School course
Postrequisites
Field training practice

Inclusive education

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27307 (3013706)
Course	2
Term	1
Credits count	3
Lections	15hours
Practical and seminar classes	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline
When studying the discipline, students acquire knowledge about the principles and methodological foundations of inclusive education. Ideas are being formed about modern models of psychological and pedagogical support for children with special needs, the elimination of existing barriers in the legal support of inclusive education and the competence of organization and management in the area of inclusive practice. Get an idea about the models of psychological and pedagogical support for children with disabilities in educational institutions.
Purpose of studying of the discipline
The purpose of this discipline is to familiarize students with the basic provisions of the organization and management of inclusive processes in education; the formation of a dynamic, effective, self-improving specialist, ready for professional activity in an inclusive education, owning innovative technologies for building an educational route for all students, taking into account their individual needs and capabilities, able to provide social psychological and pedagogical support for children and their families.
Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.
Prerequisites
Age psychology and physiology
Postrequisites
Basic and profile disciplines of the EP

Pedagogical practice

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27335 (3013710)
Course	2
Term	2
Credits count	1
Pedagogical practics	30hours
Total	30hours
Knowledge control form	Total mark on practice

Short description of discipline
The content of the practice is aimed at forming an idea about the features of the organization of the educational and pedagogical process and the management system in the holistic pedagogical process of the school. The student gets acquainted with all types and areas of activity of the teacher, including the system of work of the class teacher, observation during lessons and extracurricular activities, psychological and pedagogical diagnostics of the age characteristics of the development of students, and conducts psychological and pedagogical educational work.
Purpose of studying of the discipline
The purpose of pedagogical practice is the formation of professional pedagogical competencies related to the design and implementation of the educational process of teaching in the education system, providing conditions for the social and professional

adaptation of students, mastering the norms and values of the teaching profession, gaining experience in practical pedagogical activity, becoming a professional orientation of their personality.

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

Pedagogy

Postrequisites

Pedagogical practice

Pedagogical practice (psychological and pedagogical)

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27326 (3013673)
Course	2
Term	2
Credits count	2
Study practics	60hours
Total	60hours
Knowledge control form	Total mark on practice

Short description of discipline

The content of psychological and pedagogical practice is aimed at forming an idea about the peculiarities of the organization of the educational and pedagogical process and the management system in the holistic pedagogical process of the school. The student gets acquainted with all types and directions of the teacher`s activities, including the system of work of the class teacher, observation during lessons and extracurricular activities, psychological and pedagogical diagnostics of the age characteristics of the development of students, conducts psychological and pedagogical educational work.

Purpose of studying of the discipline

The purpose of pedagogical practice is the formation of professional pedagogical competencies related to the design and implementation of the educational process of teaching in the education system, providing conditions for the social and professional adaptation of students, mastering the norms and values of the teaching profession, gaining experience in practical pedagogical activity, becoming a professional orientation of their personality

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

Pedagogy

Postrequisites

Pedagogical practice

Methodology of chemistry training

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27393 (3013690)
Course	3
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This course provides for the formation of methodological knowledge and skills of future chemistry teachers, preparation for teaching and educational work in chemistry at school. The course is designed to form competencies in the field of conceptual and theoretical foundations of the methods of teaching chemistry, applies the algorithm of pedagogical activity focused on the result of educational work.

Purpose of studying of the discipline

Obtain methodological knowledge and skills, preparation for teaching and educational work in chemistry at school

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites
Pedagogy

Postrequisites
Pedagogical practice

Methodology of biology training

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27397 (3013692)
Course	3
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Laboratory works	0hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This course provides for the formation of students` knowledge about science in the process of teaching the subject of biology, studied in the school curriculum. The course is compiled in accordance with the updated requirements of education, new innovative technologies, group work of students. Skills are assessed by students in the form of project defense, solving and writing tests, essays.

Purpose of studying of the discipline
The purpose of teaching methods of biology as an academic discipline is the development of the major problems of education and training subjects of the biological cycle to school, to familiarize students with the organizational forms of educational process, methods and methodological techniques of biology lessons.

Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites
Pedagogy

Postrequisites
Pedagogical practice

Scientific-methodical bases of teaching chemistry in small schools

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27405 (3013694)
Course	3
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Laboratory works	0hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
Students get acquainted with the peculiarities of teaching chemistry in an ungraded school. This discipline is aimed at studying the principles, tasks and forms of teaching chemistry in rural schools, the scientific foundations of the content of the chemistry course, considers the modern structure and content of the chemistry textbook.

Purpose of studying of the discipline
Acquisition of knowledge of methods, forms and means of teaching chemistry, principles of teaching and principles of building school programs in an ungraded school, methods of controlling students` knowledge.

Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and

psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites
Pedagogy

Postrequisites
Pedagogical practice

Modern approaches to education

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27581 (3013693)
Course	3
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Laboratory works	0hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This course provides a methodological substantiation of teaching methods, their system, interconnection, which are the basis in modern educational approaches. Teaching methods are an integral part of the education system and a general didactic form of studying the subject.The subject serves to provide information about the chosen educational strategy, for the possibility of choosing and analyzing teaching methods.

Purpose of studying of the discipline
Formation in the future specialist of the necessary level of knowledge about modern teaching methods, as well as skills and abilities to use knowledge in practical activities.

Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites
Pedagogy

Postrequisites
Pedagogical practice

Technologies of the updated content of education and criteria assessment

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27391 (3013660)
Course	3
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The course reveals the essence of the concepts "Assessment", "Assessment system", "Evaluation criteria", introduces the content of the new educational standard based on the competency-based approach. As part of the updated content of education, students master the methods of formative assessment, reflection and summative assessment, based on the learning objectives that affect the formation of educational and cognitive competence.

Purpose of studying of the discipline
To study the organizational and pedagogical foundations of criteria-based assessment technology.

Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific

communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

Pedagogy

Postrequisites

Basic and profile disciplines of the EP

Electronic educational resources

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27387 (3013656)
Course	3
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

When mastering this discipline, students master the possibilities and areas of application of electronic educational resources in solving professional problems. During the course, students learn modern tools and services for creating digital educational resources, educational websites and electronic courses. He also works with educational platforms, portals and websites and learns to apply the acquired knowledge in the learning process.

Purpose of studying of the discipline

The formation of systematic knowledge in the field of the methodology of using and creating electronic educational resources.

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

Information and communication technology

Postrequisites

Basic and profile disciplines of the EP

The tasks of high complexity in chemistry

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27565 (3013659)
Course	3
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

In the course of mastering the discipline, students get acquainted with the main types of problems, master the methodology for solving chemical problems of an increased level of complexity, the methodology for teaching students to solve problems of various types and levels of complexity. The study of this discipline allows you to equip students with knowledge, practical skills and abilities.

Purpose of studying of the discipline

To master modern teaching methods for solving quantitative and qualitative chemical problems of an increased level of complexity.

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

Methodology of chemistry training

Postrequisites

Pedagogical practice

Interdisciplinary communication school chemistry course

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27570 (3013662)
Course	3
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This course studies the theoretical aspects of interdisciplinary integration in modern science education, the essence and content of interdisciplinary integration. When studying the course, students develop systemic knowledge about the methodological methods for implementing interdisciplinary connections. The development of this discipline is a necessary basis for the formation of skills for researching the effectiveness of teaching chemistry on the basis of intersubject communications.

Purpose of studying of the discipline

To study the theoretical aspects of interdisciplinary integration in modern science education.

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

Methodology of chemistry training

Postrequisites

Pedagogical practice

Methods of conducting a school chemical experiment

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27567 (3013661)
Course	3
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This discipline provides for obtaining knowledge about the purpose of a chemical experiment, its varieties, the requirements for it; introduces recommendations for preparing for a chemical experiment, teaches how to make notes of chemical experiments; allows you to work out the technique of performing a chemical experiment on the main topics of the school chemistry course.

Purpose of studying of the discipline

Get knowledge about the purpose of a chemical experiment, its varieties, the requirements for it.

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

Methodology of chemistry training

Postrequisites

Pedagogical practice

Methods of solving tasks of physical chemistry

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27563 (3013658)
Course	3
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
In the course of studying the course, students perform tasks in the main sections of physical chemistry, electrochemistry, the kinetics of one-way, simple reactions and the kinetics of complex reactions. In the process of solving computational problems, students develop logical thinking, form the ability to find the relationship between various objects, phenomena, the ability to compare, analyze, generalize.

Purpose of studying of the discipline
Master the techniques and methods for solving specific problems from various areas of physical chemistry.

Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites
Methodology of chemistry training

Postrequisites
Pedagogical practice

Technique of the solution of tasks in chemistry

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27564 (3013657)
Course	3
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This course is aimed at applying the acquired knowledge of students to solve problems in grades 7-11 of the basic level and increased complexity of the school chemistry course. Methods for solving quantitative and experimental problems of varying complexity, methods and techniques for solving problems of the subject, problems of industrial and environmental content are considered.

Purpose of studying of the discipline
To teach students the methodology for solving computational problems in chemistry according to the secondary school program

Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites
Methodology of chemistry training

Postrequisites
Pedagogical practice

Pedagogical practice

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27599 (3013699)
Course	3
Term	2

Credits count	5
Pedagogical practics	150hours
Total	150hours
Knowledge control form	Total mark on practice

Short description of discipline
During practical training, students improve the skills necessary for their professional activities and competently apply them in practice. Forms the skills of using modern technologies, combines creative search and theoretical knowledge.

Purpose of studying of the discipline
To master modern technologies of education and upbringing, as well as the possibility of their implementation in school practice: innovative teaching strategies, forms, methods and means of organizing and implementing the educational process.

Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites
Basic and profile disciplines of the EP Pedagogical practice (psychological and pedagogical)

Postrequisites
Undergraduate practice Productive (pedagogical) Practice

Elective courses of Chemistry in core grades

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27572 (3013663)
Course	3
Term	2
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This course provides for obtaining knowledge about the organization of a fundamentally new form of education - elective courses, which should provide both preparation for choosing a profile in a basic school, and the process of profile education in high school.Concepts are formed about the types, tasks of elective courses, the requirements for them.When studying a course, students develop systemic knowledge about the principles of creating an educational and methodological complex of such courses.

Purpose of studying of the discipline
Get knowledge about the organization of a fundamentally new form of education - elective courses.

Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites
Methodology of chemistry training

Postrequisites
Pedagogical practice

Methods of organization of extracurricular work on the subject

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27609 (3013698)
Course	4
Term	1
Credits count	3
Lections	15hours
Practical and seminar classes	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline
This course covers the theoretical and methodological basis, content, methods, forms and types of extracurricular activities. During the study of the subject, future teachers learn the methods of organizing and conducting educational activities outside the classroom. Students are provided with practical knowledge and skills necessary for the organization of the educational process, independent and creative preparation for teaching, taking into account the national priorities of Kazakhstan and the educational potential of disciplines.
Purpose of studying of the discipline
Independent and creative preparation of students for extracurricular work in chemistry at school.
Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.
Prerequisites
Pedagogy
Postrequisites
Undergraduate practice Productive (pedagogical) Practice

Organization and forms of independent work of pupils in chemistry

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27604 (3013689)
Course	4
Term	1
Credits count	3
Lections	15hours
Practical and seminar classes	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline
This course discusses the types, forms and methods of independent work of students in the study of chemistry. Students will master the practice of organizing and conducting independent work of students at different stages of the lesson, outside of school hours. Issues related to the criteria for evaluating independent work in a group and pair work are discussed.

Purpose of studying of the discipline
To master the types of independent work during practical and laboratory, extracurricular activities.
Learning Outcomes
ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.
Prerequisites
Pedagogy
Postrequisites
Undergraduate practice

Modern technologies in chemistry teaching

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27607 (3013691)
Course	4
Term	1
Credits count	3
Lections	15hours
Practical and seminar classes	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline
This discipline is aimed at mastering the necessary knowledge in the field of didactics, teaching technology and the features of their application in the process of teaching chemistry, methods of monitoring and accounting for knowledge and skills of students. The study of the discipline also helps to support the professional development of trainee teachers, forming their research orientation towards

practice and profession.

Purpose of studying of the discipline

To study modern educational technologies and features of their application in the process of teaching chemistry.

Learning Outcomes

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
ON3 Analyze and apply pedagogical and methodological norms and documents in the field of social, professional and scientific communications.
ON4 Apply educational resources and modern media and information technology in the educational process.

Prerequisites

Pedagogy

Postrequisites

Undergraduate practice

Module 3. Chemical Knowledge

General and Inorganic Chemistry

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27284 (3013634)
Course	1
Term	2
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This course examines the theoretical foundations of chemistry, atomic and molecular science, the electronic structure of the atom; periodic law; chemical bond, main classes of inorganic compounds, fundamentals of chemical kinetics, properties of chemical elements. When studying the course, students develop systemic knowledge about the structure and properties of inorganic substances, the mechanisms of chemical reactions and the development of inorganic chemistry.

Purpose of studying of the discipline

To master the theoretical foundations of general and inorganic chemistry.

Learning Outcomes

ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Chemistry of the metals and nonmetals

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27283 (3013635)
Course	1
Term	2
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This discipline provides an in- depth presentation of individual sections of chemistry, highlighting the properties of metals and non-metals, and their compounds, new classes of chemical compounds that have a complex of very valuable physical and chemical properties. When studying the course, students develop in-depth knowledge of the theoretical provisions of general, inorganic chemistry relating to the chemistry of metals and non-metals.

Purpose of studying of the discipline

To get acquainted with the chemical classification of elements, the properties of chemical elements and their compounds.

Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
Prerequisites
School course
Postrequisites
Basic and profile disciplines of the EP

Chemistry of heavy metals

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27286 (3013636)
Course	1
Term	2
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline provides for the study of the concept of heavy metals, their properties and classification, migration and their content in the main objects of the environment. When studying the course, students form systematic knowledge about heavy metals, about natural and man-made sources of their receipt, about the factors and mechanisms of accumulation of heavy metals in environmental objects.
Purpose of studying of the discipline
To get acquainted with the chemical classification of elements, the properties of chemical elements and their compounds.
Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
Prerequisites
School course
Postrequisites
Basic and profile disciplines of the EP

Qualitative and quantitative analysis

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27303 (3013683)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This course examines the system of qualitative analysis of cations and anions and the quantitative composition of substances. Qualitative and quantitative analysis contributes to the development of a scientific approach to the study of chemical phenomena, helps to develop the ability to consider chemical phenomena in their interaction and connection.
Purpose of studying of the discipline
The study of the main sections of analytical chemistry.
Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
Prerequisites
General and Inorganic Chemistry

Postrequisites
Basic and profile disciplines of the EP

Methods for extraction and purification of the substances

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27306 (3013684)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline considers methods for isolating and purifying substances. Such methods of separation of a mixture of substances as filtration, centrifugation, precipitation, decantation, distillation, recrystallization, sublimation and sublimation, extraction, chromatography are considered. The method of electrophoresis is based on the difference in the speed of movement of particles in an electric field. When studying this course, students learn to use theoretical and practical knowledge on the methods of isolation and purification of substances for everyday professional activities and continuing education in the magistracy.

Purpose of studying of the discipline
The assimilation of knowledge in the field of physical methods in chemical research.

Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.

Prerequisites
General and Inorganic Chemistry

Postrequisites
Basic and profile disciplines of the EP

Methods of chromatographic analysis

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27305 (3013685)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline examines the basics of chromatographic analysis, principles, their types, such as gas-liquid, liquid-liquid, thin-layer and paper chromatography, as well as physical methods in chemical research. When studying the course, students systematize knowledge about the use of the basic laws and concepts of chemical disciplines in solving experimental, computational and other tasks of increased complexity for professional purposes. Master the methodology of conducting types of chromatographic analysis.

Purpose of studying of the discipline
The study of the main methods of chromatographic analysis

Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.

Prerequisites
General and Inorganic Chemistry

Postrequisites
Basic and profile disciplines of the EP

Organic chemistry

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27351 (3013681)
Course	2
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This course examines the main classes of organic substances, mutual transformations between them, the main types of mechanisms of organic reactions and methods for their establishment. The course is aimed at developing students` systemic knowledge about the properties, structure and chemical behavior and modern ideas about the nature of the chemical bond of organic compounds.

Purpose of studying of the discipline

The study of the structure and chemical properties of the main types of organic compounds, the most important areas practical use of organic compounds.

Learning Outcomes

ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.

Prerequisites

General and Inorganic Chemistry

Postrequisites

Basic and profile disciplines of the EP

Chemistry of Organoelement compounds

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27350 (3013680)
Course	2
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

In this discipline, students get acquainted with the physical and chemical properties and applied aspects of organoelement compounds. In the process of studying the discipline, students discuss the structural features of organoelement compounds, consider the mechanisms and conditions for reactions and methods of synthesis, which are of practical value to organoelement compounds.

Purpose of studying of the discipline

Study of the electronic structure, properties, mechanism of reactions of organoelement compounds

Learning Outcomes

ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.

Prerequisites

General and Inorganic Chemistry

Postrequisites

Basic and profile disciplines of the EP

Chemistry of natural compounds

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27354 (3013682)

Course	2
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This course covers the basic chemistry of carbohydrates, lipids, porphyrins, vitamins and antibiotics, which are the main components of living cells, methods for their synthesis and analysis
In the course of studying the discipline, students develop knowledge and skills that allow planning the synthesis of different classes of natural compounds and predicting their possible biological activity.
Purpose of studying of the discipline
Study of the chemical structure, chemical transformations and biological functions of natural organic compounds
Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
Prerequisites
General and Inorganic Chemistry
Postrequisites
Basic and profile disciplines of the EP

Theory solution

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27401 (3013686)
Course	3
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline considers the physical, chemical and thermodynamic theory of solutions. According to the physical theory of solutions, in the process of dissolution of substances there is no interaction between them, when considering the chemical theory, the process of dissolution of chemicals is observed, with the formation of compounds, accompanied by a thermal effect and a change in the volume of the system.
Purpose of studying of the discipline
Improving knowledge about the theory of solutions.
Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
Prerequisites
General and Inorganic Chemistry
Postrequisites
Basic and profile disciplines of the EP

Physical and colloidal chemistry

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27402 (3013687)
Course	3
Term	1
Credits count	5

Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline considers such sections as chemical thermodynamics, chemical kinetics, electrochemistry, catalysis, solutions of electrolytes and non-electrolytes, colloidal solutions, as well as general patterns of chemical phenomena based on physical laws and principles. This course is aimed at developing knowledge among specialist teachers of performing chemical laboratory operations, determining concentrations in solutions, the ability to determine the direction of processes, their speed.

Purpose of studying of the discipline
To study the main sections of physical and colloid chemistry.

Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.

Prerequisites
General and Inorganic Chemistry

Postrequisites
Basic and profile disciplines of the EP

Cinetical of chemistry

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27404 (3013688)
Course	3
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline studies such sections as "Kinetics of heterogeneous processes", "Theoretical foundations of chemical kinetics", "Kinetics of special types of reactions: topochemical and catalytic reactions, non-isothermal, as well as chain and radiation-chemical reactions". The main goal of studying the discipline is to form students` modern ideas about the basics of chemical kinetics, as the science of the rate of chemical reactions.

Purpose of studying of the discipline
Study the basics of chemical kinetics.

Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.

Prerequisites
General and Inorganic Chemistry

Postrequisites
Basic and profile disciplines of the EP

Fuel Resources of Kazakhstan

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27737 (3013704)
Course	4
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours

Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
In this discipline, the types of fuels, their characteristics, solid fuel processing, complex use of solid fuel components in its high-temperature destructive processing, processing of oil and petroleum products, gaseous fuels are considered. When studying the course, students form systematic knowledge about the origin of various types of fuels, their composition, properties and applications, classification of gaseous fuels.

Purpose of studying of the discipline
To study the features of the fuel resources of the Republic of Kazakhstan.

Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.

Prerequisites
Chemical ecology

Postrequisites
Undergraduate practice Productive (pedagogical) Practice

Chemical industry of Kazakhstan

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27744 (3013703)
Course	4
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline provides for the study of the current state of the chemical industry of the Republic of Kazakhstan, the prospects and trends of its development, the use of chemical industry products in the national economy. The development of this discipline is a necessary basis for the formation of processing substances and typical equipment; about the main branches of the chemical industry.

Purpose of studying of the discipline
To study the current state of the chemical industry of the Republic of Kazakhstan.

Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.

Prerequisites
General and Inorganic Chemistry

Postrequisites
Undergraduate practice Productive (pedagogical) Practice

Chemical technology

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27738 (3013702)
Course	4
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline deals with natural reserves, methods of extraction, preparation, transportation and complex processing of the most important types of chemical raw materials, theoretical foundations, technological processes of the main chemical industries. When studying the course, students develop systemic knowledge about general issues of chemical technology, the most important chemical industries, about the chemical processing of fuel, industrial organic synthesis.
Purpose of studying of the discipline
To study the general provisions and theoretical foundations of chemical technology.
Learning Outcomes
ON 5 To link educational material on all issues of the school and university program of chemical and biological disciplines for everyday professional activities and continuing education in the masters program.
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
Prerequisites
General and Inorganic Chemistry
Postrequisites
Undergraduate practice Productive (pedagogical) Practice

Module 4. Biological knowledge

Anatomy and Morphology of Plants

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27288 (3013677)
Course	1
Term	2
Credits count	3
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline
The General laws of structure and development of plants. Symmetry, polarity, correlation. Analogy and homology. Convergence, reduction, ATA - Vizma, aborting. Features of its structure and functions. Fabric and topographic area in the structure of higher plants. Seed, embryo and seedling of seed plants. Root. The life cycle of higher plants. Flower.
Purpose of studying of the discipline
Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.
Prerequisites
School course
Postrequisites
Basic and profile disciplines of the EP

Taxonomy of higher plants

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27289 (3013678)
Course	1
Term	2
Credits count	3
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline
This discipline studies the classification of species of higher plants belonging to the section rhinophytes, lycopods, psilotoids, horsetails, gymnosperms and angiosperms, depending on the anatomical and morphological features of the structure, reproduction features. It also introduces the taxonomy and detailed characteristics of plants belonging to the class of liverworts of mosses, the class of monocots

and the class of dicots.

Purpose of studying of the discipline

To form students` ideas about the variety of plants, their classification, phylogenia, possible ways of evolution, diversity and systematics.

Learning Outcomes

ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Evolutionary adaptation of plants

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27290 (3013679)
Course	1
Term	2
Credits count	3
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline

This discipline studies the origin, adaptation, evolutionary development of primary aquatic plants, and plants in general, plants of the first land origin, roots, stems, leaves, flowers, seeds. In the course of studying the discipline, students will get acquainted with the structure of algae of aquatic plants, the features of the process of their reproduction, and also establish the dependence of various methods of reproduction of plant seeds on gradual adaptation and understand the cause-and-effect relationships of natural phenomena.

Purpose of studying of the discipline

Formation of dialectical-materialistic views of students, increasing the ability to biological thinking, explaining the cause-and-effect relationships of natural phenomena.

Learning Outcomes

ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Plant Sistematic

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27298 (3013637)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This course is aimed at studying classical and modern methods of studying the vegetation cover, getting acquainted with the taxonomy of species characteristics of plants, distribution areas, the relationship of species, instilling in students theoretical knowledge of plant systematics, developing skills for independent work with plant objects. Considers the relationship of plants between themselves and the environment, determines the importance of plants and ways to protect them. In the process of studying the course, students will master the methods of studying plants in a natural phytocenosis.

Purpose of studying of the discipline

to contribute to the preparation of young specialists - botanists for research work: memorization and reproduction of the studied material; mastering botanical methods in practical and research work; the ability to analyze the studied material; correct assessment of the studied material

Learning Outcomes

ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Modern aspects of cultivation of cells and tissues of the body

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27301 (3013638)
Course	2
Term	1
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This discipline studies cell culture methods in experimental biology, the history of cell culture methods, conditions and achievements of cell culture, cell culture biology, features of the metabolism of cultured cells, the influence of the external environment on cultured cells, types of nutrient media for cell and tissue cultivation, composition, sources of cultured cells, ways to protect cultured cells from infection, suspensions of cells by cryopreservation methods.

Purpose of studying of the discipline

The formation of students` ability to cultivate cells and tissues of multicellular organisms.

Learning Outcomes

ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Cytochemistry of the cell

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27302 (3013639)
Course	2
Term	1
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This subject covers the areas of cytology, histology, embryology, general and organic chemistry. Increases the readiness and ability of students to use a number of biological research methods in research work, i.e. morphological, histochemical, morphometric, histological, cytochemical methods. The subject of cytochemistry considers the chemical nature of the cell structure, the distribution of intracellular chemical compounds, their transformation into functional bonds of the cell and its components.

Purpose of studying of the discipline

Expansion and deepening of students` knowledge in the field of cytochemical research methods. The study of the structural features and composition of cells using chemical methods.

Learning Outcomes

ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary

information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
School course

Postrequisites
Basic and profile disciplines of the EP

Vertebrate and Invertebrate Zoology

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27314 (3013640)
Course	2
Term	1
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline provides for the study of issues related to the main issues of the biological diversity of the animal world. When studying the course, students develop deep knowledge about the general patterns of development and origin of various groups of invertebrates and vertebrates, about the role of animals in the environment and human life, the principles of the structure of organs, systems.

Purpose of studying of the discipline
To acquaint with the morphofunctional, taxonomic and ecological diversity of invertebrates and vertebrates, their evolution and significance in human life.

Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
School course

Postrequisites
Basic and profile disciplines of the EP

Vertebrates of Kazakhstan

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27317 (3013642)
Course	2
Term	1
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline provides for the theoretical physiological conditions in the body and the interpretation of the life of the body. When studying the course, systematic knowledge is formed about the life of a living organism, individual systems, organs, tissues and cells, the influence on each other, the relationship and relationships with the external environment.

Purpose of studying of the discipline
Analysis of the problems and prospects for the protection of wildlife to solve the tasks of protection and rational use of resources of various ecosystems of Kazakhstan that are vital for the development of society.

Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
School course

Postrequisites

Basic and profile disciplines of the EP

Comparative anatomy of vertebrates

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27316 (3013641)
Course	2
Term	1
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

his discipline provides for the study of the general patterns of the structure and development of organs and organ systems by comparing them in different systematic groups of vertebrates. When studying the course, students have professional competencies about the history of the development of comparative anatomy of animals, about the systematics and classification of animals.

Purpose of studying of the discipline

contribute to the preparation of young specialists - zoologists for research work: memorization and reproduction of the studied material; development of zoological methods in practical and research work; the ability to analyze the studied material; correct assessment of the studied material.

Learning Outcomes

ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Field training practice

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	30059 (3013715)
Course	2
Term	2
Credits count	2
Pedagogical practics	60hours
Total	60hours
Knowledge control form	Total mark on practice

Short description of discipline

Educational practice is aimed at studying the basic laws of the ecology of animals and plants in natural conditions. During the educational practice, he makes observations of organisms in nature and laboratory conditions and compares research methods, examines plants and explains scientific ideas about the diversity and systematics of animals, the features of their ecology, owns the method of identifying plants and animals, the skills of naturalistic work and environmental protection.

Purpose of studying of the discipline

The main goal of mastering the discipline is to familiarize students with the diversity of animals and plants of various landscapes in natural conditions and to give students an idea of the basic methods of field biological research, processing and storage of materials.

Learning Outcomes

ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.

Prerequisites

School course

Postrequisites

Plant Sistematic

Plant Physiology

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	30054 (3013723)
Course	2
Term	2

Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This subject forms professional knowledge and skills in mastering a profession. Plant physiology is one of the fundamental subjects for the study of wildlife. Physiology reveals the significance of processes in plants, their relationship, changes under the influence of the external environment, establishes regulatory mechanisms, and creates methods aimed at increasing the productivity of crops. Experimental work; the ability to conduct experimental work with living organisms. This is especially important for professional and pedagogical training of students.

Purpose of studying of the discipline
to give modern ideas about the nature of the main physiological processes of a plant, the mechanisms of their regulation at different levels of organization of the plant organism and the main patterns of interconnection with the environment; with the
principles of system organization, differentiation, integration of body functions.

Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
School course

Postrequisites
Basic and profile disciplines of the EP

Human anatomy

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27380 (3013643)
Course	3
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline considers the formation of a scientific understanding of the features of the internal structure of the human body. During the course, students develop systematic knowledge about human morphology, the anatomy of individual organs and systems, as well as the relationship in the human body with the motor, digestive, respiratory, circulatory, endocrine, genitourinary, nervous systems and sensory organs. The course contributes to the development of anatomical and morphological knowledge of students.

Purpose of studying of the discipline
Students gain knowledge about the structure and functioning of the human body, the basic laws of growth and development of children and adolescents, morphology features.

Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
School course

Postrequisites
Basic and profile disciplines of the EP

Anatomy, the basics of sports morphology

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27383 (3013645)
Course	3
Term	1
Credits count	5

Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The course is aimed at forming students` systematic knowledge about the structure and functions of the human body, changes in the body as a whole under the influence of various physical activities or sports activities. This course focuses on the anatomy of muscles and the physiology of human activity based on sports activity. The acquired knowledge of the course teaches students practical use for maintaining a healthy lifestyle.

Purpose of studying of the discipline
Students gain knowledge about the structure and functioning of the human body, the basic laws of growth and development of children and adolescents, the features of sports morphology of athletes.

Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
School course

Postrequisites
Basic and profile disciplines of the EP

Comparative anatomy of humans and animals

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27382 (3013644)
Course	3
Term	1
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline considers the formation of a natural and scientific understanding of the structure of each organ of man and animals. While studying the course, students gain knowledge on the embryonic development of humans and animals, comparative morphology and anatomy of the skeleton, blood transport, respiration, digestion, genitourinary, nervous systems and sensory organs. Includes the study of general patterns of the structure and development of the organ system

Purpose of studying of the discipline
Students gain knowledge about the structure of organs, organ systems and organisms of animals and humans in general and in a comparative aspect.

Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
School course

Postrequisites
Basic and profile disciplines of the EP

Physiology of the central nervous system and higher nervous activity

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27560 (3013647)
Course	3
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours

Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline provides for the theoretical physiological conditions in the body and the interpretation of the life of the body. When studying the course, systematic knowledge is formed about various forms of physiological activity of the higher nervous system, including higher psychological forms, about the integrating function of the central nervous system, conditioned reflexes, signaling system.

Purpose of studying of the discipline
The purpose of studying the discipline: To study the role of the central nervous system and higher nervous activity in ensuring the mental and mental activity of a person and his interaction with the environment.

Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
Human anatomy

Postrequisites
Basic and profile disciplines of the EP

Human and animal physiology

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27582 (3013674)
Course	3
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline provides for the theoretical physiological conditions in the body and the interpretation of the life of the body. When studying the course, systematic knowledge is formed about the life of a living organism, individual systems, organs, tissues and cells, the influence on each other, the relationship and relationships with the external environment.

Purpose of studying of the discipline
To study the features of the vital activity of the human and animal organism in a changing environment and the mechanisms of neuro-humoral regulation

Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
Human anatomy

Postrequisites
Basic and profile disciplines of the EP

The flora and fauna of the world

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27559 (3013646)
Course	3
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours

Total	150hours
Knowledge control form	Examination

Short description of discipline
His course discusses the features of flora and fauna of various types of natural and artificial ecosystems, methods and techniques for zoning flora and fauna, habitats and biota of the planet. He teaches the mechanisms of biosphere stability, the main taxonomic groups of living organisms. During the course, students expand their knowledge about the environment and the factors.

Purpose of studying of the discipline
Formation of dialectical-materialistic views of students, increasing the ability to biological thinking, explaining the cause-and-effect relationships of natural phenomena.

Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
Human anatomy

Postrequisites
Basic and profile disciplines of the EP

Genetics

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27691 (3013670)
Course	4
Term	1
Credits count	6
Lections	15hours
Practical and seminar classes	45hours
Independent work of a student under the guidance of a teacher	40hours
Independent work of the student	80hours
Total	180hours
Knowledge control form	Examination

Short description of discipline
Genetics is a basic discipline in the preparation of future biology teachers, studies the basic laws of inheritance of traits and their variability, considers the cytological foundations of mono- and dihybrid crossing, features of non-allelic interaction of genes. Genetics introduces the main provisions of the chromosomal theory of heredity, reveals the causes.

Purpose of studying of the discipline
Formation of students` knowledge system on the fundamental genetic foundations of the emergence and functioning of living organisms and biocenoses on Earth, their stability, variability and development in ontogeny and phylogeny.

Learning Outcomes
ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites
Human anatomy

Postrequisites
Undergraduate practice

Population genetics

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27695 (3013671)
Course	4
Term	1
Credits count	6
Lections	15hours
Practical and seminar classes	45hours
Independent work of a student under the guidance of a teacher	40hours
Independent work of the student	80hours
Total	180hours
Knowledge control form	Examination

Short description of discipline
The discipline population genetics studies the genetic diversity of populations, the patterns of heredity and variability in natural populations, the distribution of allele frequencies in populations under the influence of evolutionary factors. The purpose of population genetics is to determine genetic variations among different populations of the same species. Comparing the genetic composition of

different populations can give an idea of the gene flow.

Purpose of studying of the discipline

Formation of basic knowledge of students about the mechanisms of heredity and variability in populations.

Learning Outcomes

ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites

Human anatomy

Postrequisites

Undergraduate practice

Methods of solving problems in genetic

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27785 (3013700)
Course	4
Term	1
Credits count	6
Lections	15hours
Practical and seminar classes	45hours
Independent work of a student under the guidance of a teacher	40hours
Independent work of the student	80hours
Total	180hours
Knowledge control form	Examination

Short description of discipline

The course discusses methods for solving problems in the main sections of genetics, features of analyzing crossing, interactions of non-allelic genes, patterns of cleavage in autosomal and sex-linked inheritance, the influence of the crossing mechanism in linked inheritance, methods for calculating and constructing genetic maps. In the course of mastering the course, students develop the skills of applying theoretical knowledge in practice.

Purpose of studying of the discipline

To acquaint students with the ways of solving problems according to the basic laws of heredity and variability, to master the methodology of solving complex Olympiad problems.

Learning Outcomes

ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.
ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites

Human anatomy

Postrequisites

Undergraduate practice Productive (pedagogical) Practice

Molecular Biology

Discipline cycle	Profiling discipline
Discipline component	University component
SubjectID	30062 (3013728)
Course	4
Term	1
Credits count	3
Lections	15hours
Practical and seminar classes	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline

The course of molecular biology is aimed at studying the functioning of living organisms from the point of view of the chemical structure of the molecules that make up them, the composition, structure of nucleic acids, mechanisms of DNA replication, transcription and RNA and translation of genetic information on ribosomes during protein biosynthesis. The discipline explains the molecular mechanisms of heredity and variability, the main metabolic processes in the cell and the transport of substances through biological membranes.

Purpose of studying of the discipline

To study the structure and main stages of cell activity, mechanisms of preservation and transmission of genetic information at the molecular level.

Learning Outcomes

ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites

Human anatomy Biology chemistry

Postrequisites

Undergraduate practice Productive (pedagogical) Practice

Evolutionary biology

Discipline cycle	Profiling discipline
Discipline component	University component
SubjectID	27700 (3013676)
Course	4
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This discipline forms knowledge about the heredity and variability of the characteristics of various organisms, adaptability, reproduction and diversity of species in the process of evolutionary development. In the course of mastering the discipline, students receive systematic ideas about the development of ontogenetic processes in the course of evolution, the patterns of evolutionary processes, the ontogenetic basis of homoplasia and homology, global changes in flora and fauna as components of the biosphere. A materialistic view is being formed on the history of the development of wildlife.

Purpose of studying of the discipline

Formation of dialectical- materialistic views of students, increasing the ability of biological thinking, to explain the causes and consequences of natural phenomena.

Learning Outcomes

ON 6 Systematize theoretical material on fundamental disciplines in the independent search, analysis, and selection of the necessary information, its transformation, preservation, and transmission.

ON7 Demonstrate the theoretical foundations and current trends in the development of biology, using knowledge about the diversity and functioning of biological systems, their diversity and evolution, the level organization of wildlife.

Prerequisites

Human anatomy

Postrequisites

Undergraduate practice

Module 5. Interdisciplinary and experimental activities

Mathematics in natural history

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27313 (3013712)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

Students have the necessary knowledge in selected areas of mathematics. In the process of studying the discipline, students consider the main issues of probability theory and mathematical statistics, mathematical analysis and graph theory. Students apply mathematical knowledge in drawing up an equation with one and two unknowns, rounding numbers, differential calculus of functions of one and two variables in the calculations of the quantitative determination of a substance.

Purpose of studying of the discipline

To acquaint with the basics of elements of higher and linear algebra, differential and integral calculus, probability theory and mathematical statistics

Learning Outcomes

ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.

ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.

ON10 Use natural science terms for professional purposes.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Mathematical statistics in chemistry

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27292 (3013711)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

The course discusses the methods of factorial planning of the experiment to find the optimal conditions for the analysis. Students acquire skills in drawing up plans for various types of experiments, mastering ways to process the results of analysis and make decisions. The course provides for the right to choose the ways of conducting the experiment and data processing, compiling mathematical models of the study.

Purpose of studying of the discipline

Familiarize yourself with the basic methods of mathematical statistics in chemistry.

Learning Outcomes

ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Mathematical modeling of the experiment

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	27315 (3013713)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This course deals with the use of chemometric procedures in the analysis of experimental data in various fields of chemistry. When studying chemometrics, students use the methods and tools of chemometrics to solve problems of chemical analysis, to delve deeper into the terminology used in the processing of chemical information. Also, students use modern software tools for processing experimental information (Microsoft Office Excel, OpenOffice. org Calc).

Purpose of studying of the discipline

To study the issues of using a multidimensional approach based on formal logic when planning an experiment and analyzing its results.

Learning Outcomes

ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Chemical ecology

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27358 (3013714)
Course	2
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This course is aimed at acquiring knowledge about the basic principles of environmental chemistry and their operation on a local and global scale. During the study of the discipline, students discuss and predict the consequences of the impact of pollution on the environment, use knowledge in the field of physics, chemistry, earth sciences and biology to scientifically substantiate the processes occurring in the environment.

Purpose of studying of the discipline

To study the basics of chemical ecology in terms of chemical pollution of the atmosphere, hydrosphere, lithosphere and biosphere

Learning Outcomes

ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites

General and Inorganic Chemistry

Postrequisites

Basic and profile disciplines of the EP

Agrochemistry

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27349 (3013654)
Course	2
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

This course examines the subject and methods of agrochemistry, agrochemical properties of soils, processes of formation, transformation of soil organic matter, types of mineral and organic fertilizers, chemical plant protection products. When studying the course, students develop systemic knowledge about the basics of agrochemical analysis of soils, fertilizers, plants, pesticides; on the compilation and use of a cartogram for the reasonable use of fertilizers.

Purpose of studying of the discipline

To master the theoretical foundations of agricultural chemistry.

Learning Outcomes

ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites

General and Inorganic Chemistry

Postrequisites

Basic and profile disciplines of the EP

Soil chemistry

Discipline cycle	Profiling discipline
Discipline component	Electives

SubjectID	27345 (3013653)
Course	2
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline studies the chemical composition and structure of soils, the course of chemical reactions in the soil, which in turn depend on the mineral composition, organic substances, and environmental factors. Students` knowledge of how to study the chemical composition of soil in the environment is of paramount importance in predicting the fate of pollutants.

Purpose of studying of the discipline
Acquaintance of students with the peculiarities of the chemical properties of soils in solving the problems of soil science, agricultural chemistry, land reclamation.

Learning Outcomes
ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites
School course

Postrequisites
Basic and profile disciplines of the EP

Biology chemistry

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27586 (3013669)
Course	3
Term	2
Credits count	5
Lections	15hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This course summarizes knowledge on the most important compounds of the body; considers the mechanisms of their regulation and their role in ensuring the vital activity of the organism. In the course of studying the discipline, students use knowledge about the structure and properties of substances to explain metabolic processes in living organisms.

Purpose of studying of the discipline
To reveal the place of biochemistry in a number of other natural disciplines, its importance in the life of modern society and to study the patterns of biochemical reactions in the body of plants, animals and person.

Learning Outcomes
ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites
Organic chemistry

Postrequisites
Basic and profile disciplines of the EP

Forms and methods of organizing STEM training

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	27676 (3013701)
Course	4
Term	1

Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This course is aimed at the non-traditional application of interdisciplinary knowledge in any industry and any environment to achieve the best result. In the course of studying the discipline, students consider the organization of the project work of schoolchildren, the development and use of heuristic tasks of a natural science nature. They develop spatial thinking through intellectual STEM games, 3D models, etc.

Purpose of studying of the discipline
Meeting the educational needs of future teachers and using a variety of methods and tools, including the integration of research, information society, mathematics, physics, chemistry, biology and technology, available in STEM educational content.

Learning Outcomes
ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites
Pedagogy

Postrequisites
Undergraduate practice

Analysis of natural objects

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27709 (3013695)
Course	4
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline provides for the study of environmental objects, research methods and elemental composition of natural objects; patterns of accumulation, distribution of chemical elements. The development of this discipline is a necessary basis for the formation about predicting the behavior of chemical pollutants under the influence of various natural factors and anthropogenic impacts.

Purpose of studying of the discipline
To study the basics of the analysis of natural objects in the conditions of chemical pollution of the biosphere, lithosphere, hydrosphere and atmosphere.

Learning Outcomes
ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites
General and Inorganic Chemistry Chemical ecology

Postrequisites
Undergraduate practice Productive (pedagogical) Practice

Methods of sampling and sample preparation, basics of biometrics

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27784 (3013697)
Course	4
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours

Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline examines the basic methods of sampling and sample preparation, as well as the basics of biometrics. Biometrics makes it possible to calculate the average values and determine the degree of their reliability, reveal the degree of phenotypic and genotypic variability of individual traits, expressed mathematically, and establish the degree of experience reliability.

Purpose of studying of the discipline
To study the main modern methods of physical and chemical determination of air pollution, various methods of bioindication at the organismal, population, ecosystem levels.

Learning Outcomes
ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites
General and Inorganic Chemistry Chemical ecology

Postrequisites
Undergraduate practice Productive (pedagogical) Practice

Pedagogical experiment and experimental data processing

Discipline cycle	Profiling discipline
Discipline component	University component
SubjectID	27683 (3013664)
Course	4
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
Teaching this course involves improving the professional training of students in the field of organization, planning of research work, setting up a pedagogical experiment during pedagogical practice. In the course of studying the discipline, the student is able to plan the stages of pedagogical research, master the skills of processing practical data, focus on professional sources of information.

Purpose of studying of the discipline
To carry out professional training of the student in the field of pedagogical experiment.

Learning Outcomes
ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites
Pedagogy

Postrequisites
Undergraduate practice

Chemistry of the hydrosphere

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	27719 (3013696)
Course	4
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	0hours
Laboratory works	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline considers the chemical composition of the water bodies of the globe. The chemical composition of rivers, such as the processes of organic matter in soils, various involvement in biological processes, etc. When studying the course, students develop knowledge about cleaning methods, as well as predicting the behavior of the main types of pollutants in water.
Purpose of studying of the discipline
To study the basic patterns and concepts of chemistry of the hydrosphere, methods of water research, methods of purification of water bodies;Modern data on the chemical and physicochemical properties of water, its composition.
Learning Outcomes
ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.
Prerequisites
General and Inorganic Chemistry Chemical ecology
Postrequisites
Undergraduate practice Productive (pedagogical) Practice

Undergraduate practice

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	29503 (3013665)
Course	4
Term	2
Credits count	15
Undergraduate practice	450hours
Total	450hours
Knowledge control form	Total mark on practice

Short description of discipline
Pre-diploma practice is focused on the consideration of many issues and tasks set in the assignment for the thesis. When performing the research component of pedagogical practice, students get acquainted with the logic and features of psychological and pedagogical research, use its various empirical methods (observation, questioning, testing, experiment, etc.), formulate the goal and objectives, research hypothesis.
Purpose of studying of the discipline
Formation of practical skills related to conducting pedagogical research for the purpose of comprehensive use in further professional activities on the basis of theoretical knowledge gained in the learning process, collection and processing of practical material necessary for writing a thesis (project).
Learning Outcomes
ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.
Prerequisites
Educational practice Pedagogical practice
Postrequisites
Final examination

Productive (pedagogical) Practice

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	29505 (3013717)
Course	4
Term	2
Credits count	15
Working practice	450hours
Total	450hours
Knowledge control form	Total mark on practice

Short description of discipline
The production (pedagogical) practice at the final year is the logical conclusion of the previous practice of activity in the organization of the educational process at school and is aimed on the basis of pedagogical knowledge, skills and abilities in managing the holistic pedagogical process and conducting experimental work on the graduation project. Industrial pedagogical practice of 4th year students involves a deeper development of professional and pedagogical competencies, subject, methodological knowledge, skills and abilities in the organization, implementation and management of the integral pedagogical process of the class.
Purpose of studying of the discipline
The practice is designed to provide a connection between the theoretical knowledge obtained in the development of academic disciplines and practical professional activities, aimed at conducting experimental work on a graduation project.
Learning Outcomes
ON8 Present the results of experimental research work in the form of a report, scientific report, message, conclusions.
ON9 To integrate the main provisions, concepts and laws in the field of chemistry and related natural science disciplines in the

explanation of theoretical and practical tasks.
ON10 Use natural science terms for professional purposes.

Prerequisites

Pedagogical practice (psychological and pedagogical) Pedagogical practice

Postrequisites

Final examination

Final examination

Writing and defending a thesis or preparing and passing a comprehensive exam

Graduate work

Credits count	8

Final examination

Credits count	8

4.Summary table on the scope of the educational program

«6B01509 - Chemistry-Biology»

Name of discipline	Cycle/ Component	Term	Number of credits	Total hours	Lec	SPL	LC	IWST	IWS	Knowledge control form
Module 1. Fundamentals of social and humanitarian knowledge										
Foreign language	GER/CC	1	5	150		45		35	70	Examination
Kazakh language	GER/CC	1	5	150		45		35	70	Examination
Russian language	GER/CC	1	5	150		45		35	70	Examination
Physical Culture	GER/CC	1	2	60		60				Differentiated attestation
The module of socio-political knowledge (sociology, political science, cultural studies, psychology)	BS/CC	1	8	240	30	45		55	110	Examination
Kazakh language	GER/CC	2	5	150		45		35	70	Examination
Foreign language	GER/CC	2	5	150		45		35	70	Examination
Bases of economics, law and ecological knowledge	GER/US	2	5	150	15	30		35	70	Examination
Russian language	GER/CC	2	5	150		45		35	70	Examination
Physical Culture	GER/CC	2	2	60		60				Differentiated attestation
History of Kazakhstan	GER/CC	3	5	150	30	15		35	70	Qualification examination
Physical Culture	GER/CC	3	2	60		60				Differentiated attestation
Information and communication technology	GER/CC	4	5	150	15	15	15	35	70	Examination
Physical Culture	GER/CC	4	2	60		60				Differentiated attestation
World of Abai	BS/US	4	3	90	15	15		20	40	Examination
Philosophy	GER/CC	6	5	150	15	30		35	70	Examination
Module 2. Psychological-pedagogical and methodological training of personnel										
Introduction to the profession of teacher of chemistry and biology	BS/US	1	3	90	15	15		20	40	Examination
Age psychology and physiology	BS/US	1	5	150	15	30		35	70	Examination
Pedagogy	BS/US	2	5	150	15	30		35	70	Examination
Educational practice	BS/US	2	2	60						Total mark on practice
Inclusive education	BS/US	3	3	90	15	15		20	40	Examination
Pedagogical practice	BS/US	4	1	30						Total mark on practice
Pedagogical practice (psychological and pedagogical)	BS/US	4	2	60						Total mark on practice
Methodology of chemistry training	BS/US	5	5	150	15	0	30	35	70	Examination
Methodology of biology training	BS/CCh	5	5	150	15	30	0	35	70	Examination

Scientific-methodical bases of teaching chemistry in small schools	BS/CCh	5	5	150	15	30	0	35	70	Examination
Modern approaches to education	BS/CCh	5	5	150	15	30	0	35	70	Examination
Technologies of the updated content of education and criteria assessment	BS/US	5	5	150	15	30		35	70	Examination
Electronic educational resources	BS/US	5	5	150	15	30		35	70	Examination
The tasks of high complexity in chemistry	BS/CCh	6	5	150	15	30		35	70	Examination
Interdisciplinary communication school chemistry course	BS/CCh	6	5	150	15	0	30	35	70	Examination
Methods of conducting a school chemical experiment	BS/CCh	6	5	150	15	0	30	35	70	Examination
Methods of solving tasks of physical chemistry	BS/CCh	6	5	150	15	30		35	70	Examination
Technique of the solution of tasks in chemistry	BS/CCh	6	5	150	15	30		35	70	Examination
Pedagogical practice	BS/US	6	5	150						Total mark on practice
Elective courses of Chemistry in core grades	BS/CCh	6	5	150	15		30	35	70	Examination
Methods of organization of extracurricular work on the subject	BS/CCh	7	3	90	15	15		20	40	Examination
Organization and forms of independent work of pupils in chemistry	BS/CCh	7	3	90	15	15		20	40	Examination
Modern technologies in chemistry teaching	BS/CCh	7	3	90	15	15		20	40	Examination
Module 3. Chemical Knowledge										
General and Inorganic Chemistry	BS/CCh	2	5	150	15		30	35	70	Examination
Chemistry of the metals and nonmetals	BS/CCh	2	5	150	15		30	35	70	Examination
Chemistry of heavy metals	BS/CCh	2	5	150	15		30	35	70	Examination
Qualitative and quantitative analysis	BS/CCh	3	5	150	15	0	30	35	70	Examination
Methods for extraction and purification of the substances	BS/CCh	3	5	150	15	0	30	35	70	Examination
Methods of chromatographic analysis	BS/CCh	3	5	150	15	0	30	35	70	Examination
Organic chemistry	AS/CCh	4	5	150	15	0	30	35	70	Examination
Chemistry of Organoelement compounds	AS/CCh	4	5	150	15	0	30	35	70	Examination
Chemistry of natural compounds	AS/CCh	4	5	150	15	0	30	35	70	Examination
Theory solution	AS/CCh	5	5	150	15	0	30	35	70	Examination
Physical and colloidal chemistry	AS/CCh	5	5	150	15	0	30	35	70	Examination
Cinetical of chemistry	AS/CCh	5	5	150	15	0	30	35	70	Examination
Fuel Resources of Kazakhstan	AS/CCh	7	5	150	15	0	30	35	70	Examination
Chemical industry of Kazakhstan	AS/CCh	7	5	150	15	0	30	35	70	Examination
Chemical technology	AS/CCh	7	5	150	15	0	30	35	70	Examination
Module 4. Biological knowledge										
Anatomy and Morphology of Plants	BS/CCh	2	3	90	15	0	15	20	40	Examination
Taxonomy of higher plants	BS/CCh	2	3	90	15	0	15	20	40	Examination
Evolutionary adaptation of plants	BS/CCh	2	3	90	15	0	15	20	40	Examination

Plant Sistematic	BS/CCh	3	5	150	15	0	30	35	70	Examination
Modern aspects of cultivation of cells and tissues of the body	BS/CCh	3	5	150	15		30	35	70	Examination
Cytochemistry of the cell	BS/CCh	3	5	150	15		30	35	70	Examination
Vertebrate and Invertebrate Zoology	AS/CCh	3	5	150	15		30	35	70	Examination
Vertebrates of Kazakhstan	AS/CCh	3	5	150	15		30	35	70	Examination
Comparative anatomy of vertebrates	AS/CCh	3	5	150	15		30	35	70	Examination
Field training practice	BS/US	4	2	60						Total mark on practice
Plant Physiology	BS/US	4	5	150	15		30	35	70	Examination
Human anatomy	BS/CCh	5	5	150	15	0	30	35	70	Examination
Anatomy, the basics of sports morphology	BS/CCh	5	5	150	15		30	35	70	Examination
Comparative anatomy of humans and animals	BS/CCh	5	5	150	15		30	35	70	Examination
Physiology of the central nervous system and higher nervous activity	BS/CCh	6	5	150	15	0	30	35	70	Examination
Human and animal physiology	BS/CCh	6	5	150	15	0	30	35	70	Examination
The flora and fauna of the world	BS/CCh	6	5	150	15	0	30	35	70	Examination
Genetics	AS/CCh	7	6	180	15	45		40	80	Examination
Population genetics	AS/CCh	7	6	180	15	45		40	80	Examination
Methods of solving problems in genetic	AS/CCh	7	6	180	15	45		40	80	Examination
Molecular Biology	AS/US	7	3	90	15	15		20	40	Examination
Evolutionary biology	AS/US	7	5	150	15	30		35	70	Examination
Module 5. Interdisciplinary and experimental activities										
Mathematics in natural history	BS/CCh	3	5	150	15	30		35	70	Examination
Mathematical statistics in chemistry	BS/CCh	3	5	150	15	30		35	70	Examination
Mathematical modeling of the experiment	BS/CCh	3	5	150	15	30		35	70	Examination
Chemical ecology	AS/CCh	4	5	150	15	0	30	35	70	Examination
Agrochemistry	AS/CCh	4	5	150	15	0	30	35	70	Examination
Soil chemistry	AS/CCh	4	5	150	15	0	30	35	70	Examination
Biology chemistry	BS/US	6	5	150	15		30	35	70	Examination
Forms and methods of organizing STEM training	BS/US	7	5	150	15	30		35	70	Examination
Analysis of natural objects	AS/CCh	7	5	150	15	0	30	35	70	Examination
Methods of sampling and sample preparation, basics of biometrics	AS/CCh	7	5	150	15	0	30	35	70	Examination
Pedagogical experiment and experimental data processing	AS/US	7	5	150	15	30		35	70	Examination
Chemistry of the hydrosphere	AS/CCh	7	5	150	15	0	30	35	70	Examination
Undergraduate practice	AS/CCh	8	15	450						Total mark on practice
Productive (pedagogical) Practice	AS/CCh	8	15	450						Total mark on practice

Final examination										
Graduate work		8	8	240						
Final examination		8	8	240						