The list of academic disciplines of the university component

6B05 - Natural Sciences, Mathematics and Statistics
(Code and classification of the field of education)

6B053 - Physical and chemical sciences
(Code and classification of the direction of training)

0530
(Code in the International Standard Classification of Education)

B053 - Chemistry
(Code and classification of the educational program group)

6B05301 - Chemistry
(Code and name of the educational program)

bachelor
(Level of preparation)

set of 2023

Semey 2023

Developed
By the Academic Committee of the OP
The head of the AK Nesipkhan Gulnur Nesiptaevna
EP Manager Nurgaliev Nurzhan Nurlybekovich

Reviewed
at the meeting of the Quality Assurance Commission of the Faculty of Engineering and Technology
Recommended for approval by the Academic Council of the University
Protocol № 4/6 10.04.2023.
Chairman of the Commission on Quality Assurance Abdilova G.B.

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.

Bases of economics, law and ecological knowledge

Discipline cycle	General educational disciplines
Course	1
Credits count	5
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

ON1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technologies taking into account current trends in the development of society.

Learning outcomes by discipline

1) analyzes the issues of safety and conservation of the natural environment as the most important priorities of life;
2) demonstrates knowledge of the fundamentals of nature management and sustainable development, assesses the impact of man-made systems on the environment;
3) shows knowledge of the main regulatory legal acts of the Republic of Kazakhstan, their understanding and application;

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Introduction to the profession

Discipline cycle	Basic disciplines
Course	1
Credits count	3
Knowledge control form	Examination

Short description of discipline

The course studies the modern state of the chemical sphere. Considers the main directions of development of chemical technology, the production of inorganic, organic, polymeric materials, with the practice of the future work of the graduate. Studies the development of chemical knowledge, the prospects for the development of chemistry and chemical technology. Reveals the patterns and trends in the development of this science in its entirety, including chemical technology, as well as the prospects for scientific and technological progress

Purpose of studying of the discipline

To stimulate interest in the chosen profession, the formation of a worldview among students that contributes to a conscious attitude to studies, as well as to modern ways of obtaining professional knowledge

Learning Outcomes

ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence

Learning outcomes by discipline

1) Describe the main directions and prospects for the development of chemical technology and production
2) Analyze patterns and trends in the development of chemical knowledge
3) Assess the current state of the chemical sphere

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Mathematics

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The purpose of this course is to provide students with fundamental training in mathematics. The course is aimed at forming a sufficiently high culture of mathematical thinking among students and developing the ability to creatively approach problem solving. In addition to studying the fundamental foundations of higher mathematics (elements of analytical geometry, linear algebra, mathematical analysis, differential equations), the course assumes consideration of various applications of mathematics to solving production problems from the field of professional specialization.

Purpose of studying of the discipline

creation of the basis for the development of logical thinking and mathematical culture. Formation of basic knowledge and acquisition of

basic skills of using mathematical apparatus for solving theoretical and applied problems, as well as the necessary level of mathematical training for mastering other applied disciplines studied within a specific profile; skills of working with special mathematical literature

Learning Outcomes

ON 2 Apply mathematical methods and physical phenomena and laws in practice

Learning outcomes by discipline

1) Selects methods of mathematical analysis and modeling, theoretical and experimental research of applied problems
2) Uses mathematical symbolism to express quantitative and qualitative relations of objects
3) Applies methods of visual graphical representation of research result

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

General chemistry

Discipline cycle	Basic disciplines
Course	1
Credits count	3
Knowledge control form	Examination

Short description of discipline

This course studies the theoretical and practical foundations of general chemistry. Examines the basic concepts and laws of chemistry. He studies the structure of matter on the basis of quantum mechanical concepts of the structure of the atom and the chemical bond. Outlines general information about complex compounds. Forms an idea of the patterns of chemical processes. He studies the fundamentals of chemical kinetics, chemical thermodynamics, the doctrine of solutions and electrochemistry.

Purpose of studying of the discipline

- study of chemical formulas and equations, structures and properties of substances, their ability to interact with other substances.

Learning Outcomes

ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence

Learning outcomes by discipline

- understands the basic concepts and laws of chemistry, the structure of matter and the laws of chemical processes.
- explains the properties of chemical elements and their compounds, ways of obtaining and using them.
1) Describe the basic concepts and laws of chemistry
2) Study the relationship between the structure of substances and their properties
3) Explain the mechanisms and general patterns of chemical processes

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP Inorganic chemistry

Inorganic chemistry

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course studies the theoretical and practical foundations of inorganic chemistry. Considers the physical and chemical properties of elements and their compounds, based on modern views, theories about the structure of substances, the nature of the chemical bond. Introduces the distribution and forms of occurrence in nature of chemical elements, methods of production, use of synthesis products. Forms an idea about the sources of chemical pollution of the environment and the role of chemistry in solving environmental problems.

Purpose of studying of the discipline

Obtaining knowledge about the properties of chemical elements and their compounds based on the laws and theories of chemical science, the forms of finding compounds in nature, methods of obtaining and practical application

Learning Outcomes

ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence

Learning outcomes by discipline

1) Describe the forms of occurrence and distribution in nature, methods of obtaining, physical and chemical properties of chemical elements and their compounds in accordance with the structure 2) Solve problems and exercises to consolidate theoretical material
3) Summarize the observed facts and the data obtained from quantitative calculations when performing laboratory experiments

Prerequisites

General chemistry

Postrequisites

Basic and profile disciplines of the EP

Educational practice

Discipline cycle	Basic disciplines
Course	1
Credits count	2
Knowledge control form	Total mark on practice

Short description of discipline

Educational practice is organized in the educational laboratories of the department. It is planned to carry out practical, educational, research, creative tasks corresponding to the nature of future professional activity. Theoretical knowledge and practical skills acquired in the first year disciplines are consolidated. The ability to work with educational literature, handle chemical glassware, reagents and laboratory equipment and draw up a final report is revealed.

Purpose of studying of the discipline

Purpose of studying discipline: acquire the skills of a chemical experiment, apply the methods of synthesis and purification of substances in practice

Learning Outcomes

ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence

Learning outcomes by discipline

1) Link theoretical and practical knowledge obtained in the disciplines of the first course
2) Apply skills and knowledge in accordance with professional activities
3) Develop practical, educational, educational and research, creative tasks

Prerequisites

School course General chemistry

Postrequisites

Basic and profile disciplines of the EP

Analytical chemistry

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course studies the theoretical and practical foundations of analytical chemistry. Considers heterogeneous processes and precipitation reactions, acid- base balances, complex formation reactions, redox reactions. Introduces the methods of qualitative chemical analysis: fractional and systematic analysis. Forms an idea of analytical reactions, their types, sensitivity, selectivity and specificity.Teaches methods of identifying, masking, isolating, separating, and concentrating.

Purpose of studying of the discipline

Students gaining knowledge about the theoretical foundations of modern qualitative analysis

Learning Outcomes

ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence

Learning outcomes by discipline

1) Describe the mechanisms and conditions for the occurrence of analytical reactions
2) Choose a qualitative analysis method
3) Discuss the results of the analysis and draw conclusions

Prerequisites

General chemistry Inorganic chemistry

Postrequisites

Basic and profile disciplines of the EP

World of Abai

Discipline cycle	Basic disciplines
Course	2
Credits count	3
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

ON1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technologies taking into account current trends in the development of society.

Learning outcomes by discipline

1) Analyzes the philosophical and artistic foundations of works, historical facts related to the creative heritage of Abai Kunanbayev, Shakarim Kudaiberdiyev, Mukhtar Auezov
2) Uses in practice the humanistic ideas of Abai`s philosophical and artistic works
3) Assesses the place and significance of Abai`s works in the history of literature and science

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Organic chemistry

Discipline cycle	Basic disciplines

Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course studies the types of chemical bonds in the molecules of organic compounds, the classification of organic molecules. Considers the spatial structure of organic compounds. He studies hydrocarbons, their properties and applications, as well as mono- and polyfunctional compounds, halogen derivatives. Considers alcohols and ethers, carbonyl compounds, their polarity, properties. Studies carboxylic acids and their derivatives, nitrogen-containing compounds, heterofunctional compounds and synthesis methods

Purpose of studying of the discipline
To study of the main provisions of the theory of the structure of organic substances, the main classes of organic compounds, the dependence of the properties of organic compounds on their structure, patterns and mechanisms of organic reactions

Learning Outcomes
ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence

Learning outcomes by discipline
1) Describe the types of chemical bonds in the molecules of organic compounds, the classification of organic reactions
2) Analyze the spatial structure, methods for obtaining organic compounds
3) Evaluate the properties and applications of mono- and polyfunctional organic molecules

Prerequisites
General chemistry

Postrequisites
Basic and profile disciplines of the EP

Solving problems in general and inorganic chemistry

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline teaches modern theories of structure, nomenclature and classifications of inorganic substances. Considers extended in-depth versions of the methodology for solving problems of solving problems in general and inorganic chemistry in general. He studies systematic quantitative patterns and theories of chemical phenomena. Teaches the ability to solve chemical problems of the Olympiad type. Forms the concept of scientific and theoretical knowledge in chemistry for solving theoretical and practical problems. Learns to solve problems using mathematical and systems of equations.

Purpose of studying of the discipline
The study of advanced in- depth versions of the methodology for solving problems of solving problems in general and inorganic chemistry, as well as systematic quantitative laws and theories of chemical phenomena

Learning Outcomes
ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence

Learning outcomes by discipline

Prerequisites
General chemistry

Postrequisites
Basic and profile disciplines of the EP

Physical chemistry

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course studies the laws of thermodynamics and the basics of chemical kinetics, necessary for calculating the energy characteristics, direction, and kinetic parameters of physical and chemical processes. Assesses the thermodynamic possibility and kinetic parameters of chemical and physico- chemical processes in homogeneous and heterogeneous systems. Determines the influence of various external factors on the physical and chemical process. Assumes the probability of a reaction proceeding according to its thermodynamic parameters.

Purpose of studying of the discipline
Be able to apply the laws of thermodynamics and kinetics, understand the fundamental foundations of modern physical research methods

Learning Outcomes
ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence

Learning outcomes by discipline
1) Describe the basic laws of chemical thermodynamics and kinetics for solving practical and research problems
2) Determine the physico-chemical parameters of the process depending on various factors
3) Suggest total processes occurring with the simultaneous participation of many particles

Prerequisites
General chemistry

Postrequisites
Basic and profile disciplines of the EP Physical methods of research

Chemical terminology in English

Discipline cycle	Basic disciplines
Course	2
Credits count	3
Knowledge control form	Examination

Short description of discipline
This course of chemical terminology in English is aimed at training in the study of chemical terms in the main sections of chemistry and chemical technology. Exploring important issues suffixes and prefixes for active word formation in scientific chemical texts. Forms an idea of bilingual oral and written translations of chemical terms. Learns the basic principles of translating texts in chemical science.

Purpose of studying of the discipline
To teach students professional communicative competence - the ability to actively use a foreign language in their field, in everyday speech, in everyday life.

Learning Outcomes
ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence

Learning outcomes by discipline
1) Describe important questions on the grammar of the language for active word formation in scientific chemical texts
2) Explain chemical terms in the main sections of chemistry and chemical technology
3) Formulate an idea of bilingual oral and written translations of chemical terms and scientific texts

Prerequisites
Foreign language

Postrequisites
Basic and profile disciplines of the EP

Mechanisms of organic reactions

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
This discipline studies the main types of mechanisms of organic reactions and features, as well as the patterns of their course. The nature of electronic effects, varieties and conditions for the formation of intermediates, as well as the typology of reaction mechanisms are considered. The main types, stages and specifics of chemical transformations in a number of aliphatic and aromatic compounds are highlighted - radical chain reactions, electrophilic and nucleophilic substitution, addition, elimination.

Purpose of studying of the discipline
Obtaining by students of modern ideas about the mechanisms of reactions, methods of their study, as well as the formation of the ability to draw their own conclusions about the mechanism of the reaction under study,
confidently navigate the flow of information relating to the dynamics of chemical processes.

Learning Outcomes
ON4 Own the methods of synthesis, modification and technology for the production of chemicals and materials

Learning outcomes by discipline
1) Describe the main types of mechanisms of organic reactions, features and patterns of their course
2) To study the nature of electronic effects, varieties and conditions for the formation of intermediates
3) Determine the main types, stages and specifics of chemical transformations in a number of aliphatic and aromatic compounds

Prerequisites
Organic chemistry

Postrequisites
Basic and profile disciplines of the EP

Production practice I

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Total mark on practice

Short description of discipline
Production practice 1 represents a practical part of educational programs for the training of highly qualified specialists and is carried out at various enterprises in the conditions of production. It is an exceptional part of educational practice, which takes place in the highest educational institution. The results of theoretical training are acquired and concretized, skills and abilities of practical work are acquired, competencies are formed on the assigned qualification or profession.

Purpose of studying of the discipline
To consolidate the acquired knowledge and obtain the first practical skills in the future specialty

Learning Outcomes
ON5 Use knowledge of applied chemistry in professional activities
ON6 Apply knowledge of the basics of instrumental chemistry to solve scientific and applied problems

Learning outcomes by discipline
1) Summarize the theoretical knowledge gained in the initial courses with production
2) Link the results of theoretical training and the skills of practical work on the qualifications assigned
3) Obtain information about the features of professional activity in real conditions

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Production practice II

Chemical functional derivatives of organic molecules

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course examines the basic principles of modern IUPAC nomenclature, hydrocarbon derivatives, their properties and applications. He studies the types of chemical bonds in molecules and the spatial structure of organic compounds. Covers polarity, properties, acid-base catalysis, synthesis methods and applications of halogenated hydrocarbons, alcohols, ethers, carbonyl compounds, amines, nitro compounds, amino acids, carbohydrates, nucleic acids, proteins, lipids and alkaloids.

Purpose of studying of the discipline

To study of fundamental organic chemistry sections: theory of the structure of organic molecules, the electronic and steric effects of stereoisomerism of organic molecules, chemical properties, fundamental reaction mechanisms.

Learning Outcomes

ON4 Own the methods of synthesis, modification and technology for the production of chemicals and materials
ON5 Use knowledge of applied chemistry in professional activities

Learning outcomes by discipline

1) Describe the types of chemical bonds and the spatial structure of the molecules of organic compounds
2) Study mono- and polyfunctional compounds and the patterns of their behavior
3) Analyze methods for the synthesis of functional derivatives of organic compound

Prerequisites

Organic chemistry

Postrequisites

Basic and profile disciplines of the EP

Ecological Chemistry

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course examines the theoretical and practical foundations of environmental chemistry. Reveals the tasks of ecodiagnosis and ecoprophylaxis. Describes a chemical pollutant in the environment; stability and degradability. Studies the chemical transformations of pollutants in natural environments. Considers the ecological chemistry of the atmosphere, hydrosphere, soil. Reveals the essence of the impact of chemical production on the environment, as well as protection technology. Teaches experimental methods of ecological and chemical research and control of environmental objects.

Purpose of studying of the discipline

To study of the transformation of chemical compounds in the environment, forecasting the possible consequences of such changes and the formation of decision-making skills taking into account environmental requirements

Learning Outcomes

ON8 Use ecological knowledge in professional activity

Learning outcomes by discipline

1) Classify industrial pollutants
2) Evaluate physical chemical transformations of environmental pollutants
3)Solve the problems of ecodiagnosis and ecoprophylaxis

Prerequisites

General chemistry

Postrequisites

Basic and profile disciplines of the EP

Colloidal chemistry

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course studies the physicochemical properties of dispersed systems and the thermodynamics of surface phenomena. Outlines general information about adsorption at the interface. Explains electrokinetic phenomena in dispersed systems. He studies the main characteristics of lyophobic and lyophilic- dispersed systems. Considers issues of sedimentation and aggregation stability, rules for coagulation of sols by electrolytes. Forms an idea of microheterogeneous systems.

Purpose of studying of the discipline

To study the physical and chemical laws of processes and phenomena occurring at the phase boundary, as well as the properties of dispersed systems; see the areas of application of these laws, understand their fundamental possibilities in solving specific professional problems

Learning Outcomes

ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence
ON5 Use knowledge of applied chemistry in professional activities

Learning outcomes by discipline

1) Discuss surface phenomena and mechanical properties of solid molecules
2)Explain adsorption at the interface
3) Determine the main characteristics of lyophobic and lyophilic-dispersed systems

Prerequisites

Physical chemistry

Postrequisites

Fundamentals of Biochemistry

Production practice II

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Total mark on practice

Short description of discipline

This practice is directed by the organization of work at the enterprises of the chemical industry or in research institutions. Teaches basic professional skills. Studying regulatory and information literature and documentation (GOSTs, TUs, etc.). Forms modern ideas about the integrated use of raw materials, waste processing. Considers the basic methods of labor protection and safety in chemical laboratories and workshops.

Purpose of studying of the discipline

Transferring the knowledge gained by students in educational laboratories to production and technological schemes of production

Learning Outcomes

ON5 Use knowledge of applied chemistry in professional activities
ON6 Apply knowledge of the basics of instrumental chemistry to solve scientific and applied problems

Learning outcomes by discipline

1) Explain basic occupational health and safety practices in chemical laboratories and workshops
2) summarize normative documentation and information literature
3) to form basic professional skills in the chemical industry

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Production practice III

Fundamentals of Biochemistry

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course examines the biochemistry of chemical elements and their compounds. Studies the characterization and synthesis by chemical and biochemical methods of important biological molecules. Describes secondary metabolic structures, natural biologically active substances obtained from plant and animal raw materials (nucleotides and amino acids, peptides and proteins, nucleic acids, carbohydrates and their derivatives, lipids, vitamins, hormones, biological catalysts, as well as active bioregulatory substances)

Purpose of studying of the discipline

It is the study of the molecular basis of life, the composition, structure, properties of biological substances, and the reactions of these substances according to the activity of life.

Learning Outcomes

ON4 Own the methods of synthesis, modification and technology for the production of chemicals and materials
ON5 Use knowledge of applied chemistry in professional activities

Learning outcomes by discipline

1) Describe the characteristics of compounds and the synthesis of important biological molecules, secondary metabolic structures, natural biologically active substances
2) Analyze the most important indicators of plant and animal raw materials (amino acids, proteins and nucleic acids, nucleotides, carbohydrates and their derivatives, lipids, vitamins, biological catalysts)
3) Evaluate the qualitative composition of these substances by chemical and biochemical methods

Prerequisites

Organic chemistry Colloidal chemistry

Postrequisites

Basic and profile disciplines of the EP

Pedagogy

Discipline cycle	Basic disciplines
Course	4
Credits count	3
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

ON7 Own knowledge in the field of pedagogy,methods teaching chemistry

Learning outcomes by discipline

ON2 Apply modern teaching technologies and criteria- based assessment, taking into account the individual, physiological and psychological characteristics of students.
1. Knows the basic concepts of the theory of the subject
2. Has knowledge in the system of pedagogical training and makes decisions taking into account the holistic pedagogical process
3. Applies the basic skills of the teacher`s profession

Prerequisites

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

Postrequisites

Basic and profile disciplines of the EP Pedagogical practice

Methods of Teaching Chemistry

Discipline cycle	Profiling discipline
Course	4
Credits count	6
Knowledge control form	Examination

Short description of discipline

This course examines the pedagogical basis of teaching chemistry. Teaches the basic methods of teaching school and secondary special courses in chemistry. Considers systems of teaching aids. Studying modern methods of teaching in chemistry. Teaches the basics of demonstration experiments and their techniques. Reveals the essence of the organization of practical classes. Forms an idea of algorithms for solving problems in the theoretical and practical parts of chemistry.

Purpose of studying of the discipline

Improving the quality of training of specialists, the formation of natural scientific and technological knowledge in chemistry and related skills, the formation of a socially active personality

Learning Outcomes

ON7 Own knowledge in the field of pedagogy,methods teaching chemistry

Learning outcomes by discipline

1)Describe the pedagogical basis for teaching chemistry
2) Apply demonstration experiments and methods for their implementation
3) Organize modern methods of teaching chemistry

Prerequisites

Basic and profile disciplines of the EP General chemistry

Postrequisites

Pedagogical practice

Methods of scientific research in the field of chemistry

Discipline cycle	Profiling discipline
Course	4
Credits count	3
Knowledge control form	Examination

Short description of discipline

The course studies the main fundamental and applied scientific directions in the field of chemistry. Teaches reading and referencing chemistry literature. Considers the methodological basis of scientific research in chemistry. Studied fundamental research in chemistry, chemical engineering and materials sciences. Considers the essence and features of modern scientific research in the field of chemistry. Forms the concept of theoretical and experimental research methods in the chemical field.

Purpose of studying of the discipline

Formation of students` ability to analyze the results of scientific research and apply them in solving specific educational and research problems

Learning Outcomes

ON3 Use theoretical foundations of the fundamental sections of chemistry in the solution of professional competence
ON5 Use knowledge of applied chemistry in professional activities

Learning outcomes by discipline

1) describe the features of choosing the direction of scientific research and the stages of its implementation
2) own ways of understanding and critical analysis of scientific information
3) be able to conduct and organize research activities

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Undergraduate practice

Chemical Physics

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course studies the main areas of application, structure, properties of a solid body. Considers the essence and features of the nature of the forces of interaction of crystals, the structures of energy bands, the localization of the state of electrons in a crystal. He studies the theory of collisions, non-equilibrium chemical reactions. Forms the concept of active intermediates, free radicals and atoms. He studies chain reactions, flame structure and kinetics of chemical reactions in a flame, basics of cryochemistry and laser thermochemistry.

Purpose of studying of the discipline

The study of the laws of chemical physics that determine the direction of the flow of chemical processes, the physical and chemical values of the basic laws of thermodynamics, kinetics, the mechanism of chemical reactions, their role in determining the direction of chemical processes and describing the equilibrium in the system.

Learning Outcomes

ON 2 Apply mathematical methods and physical phenomena and laws in practice
ON5 Use knowledge of applied chemistry in professional activities

Learning outcomes by discipline

1) Describe the main areas of application, structure, properties of a solid body.
2) Illustrate chain reactions, the structure of a flame and the kinetics of chemical reactions in a flame, the basics of cryochemistry and laser thermochemistry.
3) Explain collision theory, non-equilibrium chemical reactions

Prerequisites

Physical chemistry Physical methods of research

Postrequisites

Basic and profile disciplines of the EP

Pedagogical practice

Discipline cycle	Profiling discipline
Course	4
Credits count	7
Knowledge control form	Total mark on practice

Short description of discipline

Practice studies the conditions of pedagogical activity, consolidation of the received theoretical knowledge in special subjects. Teaches necessary methods and skills for the profession. Studying teaching methods and pedagogical experience of teachers using the developed pedagogical methods. Examines communication and research skills, work in the field of teaching methods of the academic discipline. Forms students` professional and pedagogical skills.

Purpose of studying of the discipline

studying the fundamentals of pedagogical and educational- methodical work in higher educational institutions, mastering the pedagogical skills of conducting certain types of training sessions in the disciplines of the profile corresponding to the direction of study.

Learning Outcomes

ON6 Apply knowledge of the basics of instrumental chemistry to solve scientific and applied problems
ON7 Own knowledge in the field of pedagogy,methods teaching chemistry

Learning outcomes by discipline

1) To form communication and research skills in the field of teaching methods of the discipline
2) Compare teaching methods and pedagogical experience of teachers to use interactive methods
3) Apply professional and pedagogical skills.

Prerequisites

Methods of Teaching Chemistry Pedagogy

Postrequisites

Undergraduate practice