2. CONTENT OF THE EDUCATIONAL PROGRAM

№	Module code and name	Total number of credits	№	Code and name of the discipline	Academic credit discipline	Dual approach / partner	Cycle/ component
1	GSE module (General Education Subjects)	6	1	ISE 501 Management	2	Department of theory and practice in education	CC UC
			2	ISE 502 Foreign Language (Professional)	2	Deparment of professional foreign language training	CC UC
			3	ISE 503 Psychology of management	2	Psychology	CC UC
3	Current problems of modern chemistry	9	1	APMCh 501/1 Selected chapters in inorganic chemistry	4	Chemistry	CC OC
				APMCh 501/2 Theoretical Inorganic Chemistry			
			2	APMCh 502/1 Applied foundations of modern organic chemistry	5	Chemistry	CC OC
				APMCh 502/2 Heterocyclic compounds			
3	The main directions of modern chemistry	33	1	MDC 501 Educational technologies and teaching methodology of general chemistry	5	Chemistry	CC UC
			2	APMCh 503/1 Modern problems of analytical chemistry	5	Chemistry	MC UC
				APMCh 503/2 Spectroscopic analysis methods			
			3	MDC 502/1 Methods of solving problems in high level chemistry	6	Chemistry	MC UC
				MDC 502/2 Experimental tasks for the Chemistry Olympiad			
			4	MDC 503/1 Modern methodological foundations of teaching physical and colloid	6	Chemistry	MC UC

				MDC 503/2 Methods of teaching physical and colloid chemistry			
			5	MDC 504/1 Methods of using interactive methods of teaching chemistry in the university	6	Chemistry	MC UC
				MDC 504/2 General chemistry and teaching methods			
			6	MDC 505/1 Methodological aspects of teaching the course "Physical Research Methods"	5	Chemistry	MC UC
				MDC 505/2 Kinetics of electronic processes			
4	Fundamentals of scientific research methodology	6	1	BSR 501 Methodology and technology of scientific research	6	Chemistry	MC UC
5	RWM	10	1	RW 6.01 Intership	10	Chemistry	
		18	2	RWM 7 Research work of a master's student, including internship and completion of a master's thesis (RWM)	18	Chemistry	RWM
6	final attestation	8	1	FA-7 Preparation and defense of a master's thesis	8	Chemistry	FA
TOTAL:		90			90		

INFORMATION ABOUT MODULES AND DISCIPLINES

General Education subjects module

Module description: The disciplines of the module are aimed at learning new achievements in the field of psychological and Pedagogical Sciences, mastering the skills of oral and written communication in pedagogical various communication situations, observation and adaptation to the situation, taking into account the peculiarities of Physiology and psychology of adolescent children.

Basic terminology in the field of vocabulary and chemistry, expressing the general scientific style of the profession for educational and professional purposes, analyzes languages, methods of annotation and compilation, as well as literature of a scientific and pedagogical nature. Uses knowledge of a foreign language to communicate and understand special texts.

№	Code and name of the discipline	Cycle/ component	Number of credits	Description of the discipline	Teaching methods	LOs	Methods assessments
1	ISE 501 Management	CC UC	2	The management course reveals the content of management, forms the basic principles and methods of modern management, as well as the role of the organization in ensuring its existence and competitiveness, specific skills in implementing various types of management activities, management systems and project analysis, and also examines the history of management development. It serves to form the professional skills and abilities of future managers.	General scientific methods: system analysis and synthesis, modeling, formalization idealization.	LO 1 LO 2 LO 3	Writing

2	ISE 502 Foreign Language (Professional)	CC UC	2	The course is aimed at ensuring practical mastery of a foreign language, the formation of intercultural and communicative competence of undergraduates in non-linguistic areas of training in the process of foreign language education at the level of super-basic standard (C1). The discipline expands and improves the language skills of undergraduates in the context of their professional activities. The course includes the study of specific vocabulary, terminology and communication strategies relevant to the subject area of the master's program. Students are introduced to professional texts, documentation and communication situations that may arise in their future career. Through listening, reading, writing and speaking, students develop skills to communicate effectively in a foreign language in a professional context. Particular attention is paid to the development of presentation, negotiation and written correspondence skills.	General scientific methods: system analysis and synthesis, modeling, formalization Idealization.	LO 1 LO 2 LO 3	Writing
3	ISE 503 Psychology of management	CC UC	2	Master's students analyze the psychological aspects of leadership, including motivation, leadership, communication and conflict management. Particular attention is paid to psychological methods of personnel management and organizational change. Master's students study the application of psychological concepts to the management of educational institutions, developing skills in analysis and decision-making in complex situations. The course also includes case studies and scenarios to prepare undergraduates for effective leadership and management in an educational environment.	General scientific methods: system analysis and synthesis, modeling, formalization idealization.	LO 1 LO 2 LO 3	Writing

Current problems of modern chemistry

Module description: In the process of mastering the module, ideas and abilities are formed to solve and master the main problems of chemistry in modern society, at the stage of modern development. Undergraduates develop practical skills in the main areas of chemistry.

№.	Code and name of the discipline	Cycle/ component	Credits	Description of the discipline	Teaching methods	Target LOs	Assessment methods
4	APMCh 501/1 Selected chapters in inorganic chemistry	CC OC	4	The place of modern inorganic chemistry in the system of natural Sciences. The importance of inorganic chemistry for various fields of technology, medicine and agriculture. Periodic law, Periodic system of chemical elements: the current state of the problem. The main features and tasks of modern inorganic chemistry: search, synthesis and design of new chemical compounds, creation of structural materials of the future. Inorganic chemistry of the future.	Explanatory and illustrative method	LO 6 LO 8	Writing
	APMCh 501/2 Theoretical Inorganic Chemistry			Electronic structure of matter. Ionic bond. Types of ion gratings. Thermodynamic and kinetic regularities of behavior of compounds with ionic type of bonds. The nature of Covalence. Covalent compounds of nonmetals with multiple element-element bonds. Connection with the intermediate type of chemical bonding. Chemistry of aqueous and non-aqueous solutions. Theory of chemical bonds in transition metal compounds. Stability of covalent compounds of transition metals. Ideas about the frame and cluster compounds. Compounds of early transition metals of groups III, IV and V.			

5	APMCh 502/1 Applied foundations of modern organic chemistry	CC OC	5	Current state of organic chemistry. Organic synthesis: the main stages, patterns and trends. Organic catalysis. Reactivity and catalysis, mechanisms of catalytic reactions. Computer synthesis of complex organic compounds, molecular design. Mathematical and computer modelling in organic chemistry. Chemistry of life processes. New in the chemistry of proteins and nucleic acids. Engineering Enzymology.	Explanatory and illustrative method	LO 7 LO 8	Writing
	APMCh 502/2 Heterocyclic compounds			Classification of heterocyclic compounds. Five-membered heterocycles with one heteroatom. Five-membered heterocycles with two or more heteroatoms. Six- membered heterocycles with one heteroatom. Six and seven-membered heterocycles with two heteroatoms. Bicyclic heterocycles. Nucleic acid. Structure and structure of nucleicacids. DNA (deoxyribonucleic acids). RNA (ribonucleic acids).			
The main directions of modern chemistry **Module description**: In the process of mastering the module, ideas and skills are formed about the main problems of modern chemistry and their solution and development. Undergraduates master and develop the main areas of chemistry, including methods of physical chemistry, physico-chemical analysis, basic methods of synthesis of organic and inorganic compounds and their research							
№.	**Code and name of the discipline**	**Cycle/ component**	**Credits**	**Description of the discipline**	**Teaching methods**	**Target LOs**	**Assessment methods**

6	MDC 501 Educational technologies and teaching methodology of general chemistry	MC OC	5	Methodological foundations of teaching inorganic chemistry. Modern methods and technologies of teaching general and inorganic chemistry in universities. Methodological aspects of the study of the topic "nuclear construction". Methodological aspects of teaching the topic "chemical bonding". Teaching methods of the main sections of inorganic chemistry: solutions, theory of electrolytic dissociation, complex compounds. "Redox reactions. Electrode processes".	The case project method	LO 1 LO 6	Writing
7	APMCh 503/1 Modern problems of analytical Chemistry	CC OC	5	The subject "Modern problems of analytical Chemistry" belongs to the professional cycle of BP (TC) disciplines. This is an interdisciplinary course on environmental safety, detection and elimination of pollutants. Therefore, to study this subject, it is necessary to know in advance the basics of biology with elements of inorganic chemistry, organic, analytical chemistry, physical chemistry, chemical technology, mathematics and ecology. This course reveals the role of analytical chemistry in solving industrial and environmental problems.	The research method	LO 4 LO 5	Writing
	APMCh 503/2 Spectroscopic analysis methods			Absorption, scattering, or emission of electromagnetic energy by atoms and molecules. Molecular absorption spectroscopy. The Booger Lambert-Behr law. Radiation absorption spectroscopy. Spectroscopy of radiant scattering. Radiation spectroscopy of radiation. X-ray spectroscopy. Optical spectroscopy. Spectroscopy in the visible region. IR spectroscopy. Radiospectroscopy. Nuclear spectroscopy. NMR. An atomic emission facility. X-ray fluorescent object			

8	MDC 502/1 Methods of solving problems in high level chemistry	MC OC	6	Methods for solving problems of an increased level of complexity: calculations based on chemical formulas. Calculations based on the equations of chemical reactions. Problems with equations of parallel reactions. Physico - chemical calculations. Derivation of formulas of chemical compounds in various ways. The derivation of the formula of the substance based on the mass fraction of the elements. The derivation of the molecular formula of a substance by the relative density of its vapors and the mass, volume or amount of the substance of the combustion products. The derivation of the formula of a substance based on the general formula of a homological series of organic compounds. The method of solving combined problems. Non-standard and Olympiad tasks.	Explanatory and illustrative method	LO 1 LO 6	Writing
	MDC 502/2 Experimental tasks for the Chemistry Olympiad			Calculations based on chemical formulas and equations of chemical reactions. Problems with equations of parallel reactions. Physico-chemical calculations. Obtaining formulas of chemical compounds in various ways. The derivation of the formula of the substance based on the mass fraction of the elements. The derivation of the molecular formula of a substance by the relative density of its vapors and by mass, volume or quantity of combustion products. The derivation of the formula of a substance based on the general formula of a homological series of organic compounds. A method for solving mixed problems. Certain numeric parameters. Comparison of quantitative data from several processes			

9	MDC 503/1 Modern methodological foundations of teaching physical and colloid	MC OC	6	Chemical thermodynamics. Elements of statistical thermodynamics.Phase equilibrium and physico-chemical analysis. Solutions of nonelectrolytes. Solutions of electrolytes. Chemical kinetics.Catalysis. Homogeneous, heterogeneous catalysis. Theories of heterogeneous catalysis.Structural and mechanical properties of dispersed systems. Colloidal surfactants.The nature and some properties of IUD solutions.	The case project method	LO 1 LO 4 LO 6	Writing
	MDC 503/2 Methods of teaching physical and colloid chemistry			Chemical thermodynamics. Elements of statistical thermodynamics. Phase equilibrium and physico-chemical analysis. Solutions of nonelectrolytes. Solutions of electrolytes. Chemical kinetics. Catalysis. Homogeneous, heterogeneous catalysis. Theories of heterogeneous catalysis. Structural and mechanical properties of dispersed systems. Colloidal surfactants.The nature and some properties of IUD solutions.			

10	MDC 504/1 Methods of using interactive methods of teaching chemistry in the university	MC OC	6	The main forms and methods of interactive learning. An interactive approach. Principles and methods of building an interactive educational process at a university. Individualization. Flexibility. Electivity. A contextual approach. Modern interactive teaching methods. Problem-situational teaching methods. Round table, discussion, debate. Brainstorming, brainstorming, brainstorming. Business and role-playing games. Case-study (analysis of specific situations, situational analysis). A master class. Video conference	The case project method	LO 1 LO 6	Writing
	MDC 504/2 General chemistry and teaching methods			The specifics of modern methods and methodology in teaching chemistry. Active methods in teaching chemical disciplines. Problem-based learning. The course is aimed at studying the system of the subject and objectives of the course. The subject and objectives of the course. Modern problems of teaching and learning. The learning system: goals, content, methods, organizational forms, means, control of assimilation and diagnostics of the formed knowledge. The principles of learning. Methods of teaching chemistry. Organizational forms of teaching chemistry. Chemistry teaching tools. Assessment and diagnosis of the qualities of chemical knowledge. The methodology of studying the most important topics of general chemistry.			

11	MDC 505/1 Methodological aspects of teaching the course "Physical Research Methods"	MC OC	5	Methodology and methodology of scientific research. Characteristics and classification of physico-chemical methods of analysis. Organization of the research process. The methodology of studying the topic: "Chromatographic and spectroscopic methods of analysis". Methods of performing high-quality chromatographic analysis. Sampling and sample preparation. Methodological aspects of the study of the topic: optical methods.	The case project method	LO 1 LO 4 LO 6	Writing
	MDC 505/2 Kinetics of electronic processes			Polarization and overvoltage. Double electric layer. Electrocapillary phenomena. Diffusion kinetics. The theory of delayed discharge. Kinetics of complex electrochemical reactions. Electrochemical reactions with sequential electron transfer. Kinetics of electrode processes involving metal complexes. Oxidation—reduction as an electronic process. Electrochemical processes under conditions of a slow chemical reaction.			

Fundamentals of scientific research

Module description: This module studies disciplines aimed at the formation of scientific skills in the synthesis and identification of organic compounds, organization, creation of general scientific research, selection and development of necessary methods of analysis, familiarization with the principles of research, determination of the effectiveness of scientific research methods.

№.	**Code and name of the discipline**	**Cycle/ component**	**Credits**	**Description of the discipline**	**Teaching methods**	**Target LOs**	**Assessment methods**

12	BSR 501 Methodology and technology of scientific research	MC OC	6	The significance and significance of scientific research. Classification of sciences. The connection of the course with other disciplines. Differentiation and integration of science. Accelerated development of science. Methodological foundations for determining the level of science in different countries of the world. The level of development and the main directions of scientific research in different countries of the world. Organization of science in Kazakhstan. Legislation and acts regulating the foundations of normative research. Methodology and methodology of scientific research. The essence of the research methodology. Principles and problems of research.	The case project method	LO 1 LO 6	Writing

Research work Module

Module description: Research work is considered an important component of master's education in the field of geography and includes various stages and activities that contribute to the academic and professional growth of undergraduates. Through teaching practice, research practice, internships and the defense of a master's thesis, graduate students gain valuable experience in teaching, research and practical application of their knowledge. The application of research methods and the search for academic publications will further strengthen their research skills and strengthen their participation in the academic community.

No.	**Code and name of the discipline**	**Cycle/ component**	**Number of credits**	**Description of the discipline**	**Teaching methods**	**LOs**	**Assessment methods**
13	RW 6.01 Intership	MC OC	10	Development of scientific and methodological knowledge and compliance with the requirements of the international labor market, creative potential in pedagogical practice; consideration of the main directions and development of highways in the modern education system; study of the personality of highways.	Practical work	LO 7	Report

14	Research work of a master's student	RWM	18	The structure of the master's thesis involves the submission of chapters 1, 2 and 3 (introduction, review of educational policies and literature analysis) by the end of the first semester; Chapter 4 (description of research methods) by the end of the second semester; Chapter 5 (Data Analysis) by the end of the third semester; and submitting the final draft of the dissertation to the supervisor by April of the fourth semester, followed by a defense of the research methods before the university ethics committee at the end of the third semester.	Practical work	LO 7	Report
15	final examination	IA	8	Preparation and defense of a master's thesis	Completion and defense of the dissertation	LO 7	Defense