1. CHARACTERISTIC OF THE EDUCATIONAL PROGRAM

The purpose of the educational program: Preparation of doctors of philosophy (PhD) with in-depth knowledge of theory, methodology and practice in the field of chemistry, capable of conducting fundamental and applied scientific research, pedagogical and managerial activities.

1.1 GENERAL INFORMATION

Type of educational program	current
Name of the educational program	"8D01503-Chemistry "
Field of education	8D01 Pedagogical science
Training direction	8D015 Training of teachers in natural science subjects
The group of the educational program	D013 Training teachers of Chemistry
License to engage in educational activities	The Educational program is implemented on the basis of the Appendix to the License №KZ75LAA00018542 dated August 04, 2020 in the direction of training 8D015 Training of teachers in natural science subjects ("8D01503-Chemistry"), issued by the Committee for control in the field of education and science of Ministry of Education and Science of the Republic of Kazakhstan.
Number and Date of Registration/ Update in the Register of EP	Registration number – 8D01500027 The date of registration in the Registry – 08.14.2019 The date of updating the passport of the EP - 11.09.2023
Specialized disciplines for admission to the EP	Inorganic chemistry Organic Chemistry Methods of teaching chemistry
Educational level by NQF	level 8, doctorate
Awarded degree	PhD in the educational program "8D01503-Chemistry "
Accreditation	Institutional accreditation: ACQUIN Institute of Accreditation, Certification and Quality Assurance, date of issue: 12.22.2023, validity period of accreditation: 12.22.2023-30.09.2029
Rating of the educational program	-
The total amount of academic credits	180
Study duration	3 years

1.2 VISION, MISSION, PROGRAM GOAL, VALUES, UNIVERSITY GRADUATE ATTRIBUTES

Vision:

The University as a unique and prestigious scientific and educational center, contributing to the successful implementation of initiatives in education and science.

Mission:

Preparation of highly qualified pedagogical personnel who contributes professionally to the development of human capital of the country.

Program goal:

Our University aims to become a hub for innovative teaching, learning, research as well as the development of rural education in Central Asia.

Values:

Integrity, dedication to one's work, caring for others

The Purpose of the Educational Program: Preparation of competitive doctors of philosophy (PhD) who are capable of independent development in the professional sphere, who have deep knowledge of the theory, methodology and practice in the field of chemistry and possess the skills of research and teaching in the field of chemistry.

University graduate attributes:

- Self-guided learners and reflexive practitioners
- Responsible personalities with moral and ethical values
- Professionals with deep subject knowledge and digital skills
- Creative and critical thinkers and excellent team players and communicators
- Adaptive leaders in teaching and learning
- Diverse, inclusive and for equality of opportunity in society

1.3. THE RATIONALE BEHIND THE EDUCATION PROGRAM

Justification:

The Relevance of the EP.

The relevance of EP is explained on the one hand by the active development of the chemical direction based on the integration of the two sciences taking into account interdisciplinary links. On the other hand, the competitiveness of double-profile personnel, including in education, is increasing.

The need of the market.

The need for teachers of chemistry is relevant, especially in the context of the updated content of secondary education, requiring a teacher who is motivated for his or her professional activity, mobile, socially active and in demand on the labor market.

The need for teachers in chemistry at daytime state general education schools in the Republic of Kazakhstan is 271 people, which indicates the need for training of teachers-chemists and biologists. Thus, despite the positive changes in the system of training and development of teachers, there are still a number of problems that negatively affect the attraction and retention of qualified teachers. In this regard, the Program provides measures to solve problems in the development of the country's pedagogical potential.

By 2023, teacher training programmes will be fully updated to reflect the professional standard.

1.4. DISTINCTIVE FEATURES OF THE EDUCATIONAL PROGRAM

Academic mobility	
Double-degree program	
Additional education (Minor)	

Coincidence with similar EP of leading universities in the near and far abroad *Coincidence with Similar Results of Leading Universities of Neighbouring and Distant Countries.*

Kazan Federal University - 65 %

Sankt Petersburg state University - 50 %

1.5. GRADUATE CAREER OPPORTUNITIES

- Universities;
- Government bodies in the field of education, chemical industry;
- Establishments of control and analytical services, centers of standardization and certification;
- Agencies of natural resources and environmental protection.
- Bodies of natural resources and environmental protection.

1.6. AREAS OF PROFESSIONAL COMPETENCE

– Doctors of education in the educational program "8D01503-Chemistry" can carry out the following types of professional activity:

- educational and pedagogical: working as teachers of chemistry in higher educational institutions of the state and non-state sector;
- organizational and managerial, working as heads of departments and various services in scientific organizations, research institutes, as well as various departments and departments of the chemical, pharmaceutical, metallurgical industries, and environmental services;
- production and technology: working in the institutions of the above profiles - research and experimental research: working as specialists and researchers in the laboratories of chemical, environmental, metallurgical, pharmaceutical, petrochemical, gas and coal profiles

1.7. EDUCATIONAL PROGRAM LEARNING OUTCOMES:

LO1- Knows the standards of education, the basic rules of academic writing for the public presentation of scientific results in a modern form;
LO2 - Diagnoses scientific problems and the solution of existing problems based on theoretical analysis and empirical research, systematizing the logic and methods of scientific research;
LO3- Applies the results of complex physical and chemical studies in solving problems of professional activity, including in the project activities of students using digital knowledge;
LO4 - Offers alternative options for solving educational, research and practical problems in the field of chemistry, has the ability to choose the best methods of scientific research;
LO5- Draws up scientific and pedagogical documentation and implementation of the results of scientific research, developments in the form of materials for publications in scientific and methodological journals, including journals with an impact factor.
LO6- Able to design, implement and adapt modern aspects of chemistry into the educational process, implements analytical and technological solutions in the field of experimental and theoretical chemistry and chemical education.
LO7- Able to critically evaluate problems, approaches and trends that reflect the current state of chemistry, areas of scientific and pedagogical research and areas of professional activity.

1.4 Graduate Profile

Matrix for correlating EP learning outcomes with graduate attributes

	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7
GA1	+			+	+	+	
GA 2			+	+			+
GA 3		+	+	+			
GA 4		+	+			+	+
GA 5	+				+		+
GA 6	+	+			+	+	+

1.8. REFERENCES

The educational program is developed based on the following legal acts:

1) The State general education standard of postgraduate education. Order No. 2 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022.

2) Professional standard "Teacher". Order of the Acting Minister of Education of the Republic of Kazakhstan dated December 15, 2022 No. 500.

2. CONTENT OF THE EDUCATIONAL PROGRAM

№	Code and name of modules	Total credits by module	№	Name of subject and code	Credits by subjects	Cycle/component
1	**ORW** Module 2 Organization of research work	**9**	1	**ORW 701** Academic writing	4	CC/UC
			2	**ORW 702** Methods of scientific research	5	CC/UC
2	**ChTM** Module 2 Chemistry Teaching Methodology	**16**	1	**ChTM 701** Methodology and modern technologies for teaching general chemistry	6	MC/UC
			2	**ChTM 702/1** Methodology for the application of physical and chemical research in scientific projects of students	5	MC/OC
			3	**ChTM 702/2** Digital technologies in education and scientific research		
			4	**ChTM 703/1** Methodological aspects of teaching analytical chemistry	5	MC/OC
			5	**ChTM 703/2** Actual problems of teaching organic chemistry at the university	5	MC/OC
3	**PT** Module 3 Proffessional training	**10**	1	**PT 801** Pedagogical practice	10	UC/CC
		10	2	**PT7(8)02** Research practice	10	MC/CC
		123	3	**PT7(8,9) 031** Doctoral student research work, including internship and doctoral dissertation DSRW	112	DSRW
			4	Methods of scientific research	2	
			5	Intensive courses	9	
4	**FC** Final certification	**12**	1	**FE 901** Writing and defense a doctoral dissertation	12	FC
TOTAL:		**180**			**180**	

2.1. DESCRIPTION MODULES AND DISCIPLINES

ORW – 1 Organization of research work

Module description: The content of the module covers in detail the issues necessary to understand the essence of research work and methods for its implementation, reveals the basic concepts and categories of scientific research, describes the methodological principles of scientific research. A great place in the study of the module is occupied by the basics of modern information and bibliographic culture, methods, methods and means of obtaining, storing, processing information. The study of the disciplines of the module is designed to familiarize doctoral students with the organization of scientific knowledge and scientific research, to prepare them for conducting their own research and writing dissertations. This module involves the development of methods and technologies of research work using modern digital resources. The pedagogical practice of the module is aimed at involving a doctoral candidate in the teaching or teaching and methodological activities of the department to which he is attached, which allows to strengthen practical training in these areas and acquire the necessary practical skills for the competent organization and implementation of teaching and (or) educational and methodological work.

№	Name of subject and code	Cycle/component	Credits	Subject discruption	Teaching methods	LO by EP	Assessment methods
1	**ORW 701** Academic writing	UC	4	The discipline is aimed at developing the skills of writing various scientific texts (scientific article, report, opinions, literary review, empirical article, etc.) in accordance with the standard of education and the basic rules of academic writing for the design of scientific and pedagogical documentation and publication of research results in scientific methodological journals, including journals with impact factor. The course develops the ability to critically evaluate problems, approaches and trends in the field of professional activity of a doctoral candidate.	Empirical method, problem-based search method	LO1, LO5, LO7	Written
2	**ORW 702** Methods of scientific research	UC	5	The discipline deals with the basic concepts of research work, scientific methods of research and methods of scientific search. They get acquainted with diagnosing scientific problems and form skills for solving existing problems on the basis of theoretical analysis and empirical research, systematizing the logic and methods of scientific research.	Empirical method, problem-based search method	LO1, LO2, LO5, LO7	Written

				They get acquainted with the procedures for formalizing and implementing the results of scientific research, preparing publications based on the results of research work in journals with an impact factor. During the course, the student learns to critically evaluate the problems, approaches and trends of modern chemistry, scientific, pedagogical and professional spheres.			

ChTM-2 Chemistry Teaching Methodology

Module description: The module includes disciplines, mastering which, doctoral students gain knowledge about innovative methods and modern technologies for teaching chemistry at the stages of higher education. The material of academic disciplines serves as the basis for understanding the features, principles, conditions, logical and temporal structure of teaching chemistry. The module focuses on methodological issues of teaching chemistry. The research practice of the module is aimed at developing the skills and abilities of a doctoral candidate to conduct scientific research in a chosen area, to use scientific methods in conducting research, to analyze, generalize and use the results obtained.

№	Name of subject and code	Cycle/component	Credits	Subject discruption	Teaching methods	LO by EP	Assessment methods
1	**ChTM 701** Methodology and modern technologies for teaching general chemistry	UC	6	The course considers various options for solving methodological problems and modern technologies for teaching general chemistry, develops the ability to choose optimal teaching methods, the ability to design, implement and adapt modern aspects of chemistry into the educational process, implements analytical and technological solutions in the field of experimental and theoretical chemistry and chemical education.	Empirical method, problem-search method	LO4, LO6	Written
2	**ChTM 702/1** Methodology for the application of physical and chemical research in scientific projects of students	OC	5	During the course, the skills of applying the results of complex physical and chemical studies in solving problems of professional activity, including in the project activity of students using digital knowledge, are formed. The course is aimed at developing the ability to design, implement and adapt modern achievements in chemistry into the educational process, implement analytical and	Empirical method, problem-search method	LO3, LO6	Written

				technological solutions in the field of experimental and theoretical chemistry and education.			
	ChTM 702/2 Digital technologies in education and scientific research			The application of modern digital technologies in the educational process (including design work), complex physical and chemical research and in professional activities is considered. Develops skills in developing various options for solving educational, research and practical problems in the field of chemistry and pedagogical science using digital knowledge, forming the ability to choose the best methods of scientific research.	Empirical method, problem-search method	LO 3, LO 4	Written
3	**ChTM 703/1** Methodological aspects of teaching analytical chemistry	OC	5	The course considers the methodological aspects of teaching analytical chemistry and develops the ability to analyze and implement modern aspects of chemical analysis into the educational process, implement analytical and technological solutions in the field of chemical education, diagnose scientific problems and solve existing problems based on theory and empiricism in the system of scientific search and logic in areas of analytical chemistry.	Empirical method, problem-search method	LO 2, LO 6	Written
	ChTM 703/2 Actual problems of teaching organic chemistry at the university			The discipline considers topical problems of teaching organic chemistry and directs to the analysis and search for alternative solutions to educational, research and practical problems in the field of organic chemistry, to the development of the ability to introduce and adapt modern scientific achievements of organic chemistry into the educational process. implementing technological solutions in the field of theoretical and practical organic chemistry and education.	Empirical method, problem-search method	LO 4, LO 6	Written

PT – 2 Proffessional training

Module description: The module examines the performance of a doctoral student's research work on their subject using modern methods of scientific research, based on modern theoretical, methodological and technological achievements of science and practice. The module considers the passage of a scientific internship in order to get acquainted with innovative technologies and new types of production, conduct scientific and experimental research in scientific organizations and / or organizations of relevant industries or fields of activity in the country or abroad.

№	Name of subject and code	Cycle/component	Credits		Subject discruption	Teaching methods	LO by EP	Assessment methods
1	**PT 801** Pedagogical practice	UC	10		Development of creative potential, development of scientific and methodological knowledge in pedagogical practice and adaptation to the requirements of the international labor market; to consider the main directions and development of doctoral students in the modern education system;	Educational process	-	Report
2	**PT7(8)02** Research practice	UC	10		Development of creative potential, development of scientific and methodological knowledge and adaptation to the requirements of the international labor market; to consider the main directions and development of doctoral students in the modern education system;	Practical work	-	Report
3	**PT7(8,9) 03** Doctoral student research work, including internship and doctoral dissertation DSRW	DSRW	3	5	Research work is carried out aimed at developing the ability of doctoral students to make their own theoretical and practical conclusions. The formation of one's own opinion forms the skill of an objective assessment of scientific information, the ability to integrate interdisciplinary knowledge into a free scientific search. Examines the ways of applying scientific knowledge in educational activities, discusses them in the scientific community.	Practical work	-	Report
	Intensive courses		2		The discipline "Methods of scientific research", carried out in order to provide the student with the information necessary for effective writing of scientific research work, carries out a comprehensive analysis of various scientific texts, starting with the concept of research. The analysis of research works is carried out, focusing on the writing of their methodology section. The doctoral student is given the opportunity to			

					develop a research plan that he considers appropriate, combining the experience and knowledge gained up to this stage in his field of research. In addition, detailed information is provided on the set of studies that are included in the design of the research work. This contributes to the systematic recording of the doctoral student's research work and informing about other methods of scientific research. It will also improve knowledge about the information necessary for the course of the research process, such as the use of quantitative, qualitative, mixed research methods, ways of collecting data, research ethics, data analysis**.**			
4	**PT7(8,9) 03** Doctoral student research work, including internship and doctoral dissertation DSRW	DSRW	20	25	Research work is carried out aimed at developing the ability of doctoral students to make their own theoretical and practical conclusions. The formation of one's own opinion forms the skill of an objective assessment of scientific information, the ability to integrate interdisciplinary knowledge into a free scientific search. Examines the ways of applying scientific knowledge in educational activities, discusses them in the scientific community.	Practical work	-	Report
	Intensive courses		5		is aimed at developing the skills of writing various scientific texts (scientific article, report, reviews, literary review, article based on empirical data, etc.), comprehensive mastery of their features and structures. The course covers all the problems that a doctoral student faces in the process of writing an article, starting with the choice of a topic and ending with its publication. In the course of studying the discipline, doctoral students improve such skills as critical thinking, systematization of writing, scientific discourse, critical reading, analysis, evaluation, etc. They get acquainted with the structure and styles of scientific articles in highly rated journals of international level.			
5	Doctoral student research work, including	DSRW	18	20	Research work is carried out aimed at developing the ability of doctoral students to make their own theoretical and practical	Practical work	-	Report

	internship and doctoral dissertation DSRW				conclusions. The formation of one's own opinion forms the skill of an objective assessment of scientific information, the ability to integrate interdisciplinary knowledge into a free scientific search. Examines the ways of applying scientific knowledge in educational activities, discusses them in the scientific community.			
	Intensive courses		2		is aimed at developing the skills of writing various scientific texts (scientific article, report, reviews, literary review, article based on empirical data, etc.), comprehensive mastery of their features and structures. The course covers all the problems that a doctoral student faces in the process of writing an article, starting with the choice of a topic and ending with its publication. In the course of studying the discipline, doctoral students improve such skills as critical thinking, systematization of writing, scientific discourse, critical reading, analysis, evaluation, etc. They get acquainted with the structure and styles of scientific articles in highly rated journals of international level.			
6	Doctoral student research work, 7including internship and doctoral dissertation DSRW	DSRW	23	25	Research work is carried out aimed at developing the ability of doctoral students to make their own theoretical and practical conclusions. The formation of one's own opinion forms the skill of an objective assessment of scientific information, the ability to integrate interdisciplinary knowledge into a free scientific search. Examines the ways of applying scientific knowledge in educational activities, discusses them in the scientific community.	Practical work	-	Report
	Intensive courses		2		is aimed at developing the skills of writing various scientific texts (scientific article, report, reviews, literary review, article based on empirical data, etc.), comprehensive mastery of their features and structures. The course covers all the problems that a doctoral student faces in the process of writing an article, starting with the choice of a topic and ending with its publication.			

					In the course of studying the discipline, doctoral students improve such skills as critical thinking, systematization of writing, scientific discourse, critical reading, analysis, evaluation, etc. They get acquainted with the structure and styles of scientific articles in highly rated journals of international level.			
7	Doctoral student research work, including internship and doctoral dissertation DSRW	DSRW	30		Research work is carried out aimed at developing the ability of doctoral students to make their own theoretical and practical conclusions. The formation of one's own opinion forms the skill of an objective assessment of scientific information, the ability to integrate interdisciplinary knowledge into a free scientific search. Examines the ways of applying scientific knowledge in educational activities, discusses them in the scientific community.	Practical work	-	Report
8	Doctoral student research work, including internship and doctoral dissertation DSRW	DSRW	18		Research work is carried out aimed at developing the ability of doctoral students to make their own theoretical and practical conclusions. The formation of one's own opinion forms the skill of an objective assessment of scientific information, the ability to integrate interdisciplinary knowledge into a free scientific search. Examines the ways of applying scientific knowledge in educational activities, discusses them in the scientific community.	Practical work	-	Report
9	**Final Certification**	FE	12		Writing and defense a doctoral dissertation			

3. RESOURCE SUPPLY OF THE EDUCATIONAL PROGRAM

3.1. LIBRARY FUND

One of the important indicators of the quality of training in the educational program is the provision of students with educational, methodological, scientific literature, reference and periodicals.

The library Fund for the EP cipher and name as of may 1, 2023 is _3102___copies, including in the state language - __2325_copies, _746__copies in Russian and__31__ copies in foreign languages.

The University library provides students and faculty with access to databases: IPR books, Polpred, Alembook, Web of Science, Elsevier (Scopus).

Access to the Republican interuniversity electronic library (RIEL), which combines electronic educational and scientific resources of Universities of the Republic of Kazakhstan, is provided.

Students of the educational program have access to the following scientific journals: Students of the educational program are provided with access to the following scientific journals: Izvestiya NAN RK, Bulletin of NAN RK, Chemical journal of Kazakhstan, Bulletin of KazNU named after al-Farabi (chemical series, biological series), Vestnik KazNatsZhenPU, Chemistry mectepta, Biology at the Kazakhstan school, Chemistry at school (Russia), Biology at school (Russia), Chemistry directory, Biology directory, Search, Higher School of Kazakhstan.

Since 2010, the library provides an opportunity for students of Kazakh National Women's Teacher Training University to get acquainted with the content of master's theses in traditional format (more than 150 titles), half of it have been converted into PDF format.

Students can also use the "Kazakh National Women's Teacher Training University's Electronic library" service, which provides access to the electronic library from a computer anywhere in the world in 24/7 format (website address: lib.kazmkpu.kz). There are about 10,000 full-text sources, more than 1,000 licensed books, 6676 scanned books by the library staff, and about 300 books that belong to the rare collection.

3.2. TEACHERS STAFFING

The educational program is implemented by the Chairs Chemistry. Quantitative and qualitative indicators of faculty serving the educational program (disciplines of basic and major cycles):

Total number of faculty - 20 people, including: 18

Doctor of science – 3

Candidate of Sciences – 8

Ph.D – 3

The ratio of degree awarded faculty members of the EP– 68,4 %.

The qualification characteristics of the teaching staff of the educational program are reflected in the **Personnel Directory.**

3.3. MATERIAL AND TECHNICAL BASE

Laboratory research, classes, experiments, analyses, and experiments for scientific and industrial purposes are conducted in a specially designated room-the laboratory. All laboratory classrooms are equipped and equipped with special chemical modern equipment (photocolorimeter, thermostat, ionometer, potentiometer, electronic, analytical scales). All laboratory classrooms of the

Department of chemistry meet the requirements of curricula and programs to conduct laboratory-practical and research work.

Name of the laboratory: No. 333 "Complex chemical and biological research center" of equipment in the laboratory: Distiller "GFL-2004", IR spectrometer "Bruker ALFA", UK spectrometer "SI Analytics UviLine 9400-9100", Atomic adsorption spectrometer" Perkin Elner Pin AAcle 900", x – ray Diffractometer" RiGaku Mini Flex 300/600", Analytical scales" Ohaus Pioneer", pH meters.

Name of the laboratory: No. 322

Chemical equipment in the laboratory: 1 computer, reagents and devices for laboratory studies, fume hood, electronic scales, microscope, adsorption unit. (computer performance). QALFC.

Name of the laboratory: No. 326

Chemical equipment in the laboratory: 1 computer, reagents and chemical devices for laboratory classes, fume hood, muffle furnace,

laboratory electric furnace, conductometer.

Name of the laboratory: No. 328

Chemical equipment in the laboratory: 1 computer, laboratory reagents and devices, fume hood, water thermostat, rotating evaporator, technical scales, water heater flask, reactor glass for organic synthesis, drying Cabinet, photocolorimetr.

Name of the laboratory: No. 332

Chemical equipment in the laboratory: 1 computer, for laboratory studies reagents and chemical devices fume hood, electronic scales, drying Cabinet, melting point. detector, Refractometer, KFC 2 photocolorimeter, pH meter.

Name of audience: No. 331

Chemical equipment in the laboratory: 1 interactive whiteboard (acer), 1 computer, stand.

Practice bases:

№	Name of company	№ and contract date
1	Scientific research Institute of Gorenje problems, Almaty. The contract	07.08.2018г.
2	Institute of Chemical Sciences named after A.B. Bekturov, Almaty. Memorandum,	27.01.2022 г.
3	Institute of Metallurgy and Enrichment	19.07.2022г.
4	Aktobe Regional University named after. K. Zhubanova	27.01.2022г.

4. LONG-TERM PLAN FOR THE DEVELOPMENT OF THE EDUCATIONAL PROGRAM

	Content of the event	**Implementation period**	**Responsible**
Educational and Methodological Direction			
1	Development of syllables, educational and methodological complexes of disciplines	August 2023	Teaching staff of the Department of Chemistry
2	Preparation of textbooks and teaching aids	during a year	Teaching staff of the Department of Chemistry
3	Conducting methodological seminars	during a year	Teaching staff of the Department of Chemistry

4	Preparation of basic educational programs accredited in academic year: preparation of explanatory notes and other structural components of the EP.	during a year	EP developers
Research Direction			
1	Boosting research grant applications	during a year	Teaching staff of the Department of Chemistry
2	Activation of the activities of the teachers of the department in the preparation of publications indexed in SCOPUS, Web of Science	during a year	Teaching staff of the Department of Chemistry
3	Organization of a scientific and professional seminar for teachers, bachelor students.	during a year	The head of the center Dzhiembaev B.Zh.
4	Form an information database of scientific achievements and scientific potential of the teachers of the department	during a year	Myrzakhmetova N.O. Teaching staff of the Department of Chemistry
Training			
1	Seminar on the topic: "Methods for the isolation of biologically active substances of their Compositae plants"	during a year	Azimbaeva G.E. Candidate of Chemical Sciences, Associate Professor
2	Conducting seminars and refresher courses	during a year	Teaching staff of the Department of Chemistry
3	Organization and passing of refresher courses for all teaching staff	during a year	Teaching staff of the Department of Chemistry
Career Guidance			
1	Participation in Olympiads held at universities and schools	during a year	Azimbaeva G.E. Candidate of Chemical Sciences, Associate Professor
2	Participation in international and republican conferences, symposia	during a year	Teaching staff of the Department of Chemistry
3	Carrying out vocational guidance work	during a year	Teaching staff of the Department of Chemistry