NON-COMMERCIAL JOINT STOCK COMPANY
KAZAKH NATIONAL PEDAGOGICAL UNIVERSITY
NAMED AFTER ABAI

FACULTY OF SCIENCE AND GEOGRAPHY

APPROVED
Dean of the Faculty
K.D. Kaimuldinova
2023 y.

DEVELOPMENT PLAN OF THE EDUCATIONAL PROGRAM 8D01510-CHEMISTRY

2023-2029

ALMATY, 2023

The Development Plan of the Educational Program has been developed based on the following documents: On the Nationwide Priorities of the Republic of Kazakhstan until 2025 (Decree of the President of the Republic of Kazakhstan dated 26.02.2021 № 520) https://adilet.zan.kz/rus/docs/U2100000520/history **Development Strategy** «ABAI UNIVERSITY» 2023-2029 y.

https://www.kaznpu.kz/docs/docs/260224/Prog_ru.pdf

Approved
At the meeting of the Faculty Council of Natural Sciences and Geography
Minutes № 5 dated 25.01.2023

Reviewed
At the meeting of the Department of "Chemistry"
Minutes №6 dated 18.01.2023
Head of Department Zh.S. Mukataeva

FOREWORD

The development plan for the educational program 8D01510 – Chemistry for the years 2023-2029.

Code and name of the field of education: 8D01 Pedagogical Sciences
Code and name of the training direction: 8D01510 - Training of Teachers for Natural Science Subjects
Group of educational programs: 8015-Training of Chemistry Teachers
The strategy of the program is aimed at the formation and implementation of the established competency model, as well as expanding the possible range of employers.
Mission of the educational program: To train highly qualified, competitive chemistry teachers with deep theoretical knowledge, practical skills, and research competence, capable of applying innovative methods and technologies in teaching, integrating the principles of sustainable development into the educational process, and contributing to the development of science and education at the national and international levels.
Goal of the educational program: To train highly qualified teachers in the field of chemical education, possessing fundamental knowledge in chemistry, modern teaching methods, research skills, and digital competencies.

ANALYSIS OF THE CURRENT SITUATION

General information about the educational program

Developers of the EP development plan	Representatives of the Department:Mukataeva Zh.S.,Korganbayeva Zh.K.,Akylybekova T.N.,Chinibayeva N.S. Employers:Nauryzbayev A.S., Principal of Secondary School No. 26, Almaty Region, Ili District; Bidaybekova E.I., Principal of School-Gymnasium No. 159, Almaty; Shazhabayeva K.S., Principal of Specialized Lyceum №92 named after Mahatma Gandhi, Almaty, Bostandyk District. Students:Ghalymova N., PhD student of the chemistry educational program.
Academic degree:	Doctor of philosophy (PhD) in educational program 8D01510 – Chemistry
Year of establishment:	2024
Language of instruction:	kazakh, russian
Form of study:	full-time
Duration of study:	2
Number of credits:	180
Uniqueness of the EP	The educational program 8D01510 - Chemistry is distinguished by being developed with consideration of the regional features and strategic objectives of the university. The program is aimed at preparing specialists in the field of chemistry who will be able to successfully address the challenges faced by the region and the university. Advantages of the Program: 1. Relevance and Demand for Knowledge The program covers a wide range of relevant topics and issues in the field of chemistry, as well as innovative teaching methods, which ensures that graduates are in demand in the labor market. 2. Integration of Sustainable Development in Chemical Education The program focuses on introducing the principles of sustainable development into chemistry teaching, fostering ecological responsibility among future educators, and helping students understand global environmental issues through the lens of chemistry. 3. Preparation of Pedagogical Scientists The program is aimed at training pedagogical scientists capable of conducting fundamental and applied research in

	the field of chemical education, developing innovative teaching methods, and integrating scientific achievements into the educational process. 4. Inclusion of Pedagogy, Psychology, Educational Technologies, and Natural Sciences The integration of pedagogy, psychology, educational technologies, and natural sciences enables graduates to be flexible in their professional activities, design unique curricula, and implement new educational models. 5. Active Involvement in Scientific and Educational Projects Future educators master modern methods of teaching chemistry through active participation in scientific and educational projects, internships at leading universities and laboratories, as well as working with real-world case studies. 6. Development of Management and Communication Skills The program develops management and communication skills, preparing educators to lead educational institutions, develop educational policies, and implement reforms in the field of chemical education.
Graduate Model	✓ Able to design and conduct comprehensive research, including interdisciplinary studies, based on a holistic, systemic scientific worldview. ✓ Possesses deep knowledge in the field of chemistry, teaching methods, and modern educational technologies. ✓ Capable of managing educational projects and programs. ✓ Able to think critically and engage in self-reflection. ✓ Committed to the principles of academic integrity and ethics. ✓ Demonstrates flexibility and adaptability in a rapidly changing educational environment.
Types of professional activity	✓ Scientific and research activity ✓ Scientific and pedagogical activity ✓ Project and technological activity ✓ Organizational and managerial activity
Partners for Academic Mobility (Internal and External)	*External Academic Mobility* Pomeranian Academy in Słupsk (Poland); University of Poitiers (France); University of Lille (France); University of Lorraine (France); Heidelberg University (Germany); Adam Mickiewicz University (Poland); Mykolas Romeris University (Lithuania); Vilnius University (Lithuania); Vytautas Magnus University (Lithuania); University of Debrecen (Hungary); Niğde Ömer Halisdemir University (Turkey); Muğla Sıtkı Koçman University (Turkey); Giresun University (Turkey); Fırat University (Turkey); Moscow City University of Pedagogy (Russia); Volgograd State Social-Pedagogical University (Russia). *Internal Academic Mobility* Aktobe University named after S. Baisev; Atyrau University named after H. Dosmukhamedov; K. Zhubanov Aktobe Regional University; Pavlodar Pedagogical University; Kyzylorda University named after Korkyt Ata.
Employment of graduates	100%
Availability of an appendix to the license for the training direction	№ 0137373
Main enterprises with which cooperation is carried out	KSU "Department of Education of the City of Almaty", State Institution "Department of Education of the Almaty Region", secondary school №26, Almaty Region, Ili District, school - gymnasium №159, Almaty, KSU

	specialized lyceum №92 named after Mahatma Gandhi, Almaty, Bostandyk District, etc.
Expected final results of the educational program development plan implementation	- improvement of the educational and professional activities of students and faculty. - enhancement of faculty qualifications in the area of innovative teaching technologies. - development of educational and teaching-methodological literature in English. - participation of students and faculty in competitions and project implementations. - improvement of the information and technical infrastructure. - development and operation of joint educational programs with domestic and foreign universities. - increase in the number of publications by faculty in high-ranking journals (Q1, Q2) in the Journal Citation Reports (JCR), WoS, and Scopus. - increase the proportion of faculty engaged in research activities.

Main risks of the educational program

Risk name	**Possible consequences**	**Management mechanisms and measures**
Competition in the educational services market	Decreasing attractiveness of the program, outflow of applicants to other universities	- Development of the uniqueness of the EP (inclusion of modern technologies, artificial intelligence, digital laboratories, sustainable development in chemistry). - Increasing the recognition of the program through participation in educational exhibitions, forums, social networks. - Interaction with employers and the Alumni Association to expand employment opportunities for graduates.
Formation of public opinion about the program	Decrease in confidence in the EP, decrease in the number of students	- Promotion of successful graduates and their achievements in the media and social networks. - Organization of open lectures, master classes, webinars with industry experts. - Inclusion of elements of international accreditation and cooperation with foreign universities.
Contingent of students	Decrease in the number of incoming and current master's students	Implementation of active career guidance work in schools. - Expansion of grant opportunities and targeted educational programs. - Development of practice-oriented courses and internships for students. - Creation of a comfortable educational environment, support for student initiatives.
Economic crisis	Decrease in students' solvency, increase in deductions	- Flexible payment system, provision of installments. - Development of a system of scholarships and financial support for students. - Inclusion of students in scientific and educational grant programs. - Organization of consulting support on issues of financing education.
Inconsistency of the program content with the requirements of the labor market	Graduates do not have the necessary competencies, low employment rate	- Regular updating of the EP taking into account the current requirements of employers. - Introduction of courses on digital technologies, pedagogical design, STEM education. - Active cooperation with employers, conducting internships and practices.

Insufficient level of digitalization	The program lags behind modern trends in education	- Implementation of online courses, virtual laboratories, artificial intelligence in the educational process. - Development of digital competencies of teachers. - Use of modern educational platforms and distance learning technologies.
Personnel risks	Insufficient qualifications of teachers, shortage of personnel	- Development of a system for improving the qualifications of teachers. - Involving industry practitioners to conduct lectures and seminars. - Motivating teachers to engage in scientific activities, participation in grants.
Low motivation of students	Declining academic performance, high staff turnover in the education system	- Inclusion of gaming technologies and project-based learning. - Organization of competitions, olympiads, hackathons in chemistry. - Development of mentoring, interaction with successful graduates.

SWOT-analysis of the implementation of educational programs

	Strengths	**Weaknesses**
Internal factors	- High level of graduate preparation in the fields of chemistry and pedagogy. - Programs integrated with the latest educational technologies (artificial intelligence, virtual laboratories). - Opportunities for internships in leading schools and universities. - Alignment of the program content with current requirements (STEM education, TPACK model). - Availability of strong scientific staff and practitioner-teachers. - Opportunities to participate in international educational programs, conferences, and grants.	Insufficient funding for laboratory equipment and digital technologies. - Limited choice of elective courses on pedagogical innovations. - Low level of English proficiency among some students, limiting access to international studies and internships. - Limited opportunities for dual studies and internships abroad.
	Favorable opportunities	**Threats and risks**
External factors	- Growing demand for chemistry teachers with digital competencies and knowledge of modern teaching methods. - Development of online education and distance learning technologies, expanding student outreach. - Opportunities to participate in international grant programs (Erasmus+, etc.). - Active integration of sustainable development chemistry into school curricula, making graduates highly sought after specialists. - Partnerships with leading schools, educational platforms, and the industry for practical student training.	- High competition from other universities and online educational platforms. - Economic instability, affecting the number of grant and fee-paying students. - Low level of technology implementation in schools, which can reduce the relevance of the knowledge acquired by students.

1.MAIN OBJECTIVES OF THE EDUCATIONAL PROGRAM DEVELOPMENT Direction 1.
Expanding access to the university's educational services

№	**Performance indicators**	**Unit**	**2023**	**2024**	**2025**
1.	The contingent of students in the educational program 8D01510 – Chemistry	Unit	3	8	11
2.	Admission to the educational program.	Unit	3	4	3
3.	Graduation.	Unit	6	1	3

Direction 2. Innovative support of educational activities

№	**Performance indicators (share, percentage, quantity)**	**Unit**	**2023**	**2024**	**2025**	**Responsible executors**	**Form of completion**
1.	Decision-making on the type of educational program (existing, new, innovative, interdisciplinary, additional (minor), joint educational program)	units	Д -1	Д – 1	Д- 1	graduating department	EP
2.	Participation of the educational program in program rankings	fact	+	+	+	graduating department	Results of the educational program ranking
3.	Accreditation of the educational program	fact			+	graduating department	Accreditation result
4	Post-accreditation monitoring completion	fact	+			graduating department	Monitoring results
5.	Updating the educational program in line with labor market requirements	fact	+	+	+	graduating department	Updated educational program (EP), Expert opinions
6.	Analysis of the educational program for alignment with the university's strategic development plan	fact	+	+	+	graduating department	Meeting minutes of the departments
7.	Conducting roundtable discussions on integrating competencies into the educational process	fact	+	+	+	graduation department, employers	Help, protocol
8.	Number of industry specialists involved in the educational process	peopl e	3	4	5	graduating department	Agreements, memorandums
9.	Participation of representatives of potential stakeholders as experts of the EP	fact	+	+	+	graduating department, employers	Minutes of the department meetings
10.	Analysis of the availability of PPS with the corresponding potential for the development of EP	%	100	100	100	graduating department	Staff form of the department's teaching staff
11.	Number of faculty members who have completed professional development courses in the subject area	%	100	100	100	Graduating department Faculty and teaching staff	Certificates, diplomas
12.	Improving qualifications, degrees of teaching staff through training in doctoral studies PhD, internships	fact	+	+	+	graduating department	Certificates diplomas
13.	Development of digital knowledge and research competencies, allowing graduates to master an expert level of IT competencies and skills in scientific research.	fact	+	+	+	university, department, faculty	Certificates diplomas
14.	Providing micro-degrees (nanodegrees) for future teachers	fact	+	+	+	university, department, faculty	Certificates diplomas
15.	Improving the quality of the teaching staff Organization of Winter and Summer Schools for the teaching staff	fact	+	+	+	university, department, faculty	Certificates diplomas
16.	Organization of work within the framework of the "Silver University" to obtain a quality education for	fact	+	+	+	university, department	report

	everyone and at any age. (specializations to choose from: digital education, inclusive education, training based on digital technologies)						
17.	The share of graduates of the EP who are employed in the first year after completing their studies (from the total number of graduates)	%	100	100	100	graduating department	Employment Results
18.	The share of graduates of the EP, trained under state orders, employed in the first year after graduating from the university under the EP	%	100	100	100	graduating department	Employment results
19.	Percentage of university graduates participating in the assessment of the quality of educational services (full-time education)	%	20	25	30	graduating department	Presence on the commission
20.	Participation of Master's students in determining the content of the program	fact	+	+	+	graduation department, students	Among the authors of the EP
21.	Number of employers participating in the assessment of the quality of training of specialists	Unit	2	5	5	Employers of the EP	Agreements, memorandums, expert conclusions
22	The proportion of students participating in the assessment of the teaching activities of the teaching staff	%	50	50	50	graduating department students	Results of the survey
23	Number of teaching aids developed in the Kazakh language	Unit	4	5	7	graduating department students	Developments by discipline m
24	Number of educational and methodological publications developed by teaching staff on the specifics of the educational program	Unit	-	1	2	graduating department	educational and methodological publications, textbooks

Direction 3. Internationalization of the program

№	**Performance indicators (share, percentage, quantity)**	**Unit**	**2023**	**2024**	**2025**	**Responsible executors**	**Form of completion**
1.	Interuniversity partnership within the framework of the EP: Double-degree EPs	units	-	-	1	graduating department	SOP,Double-diploma EP
	with a foreign university	units	-	-	1		
	with a Kazakh university	units	-	1	1		
2.	Number of students in the educational program participating in the internal incoming academic mobility program.	units	1	1	1	graduating department	Order,report
3.	Number of students in the educational program participating in the internal incoming academic mobility program.	units	-	1	2	Graduating department, student	Order, student transcript
4.	Number of faculty members	units	-	1	1	graduating	Order, transcript

	participating in the internal outgoing academic mobility program.					department student	of students
5.	Number of faculty members participating in the internal incoming academic mobility program.	units	1	1	1	graduating department PPS	Order, report
6	Number of faculty members participating in the internal incoming academic mobility program	units	1	1	1	graduation department Faculty of Science Academic Mobility Center	report
7.	Number of invited foreign scholars.	units	-	1	1	graduating department PPS	report
8.	Number of faculty members participating in the external outgoing academic mobility program	units	1	1	1	graduation department Faculty of Science Academic Mobility Center	report
9.	internships within the framework of international exchange programs (ERASMUS +, DAAD, Mevlana, Bolashak)	units	-	1	1	graduating department of academic mobility center	report

Direction 4. Expanding the scope of scientific research and innovation

№	**Performance indicators (share, percentage, quantity)**	**Unit**	**2023**	**2024**	**2025**	**Responsible executors**	**Form of completion**
1.	Number of faculty members involved in educational and research projects	person	2	2	3	graduating department	report
2.	Number of faculty members involved in the implementation of fundamental and applied research	person	2	2	3	graduating department	report
3.	Number of publications in journals indexed in the 1st, 2nd, and 3rd quartiles according to the Journal Citation Reports by Clarivate Analytics or journals with a percentile rank based on CiteScore in the Scopus database.	units	1	2	3	graduating department	Indicator of the base
4.	Number of publications of doctoral students' research articles in journals with a non-zero impact factor, indexed in Thomson Reuters/Scopus databases.	units	1	2	3	graduation department doctoral students	Database indicators
5	International Scientific and Practical Conference "Modern Aspects of Chemical Science and Chemical Education: Theory and Practice," Almaty.	fact	-	+	-	graduating department	Journal collection, media coverage, and

							social media links.
6	Round table "Path to Science" – Scientific and Methodological Seminar with Meetings of Outstanding Chemists and Scientists.	fact	+	+	+	graduating department	Media coverage and social media links.
7	Number of research projects conducted within the framework of international cooperation.	units	1	1	1	graduating department	report
8	Number of publications by faculty members in journals recommended by the Committee for Control in Education and Science (CCES).	units	3	6	8	graduating department	report
9	Number of faculty members participating in the National "Best Teacher" competition.	units	1	1	1	graduating department	Competition result
10	Number of publications by students.	fact	1	1	1	graduating department student	report
11	Number of students participating in scientific research and competitions.	units	1	1	1	graduating department student	report
12	Operation of scientific centers and laboratories: • Organic Synthesis Laboratory • Physico-Chemical Methods of Research Laboratory • Inorganic Chemistry Laboratory • Analytical Chemistry Laboratory • Chemical Technology Laboratory Petrochemistry and Organic Chemistry Laboratory	fact	+	+	+	graduating department student	Auditorium fund

Direction 5. Improving infrastructure and material-technical base

№	**Performance indicators (share, percentage, quantity)**	**Unit**	**2022**	**2023**	**2024**	**2025**	**Responsible executors**	**Form of completion**
1	Development of the computer park	fact	+	+	+	+	graduating department	infrastructure modernization
2	Acquisition of software.	fact	+	+	+	+	graduating department	infrastructure modernization
3	Acquisition of laboratory equipment and others.	fact	+	+	+	+	graduating department	infrastructure modernization
4	Replenishment of the library collection	fact	+	+	+	+	graduating department	infrastructure modernization
5	Purchase of furniture.	fact	+	+	+	+	graduating department	infrastructure modernization

Direction 6. Career guidance work within the framework of the educational program.

№	**Performance indicators (share, percentage, quantity)**	**Unit meas**	**2022**	**2023**	**2024**	**2025**	**Responsible executors**	**Form of completion**

1	Providing presentations to students and school teachers on online and offline platforms, distributing materials with information about the educational program, a list of subjects for the Unified National Testing (ENT), a list of documents required for admission, as well as the university's ranking, its material and technical base, and admission opportunities at ABAI UNIVERSITY.	fact	+	+	+	+	graduating department	Report, social media links.
2	Conducting meetings of the Council on career guidance and preparation of applicants, organizing the work of working groups in key areas.	fact	-	+	+	+	graduating department, faculty members, students	Memorandum, agreement
3	Round table “Career Guidance – investment in the future."	fact	+	+	+	+	graduating department	Report

Direction 7. Educational work within the framework of the educational program.

№	**Performance indicators (share, percentage, quantity)**	**Unitmeas**	**2022**	**2023**	**2024**	**2025**	**Responsible executors**	**Form of completion**
1	Conducting events within the framework of the Programs and in accordance with the educational work plan of the University	fact	+	+	+	+	graduating department	Report, links on social media.
2	Conducting events oriented to national educational ideal, system of basic national values (Concept of the Great Abai "Tolyk adam")	fact	+	+	+	+	graduating department	Report, links on social media.
3	Implementation of comprehensive measures: development of a Program for training and talent development, development of coaching, mentoring and mentoring methods, work of a social and psychological assistance service.	fact	+	+	+	+	graduating department	Report