

1. DESCRIPTION OF THE EDUCATIONAL PROGRAM

The purpose of the educational program: Training of personnel to solve urgent problems in the field of chemical production and science.

1.2. VISION, MISSION, PROGRAM GOAL, VALUES, ATTRIBUTES OF A UNIVERSITY GRADUATE

Vision:

An intellectual platform that develops teachers who can manage in a rapidly changing world.

Mission:

Formation of teacher leaders who are able to create, develop and disseminate advanced knowledge and values in the field of education for the benefit of the country and the world.

Program goal:

The university aims to become a hub for innovative methods of teaching, learning and research, as well as the development of rural education in Central Asia.

Values:

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

University Graduate Attributes::

- Self-taught, able to reflect and explore their practice
- Have moral and ethical qualities and are responsible
- They have deep subject, digital knowledge and a broad intellectual outlook
- Creative and critical thinking, collaborative and communicative
- Practice leadership in teaching and learning, and are adaptable to rapidly changing environments
- Diverse, inclusive and for equality of opportunity in society

1.3. RATIONALE OF THE EDUCATIONAL PROGRAM

One of the priority areas for the development of the Republic of Kazakhstan is the development of competitive production of the chemical industry, aimed at the production of high-tech, experimental and innovative products. In the structure of the production of the chemical industry in Kazakhstan, 64% is occupied by basic chemistry, which occupies about 21% of inorganic acids, alkalis and their salts, explosives, as well as varnishes and paints, agrochemistry (mineral fertilizers and pesticides), petrochemicals is represented by one large enterprise and is 10 % of the total production of the chemical industry. Consumer chemistry, represented by enterprises producing detergents and cleaning products, is 5%.

The volume of production of the chemical industry in January-March 2022 in the production of chemical products for the analyzed period, the main share was other inorganic substances - 37.2%, fertilizers and nitrogen-containing substances 15.6% and other chemical products not included in other groups - 9, 4%. The physical volume index (hereinafter referred to as IPV) for the analyzed period amounted to 114.2%. The largest growth in production volumes in physical terms is shown by the following products: additives in cement (by 3.3 times), paints and varnishes based on polymers (+22.1%), paint putties (+23.4%), which is associated with the activation of construction works; caustic soda (+95.2%), sodium tripolyphosphate (+48.1%), ethyl alcohol (+21.5%), detergents (+26.0%), carbon dioxide (+16.5%), hydrochloric acid (+5.0%), ammonia

(+3.7%) due to growth in consumer demand; chromium compounds: sodium dichromate (+21.2%), chromium oxide (+13.5%), chromic anhydride (+3.2%), which is associated with the restoration of production and sales of accumulated stocks at AZKhS JSC.

Exports of chemical industry products in January-February 2022 amounted to 159.3 million US dollars and show a slight increase of 2.5% compared to the same period in 2019. Main export countries: Russia (15.9%), Uzbekistan (8.3%) and Germany (8.2%). Imports of chemical products in January-February 2021 amounted to USD 32.8 million, which is 4.1% lower than the same indicator in 2019, which is associated with a decrease in imports from Russia's major supplier countries (-3.8 %) and China (-2.5%). Main importing countries: Russia (46.6%), China (18.9%) and Germany (3.8%).

Specialists in this industry can work in many industries and industries, so the demand in the labor market is very high. Thus, we can conclude that it is easy to find a job as a chemist, since this profession is in demand.

<https://qazindustry.gov.kz/ru/analytics>

1.4. FEATURES OF THE EDUCATIONAL PROGRAM

Academic mobility	Niide University (Niide, Türkiye)
Dual Degree Program	Mississippi Valley University (USA)
Additional education (Minor)	Chemist – ecologist specialist in assessing and reducing the impact of certain chemicals used in household and work on the environment.

Coincidence with similar EPs of leading universities of near and far abroad

Utah Valley University (USA) - 59.1%

University of Delaware (USA) - 51.3%

Sogang University (Korea) - 24.3%

1.5. POTENTIAL DIRECTION AND GRADUATE JOBS

KazNWTTU students have the opportunity to be competitive in the labor market during their studies or acquire additional competencies to meet personal needs. To do this, students are offered a choice of one of the Minor programs.

The list of additional programs, their brief description, the composition of subjects and the educational results that they provide are given in the catalog of additional education programs "Chemist-Ecologist" (Minor). Types of professional activity:

Bachelor of Science in the educational program 6B05301-Chemistry can perform the following professional activities.

- - research: performance of scientific research on profile disciplines about various scientific and research and production institutions (chemistry, biochemistry, etc.);
- - design: implementation of general and specialized developments in design
- and design organizations (ecology, technology, chemical production);

- - production and management activities in state structures
- at various levels (education departments, akimats, laboratories of the chemical and biological direction);
- organizational and technological activities in the production of chemical and biological and ecological profile (SES, production for the processing of agricultural and mineral raw materials, etc.).

Employment opportunities:

Organizations where a graduate of this EP can get a job:

- 1) scientific organizations: research centers in the field of chemistry, biochemistry;
- 2) management organization: government bodies that use chemical and biological research methods in their work, organizations of various forms of ownership.

1.6. AREAS OF PROFESSIONAL COMPETENCE

Areas of professional competence 1

Able to systematically and critically apply fundamental knowledge of chemistry to solve professional problems and master the methods of self-learning and self-development in the framework of professional activities;

Areas of professional competence 2

Able to carry out advanced scientific research using physicochemical, chemical methods.

Areas of professional competence 3

Able to take part in the implementation of various projects, showing the ability to work in a team, interact effectively, make informed decisions.

1.7. LEARNING OUTCOMES OF THE EDUCATIONAL PROGRAM

LO 1 - Applies a variety of communication formats taking into account socio-cultural diversity, adheres to the principles of equality and accessibility in education, to create a prosperous and inclusive environment, has leadership qualities and is able to apply them to develop collective potential

LO 2 – Possess high-level critical and creative thinking skills, are capable of self-regulation and reflection to solve professional problems

LO 3 – Demonstrate knowledge of and adherence to ethical and legal norms in research and use of digital technologies. Apply security measures when working with digital information and data protection, promote the active, safe and ethical use of digital resources.

LO 4 – They have the skills to conduct research work, are able to analyze the results of research in the subject area.

LO 5 – Students master the basics of the theory of fundamental sections of inorganic and organic chemistry; are able to substantiate the laws and causes of changes in the structure and properties of chemicals, aliphatic, cyclic and macromolecular compounds.

LO 6 – Possesses the skills of conducting chemical experiments and interpreting their results.

LO 7 – On the basis of fundamental theoretical knowledge, they are able to evaluate the possibilities of physical and chemical methods, reasonably choose the appropriate method for a specific practical task, competently use modern analytical equipment when conducting experiments, mathematically process research results, synthesize organic compounds, conduct a qualitative and quantitative analysis of organic compounds.

LO 8 – They are able to demonstrate knowledge of the basic concepts and laws of physical chemistry, apply physical methods to study the structural characteristics of molecules, chemical and physical processes in gaseous and condensed media, reasonably select the optimal method for qualitative and quantitative analysis of a substance.

LO 9 – Possess theoretical knowledge and practical skills of analysis by physicochemical and chromatographic methods; are able to competently use modern analytical equipment when conducting experiments in their professional activities.

LO 10 – They are able to critically analyze and systematize the results of a study or test, incl. with the subsequent presentation of materials in the form of scientific reports, publications and presentations.

LO 11 – Existing experimental methods and technologies for obtaining chemical and nanochemical substances are analyzed from the point of view of their safety for the environment and humans.

LO 12 – They know the basic methods of searching and summarizing the information necessary to complete a thesis and professional tasks.

Comparison matrix of learning outcomes for the EP with the attributes of a graduate

	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
AB1		+	+	+	+	+	+	+	+	+	+	+
AB 2	+								+	+	+	+
AB 3	+					+	+			+		
AB 4	+								+			+
AB 5		+	+	+	+	+	+	+	+	+	+	+
AB 6	+		+					+				

1.8. NORMATIVE REFERENCES

The program was developed on the basis of the following legal acts:

1. Sectoral qualifications framework for the field of chemical production, approved by Protocol No. 1 of the meeting of the sectoral tripartite commission on social partnership and regulation of social and labor relations under the Ministry of Health and Social Development of the Republic of Kazakhstan dated August 16, 2016.

2. State obligatory standard of higher and postgraduate education, approved by order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No. 2. Registered with the Ministry of Justice of the Republic of Kazakhstan on July 27, 2022 No. 28916.

