



APPROVED

Chairman of the Board – Rector

M. Begentayev

« 07 » 06 2024

Agreed:

Member of the Board – First Vice-Rector for International Cooperation and Strategic Development

S. Yermekbayev

« 14 » 06 2024

Member of the Board – Vice-Rector for Science and Corporate Development

E.I. Kuldeev

« 07 » 06 2024

Member of the Board – Vice-Rector for Academic Affairs

R.K. Uskenbayeva

« 10 » 06 2024

Member of the Board – Vice-Rector for Administrative, Social and Educational Work

S.K. Shalabayev

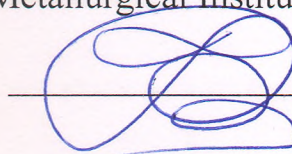
« 07 » 06 2024

Development Program
of the O.A. Baikonurov Mining and Metallurgical Institute
for 2024-2027

Almaty 2024

1 DEVELOPED by the Mining and Metallurgical Institute

Director of the Institute



K.B. Rysbekov.

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2 AGREED

Director of the Department of Science



D.U. Alshimbayeva

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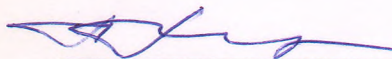
Head of the Office of
Commercialization and
International Cooperation



A.A. Akatayeva

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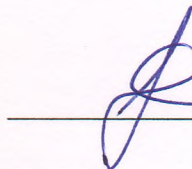
Director of the Registrar's Office



N.K. Kyzylbayev.

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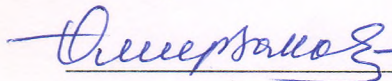
Head of the Department of
Publication Activity and
Scientific Editions



G.A. Burshukova

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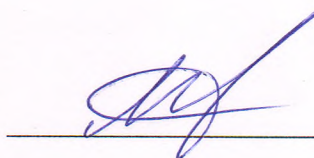
Director of the Scientific Library



Sh.M. Omirzakova.

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Head of the Office of
Commercialization and
Contract Research

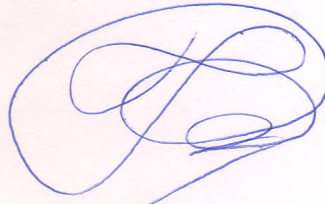


M.M. Abdipov

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List of Executives

Director of the MMI



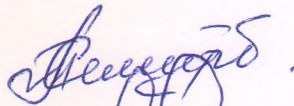
Rysbekov K.B., PhD in
Technical Sciences,
Professor

Deputy Director



Aitenov K.D., PhD in
Technical Sciences,
Associate Professor

Deputy Director



Soltabayeva S.T., PhD in
Technical Sciences

Deputy Director



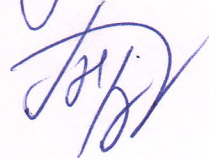
Kuandykov T.A., Doctor of
Philosophy (PhD)

Head of the Department of
"Mining"



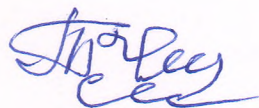
Moldabaev S.K., Doctor of
Technical Sciences,
Professor

Head of the Department of
"Metallurgy and
Beneficiation of Mineral
Resources"



Barmenshinova M.B., PhD
in Technical Sciences,
Associate Professor

Head of the Department of
"Metallurgical Processes,
Thermotechnics, and
Technology of Special
Materials"



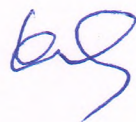
Chepushtanova T.A., PhD
in Technical Sciences,
Associate Professor

Head of the Department of
"Surveying and Geodesy"



Orynbasarova E.O., Doctor
of Philosophy (PhD),
Associate Professor

Head of the Department of
"Materials Science,
Nanotechnology, and
Engineering Physics"



Kudaybergenov K.K.,
Doctor of Philosophy
(PhD)

Head of the Department of
"Chemical Processes and
Industrial Ecology"



Kubekova Sh.N., PhD in
Technical Sciences,
Associate Professor

Section 1. Introduction

The Development Program of the Mining and Metallurgical Institute named after O.A. Baykonurov of the K.I. Satpaev National Research Technical University for 2023-2027 (hereinafter referred to as the Development Program) is developed in accordance with the Development Program of the non-profit joint-stock company "Kazakh National Research Technical University named after K.I. Satpaev" for 2023-2027 and the Decree of the Government of the Republic of Kazakhstan dated May 26, 2023, No. 401.

This Development Program outlines new stages of the institute's development for the period of 2023-2027. It is planned to monitor the progress of priorities, directions, and goals using appropriate indicators and reference indicators for comparative analysis. Through these tools, the university will be able to effectively use resources, respond to external challenges, and update the Development Program while remaining committed to the university's mission.

Currently, the global development trend of the university requires the development of a third mission—interaction with society. Three main aspects of the activities of KazNITU under the third mission—technology and innovation transfer, continued education, and social participation—are the policy of influencing the development of society and the external environment.

To prepare competitive personnel, KazNITU uses a methodology combining production knowledge + education—dual education.

To achieve the goals set by the Development Program for 2023-2027, the creation of a new technology research hub in engineering education and science (hereinafter referred to as the hub) is proposed, which responds to the challenges of time, regulatory documents, and tasks for the development of science and the improvement of the quality of higher education, as outlined in the President's Address.

The result of the implementation of the Development Program will be a high level of scientific research, education, and project work, recognized globally, allowing KazNITU to enter the ranks of leading research universities in the world as a university that is one of the drivers of modernization of the national system of engineering education and science and contributes significantly to the innovative development and global competitiveness of Kazakhstan.

Title of the Development Program

Name of the Development Program	Development Program of the Mining and Metallurgical Institute named after O.A. Baikonurov of the Non-profit Joint-Stock Company "Kazakh National Research Technical University named after K.I. Satpaev" for 2023-2027
Basis for development	1. The Law of the Republic of Kazakhstan "On Education." 2. The Law of the Republic of Kazakhstan "On Science." 3. The Law of the Republic of Kazakhstan "On State Youth Policy." 4. The Law of the Republic of Kazakhstan "On the Commercialization of Scientific and (or) Scientific-Technical Activities Results." 5. The speech of the Head of State, Kassym-Jomart Kemelievich Tokayev, at the anniversary session of the National Academy of Sciences on June 1, 2022. 6. The National Development Plan of the Republic of Kazakhstan until 2025, approved by the Decree of the President of the Republic of Kazakhstan on February 15, 2018, No. 636. 7. The Concept of Development of Higher Education and Science in the Republic of Kazakhstan for 2023-2029, approved by the Resolution of the Government of the Republic of Kazakhstan on March 28, 2023, No. 248. 8. The Order of the Minister of Education and Science of the Republic of Kazakhstan from October 25, 2018, No. 590 "On the Approval of the Structure and Rules for the Development of the Organization's Development Program for Higher and (or) Postgraduate Education."
Developers	Non-profit Joint-Stock Company "Kazakh National Research Technical University named after K.I. Satpaev" Mining and Metallurgical Institute named after O.A. Baikonurov
Goal	The transformation of the university into a leading scientific, technical, and educational center for the system-forming industries of the country's economy.
Objectives	Provide highly qualified specialists with higher and postgraduate education, new generations of engineers for the labor market. Introduce innovative educational technologies based on advanced world practices, improving the efficiency and quality of work for the teaching staff and the educational/scientific research activities of students, master's degree students, and

	PhD doctoral students, while developing the university's own brand in specialist training. Ensure integration into the global higher education system through international institutional accreditation and accreditation of educational programs. Implement research projects and programs in applied, fundamental, and critical technologies of priority areas that contribute to the development of the country's economy. Ensure the integration of education, science, and industry, create conditions for the commercialization of intellectual property and technologies, and develop collaboration between "university and industry." Become an internationally recognized scientific and educational institution, uniting scientists and students from different countries. Develop modern infrastructure for educational and research processes, promoting the use of advanced information technologies. Implement a set of measures for patriotic education, the formation of civil activity and social responsibility, provide comprehensive social support, and ensure the health protection of students and staff.
Implementation Period	2023-2027
Funding Sources	• Republican budget; • Funds received from organizations, enterprises, and institutions through contracts; • University's own funds; • Charitable contributions from sponsors, voluntary donations from legal entities and individuals, patronage.

Section 2. Description of the Prospects for the Organization of Higher and (or) Postgraduate Education, Considering the Current State and Long-Term Goals

KazNITU is the only Kazakhstani higher and (or) postgraduate education organization (hereinafter – OVP) that has been granted the status of "National Research Technical University." This defines the main vector for the development of OVP, focusing on conducting advanced scientific research in technical sciences and creating conditions for the formation of a new generation of scientists.

According to the Ministry of Labor and Social Protection of the Republic of Kazakhstan, a decline in activity from employers, manifested in a significant

reduction in the number of job vacancies, has mostly affected highly qualified specialists – demand decreased by 35% (11.7 thousand vacancies). In contrast, demand for specialists with intermediate and low qualifications has increased by 5% (+2.3 thousand vacancies) and 9% (+3 thousand vacancies), respectively.

The COVID-19 pandemic once again demonstrated the importance of digital readiness. Specifically, the implementation of transformational digital technologies and digital innovations allowed the rapid creation of numerous advanced digital solutions that accelerated the recovery of economic activity and stabilized operational processes.

Moreover, current graduates need to develop both hard skills and soft skills. KazNITU is actively promoting the comprehensive development of students according to Gardner's multiple intelligences concept: students actively use a practice-oriented approach, studying at OVP while simultaneously working at enterprises (logical-mathematical and linguistic intelligence). There is a system of physical education credits by attending various sports clubs and passing presidential fitness tests (physical and bodily-kinesthetic intelligence), and student clubs focused on robotics, augmented reality, and virtual reality are well-developed (interpersonal and existential intelligence). Elective courses are taught through platforms such as Coursera, allowing students to gain knowledge from leading innovative OVPs worldwide (MIT and Stanford). Guest lecturers, including businesspeople, practicing researchers, and opinion leaders, are invited to give lectures, courses, and mentoring sessions. Elective modules for all students include courses on SMM (social media marketing), product and project management from top influencers, PMI (Project Management Institute) specialists, and info-businessmen.

As a result, graduates become multitasking communicators with a broad production profile, ready to solve various business cases and possessing a versatile vision of the situation.

KazNITU sees itself as a unifying force for the scientific community, business, and government, according to the Triple Helix concept, as a center for engineering education, fundamental and applied research of global standards.

The prospects for KazNITU's activities are planned to focus on:

1. Equalizing access and ensuring equality to quality education;
2. Developing high-quality scientific infrastructure to create an advanced scientific and technological hub for generating world-class innovative developments;
3. Developing infrastructure and management through the digital transformation of the university;
4. Contributing to the formation and development of HR management;
5. Preparing students for the future, including motivating continuous improvement of skills and competencies throughout life;
6. Implementing progressive technological solutions in science and OVP in the production and industrial sectors with a global scientific reach;
7. Contributing and directly participating in the development of leading industries (oil and gas, mining and metallurgy, geology, mechanical engineering and energy, information technology, ecology) and increasing the share of private investment in science;

8. Collaborating with regional OVPs in research and educational activities.

The set goals and objectives will allow KazNITU to meet the needs not only of the government, individuals, and the business community but also of the industrial sector of the economy.

Here is the translation of the provided text:

3. Block of Analytical and Prognostic Justification of the Development Program

3.1 Analysis of the State of the Higher and (or) Postgraduate Education Organization's Activities, Key Problems, and Their Causes

In accordance with the university's mission, the Mining and Metallurgical Institute named after O.A. Baikonurov is a structural division of the Non-profit Joint-Stock Company "Kazakh National Research Technical University named after K.I. Satpaev." The Institute implements major educational programs for higher and postgraduate education, prepares scientific and pedagogical staff, and carries out research, international, educational-methodological, and other types of activities.

The Institute has six departments: "Mining," "Metallurgy and Ore Dressing," "Metallurgical Processes, Thermal Engineering, and Technology of Special Materials," "Surveying and Geodesy," "Materials Science, Nanotechnology, and Engineering Physics," and "Chemical Processes and Industrial Ecology."

Currently, the educational activities at the Mining and Metallurgical Institute are carried out by 6 graduating departments offering 35 educational programs for training specialists: 13 undergraduate programs, 13 master's programs, and 9 doctoral programs.

Undergraduate Programs:

6B05206 – Environmental Engineering
6B07109 – Engineering Physics and Materials Science
6B07116 – Technology of Basic Industries and New Materials
6B07203 – Metallurgy and Ore Dressing
6B07205 – Mining Engineering
6B07207 – Engineering Physics and Materials Science
6B07212 – Recycling in Metallurgy
6B07213 – Mineral Processing
6B07217 – Technology of Rare and Radioactive Elements
6B07218 – Foundry Production Technology
6B07219 – Non-ferrous Metallurgy
6B07303 – Geospatial Digital Engineering
6B07310 – Land Management and Cadastre

Master's Programs:

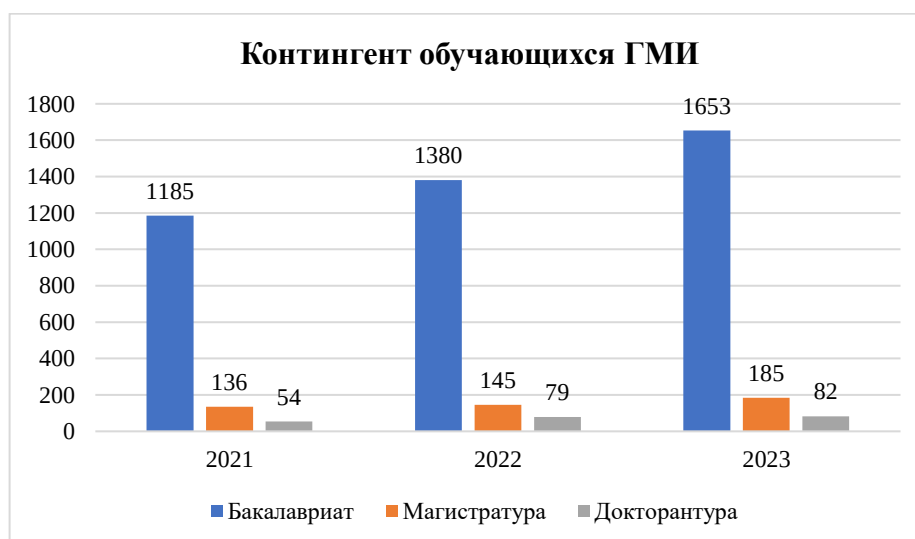
7M05202 – Bioecological Engineering
7M05301 – Applied and Engineering Physics
7M07103 – Materials Science and Technology of New Materials
7M07110 – Chemical Processes and Chemical Materials Production

7M07143 – Chemical Technology of Inorganic Substances
 7M07201 – Automation and Digitalization of Metallurgical Processes
 7M07203 – Mining Engineering
 7M07204 – Metallurgy and Ore Dressing
 7M07226 – Ore Dressing
 7M07227 – Surveying
 7M07229 – Extractive Metallurgy
 7M07306 – Geospatial Digital Engineering
 7M07324 – Land Management

Doctoral Programs:

8D05201 – Bioecological Engineering
 8D05301 – Applied and Engineering Physics
 8D07103 – Materials Science and Engineering
 8D07109 – Innovative Technologies and New Inorganic Materials
 8D07114 – Nanomaterials and Nanotechnology
 8D07201 – Ore Dressing
 8D07203 – Mining Engineering
 8D07204 – Metallurgical Engineering
 8D07306 – Geospatial Digital Engineering

As of September 1, 2023, the number of students at KazNITU is as follows:
 Undergraduate – 1653, Master’s – 185, Doctoral – 82.



Student Enrollment by 3 Levels of Education Over Three Years (2021-2023)

Increase to 80% by 2027 in the number of master's students engaged in experimental work; reaching 10 joint projects with enterprises and organizations in Kazakhstan by 2027, within the total number of educational, scientific, innovation, and socio-cultural projects; increasing the number of international students to 50 by 2027, as a proportion of the total student body.

The main criteria for evaluating OVP were: academic activities and employment outcomes, expert assessment, reputation among employers, student evaluation, and alumni feedback.

Accreditation of Educational Programs at the Mining and Metallurgical Institute (MMI)

The educational programs of MMI have been accredited by the Independent Agency for Accreditation and Rating (IAAR), the Independent Agency for Quality Assurance in Education (IQAA), and ASIIN. The accreditation certificate for the educational program 6B07303 – Geospatial Digital Engineering issued by IAAR (certificate number AB 3601) is valid until June 10, 2026.

The department is the main educational and scientific structural unit of the Institute, responsible for educational, methodological, and research activities in one or several related disciplines, as well as educational work among students, preparing scientific and pedagogical staff, and further professional development.

The teaching staff of the departments of the Institute meets the profile of the bachelor's, master's, and doctoral programs in both basic education and scientific specialization.

The department's staff is determined based on the normative academic workload and the applicable methodological recommendations for planning educational load.

Teaching Staff for the 2021-2022 Academic Year: Total: 78 staff members, Full-time staff: 63, Doctors of Science: 9, Candidates of Science: 25, PhD holders: 16, Masters: 13. Faculty qualification level (excluding Masters): 79.3% Average age: 49.9

Teaching Staff for the 2022-2023 Academic Year: Total: 110 staff members, Full-time staff: 88, Doctors of Science: 13, Candidates of Science: 36, PhD holders: 21, Masters: 18, Faculty qualification level (excluding Masters): 76.6%, Average age: 46.5

Teaching Staff for the 2023-2024 Academic Year: Total: 94 staff members, Doctors of Science: 16, Candidates of Science: 36, PhD holders: 27, DBA: 1, Masters of Technical Sciences: 14, Without a degree: 1, Faculty qualification level (excluding Masters): 84.0%, Average age: 46.5

In terms of both the professional experience and age composition of the teaching staff, the departments are capable of conducting productive scientific research.

Faculty Composition at the Mining and Metallurgical Institute for the 2023-2024 Academic Year: Total: 93 staff members, Doctors of Technical Sciences: 15, Candidates of Science: 35, PhD holders: 26, DBA: 1, Masters of Technical Sciences: 15, Faculty member without a degree: 1 teacher without an academic degree

Departmental Staff Breakdown:

Department of Mining: 15 staff members 3 Doctors of Technical Sciences, 8 andidates of Technical Sciences, 4 PhD holders

Department of Metallurgy and Ore Dressing: 17 staff members 1 Doctor of Technical Sciences, 9 Candidates of Technical Sciences, 7 PhD holders

Department of Metallurgical Processes, Thermal Engineering, and Technology of Special Materials: 7 staff members, 1 Doctor of Technical Sciences, 2 Candidates of Technical Sciences, 3 PhD holders, 1 Master of Technical Sciences.

Department of Materials Science, Nanotechnology, and Engineering Physics: 7 staff members 1 Doctor of Technical Sciences, 1 Candidate of Technical Sciences. 2 Candidates of Physical and Mathematical Sciences, 2 PhD holders, 1 Master of Technical Sciences.

Department of Surveying and Geodesy: 26 staff members, 4 Doctors of Technical Sciences, 7 Candidates of Technical Sciences, 7 PhD holders, 8 Masters of Technical Sciences, Department of Chemical Processes and Industrial Ecology: 21 staff members, 5 Doctors of Science, 6 Candidates of Science, 3 PhD holders 1 DBA, 5 Masters of Technical Sciences, 1 faculty member without a degree



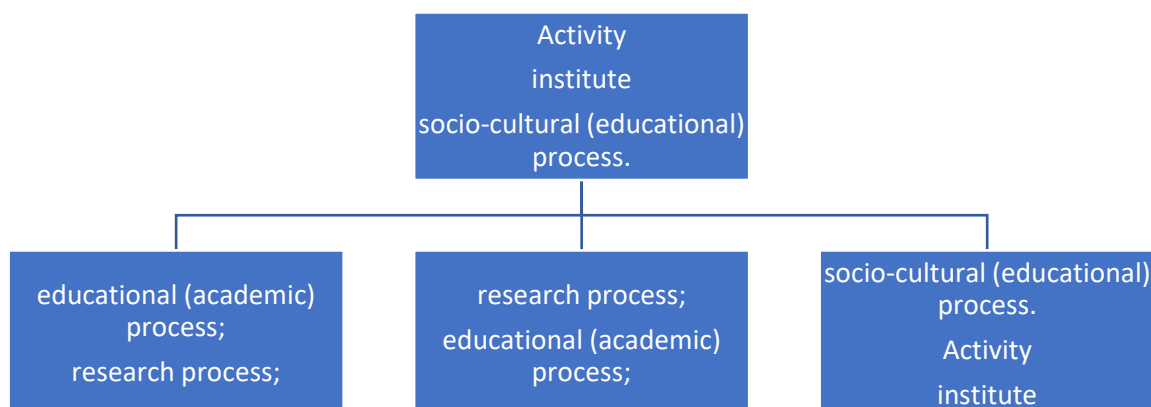
The main objective in the development of human capital at the institute is to reduce the average age and maintain a high level of academic staff qualification (PPS).

Under the academic mobility program, students travel abroad for one semester to study at higher education institutions in countries such as Poland, Russia, Germany, South Korea, and Malaysia.

As part of the Erasmus+ program, the director of the Graduate School of Engineering, the department head, and faculty members undergo internships at leading higher education institutions in the European Union.

Work is being carried out to sign agreements for dual degree programs with other universities, including the National Research Tomsk Polytechnic University, Saint Petersburg State Polytechnical University of Peter the Great (Russian Federation), Stanisław Staszic Academy of Mining and Metallurgy (Poland), Białystok University (Poland), University of Miskolc (Hungary), and others.

For training in these programs, major experts from production and foreign scientists are attracted, practice is carried out directly at enterprises, and internships are carried out for these students at the Uranium Center of Tomsk Polytechnic University.



The total number of educational programs offered by the institute is 34, including: 13 bachelor's degree programs, 13 master's degree programs, and 9 doctoral programs.

The modernization of the content of higher education programs in line with global trends is carried out through international specialized accreditations, professional associations, and specialized certification. Innovative teaching and research methods and technologies have been developed and tested for the preparation of highly qualified professionals with higher education and postgraduate education. These methods focus on the further development and improvement of conceptual foundations and the education system, science, and applied practical knowledge, which have been incorporated into the educational, scientific, and methodological fields.

To ensure collegiality and transparency in decision-making regarding academic and scientific-innovative activities, as well as to define the policy of the university's educational process, collegial bodies such as the Board of Directors and the Board have been created, following international experience.

The academic process for educational programs is regulated by curricula for each specialty.

The basic principles of academic activity ensure its realization in the system of rules and guidelines:

1. **Principle of compliance with global education standards** – ensuring that the quality of educational activities (teaching and instruction) matches world education standards.
2. **Principle of student-centered education** – focusing on the needs and development of students.

3. Principle of integration of education, science, and production – bridging the gap between theoretical learning and practical, industry-related applications.

4. Principle of lifelong learning – promoting continuous improvement of skills and competencies throughout one's career.

5. Principle of internationalization of education – fostering cross-border educational cooperation and exchange.

The maximum number of educational programs and licenses is concentrated in the first and second levels of the education process—bachelor's and master's degrees. The doctoral programs represent the smallest share. The demand for the institute's educational programs is multifaceted, coming from:

- The state (government order for personnel preparation);
- Individuals (human resources as potential labor market participants);
- The business community and entrepreneurial structures (organizations, enterprises, firms, companies).

The institute has also conducted targeted training of highly qualified personnel through corporate master's programs for organizations such as SC NAK “Kazatomprom” and SC “UK TMK” on a contractual basis. In 2019, 8 master's students graduated from SC NAK “Kazatomprom”, and in 2021, 4 master's students graduated from SC “UK TMK”.

The minimum share of training personnel funded by enterprises, firms, companies, and international financial sources is limited.

In the three-tier education system, the highest demand is for bachelor's programs, with moderate demand for doctoral programs.

"The reduction of the academic workload, resulting in a decrease in the teaching staff and young people who could become part of the academic research environment, leads to the fact that the curricula of the academic programs in their framework and structure do not align with the university's research model. The workload for a young assistant is 30 credits, and with such a load, carrying out projects is impossible even considering physical limitations. Each subject should correspond to full-time paid 6 credits, which would reduce the number of subjects, improve quality, and provide the teaching staff with enough time resources to engage in scientific work. There is a lack of funding for student industrial practices. The university does not have a department for educational and methodological work. There is a need to increase career orientation work, fund this direction, and open KazNITU branches in the regions."

3.1.2 Analysis of the state of activities, key problems, and causes in post-graduate distance education

Post-graduate and distance education in the modern world, with its constantly changing standards and norms, plays one of the most important roles in the overall education system. Since the value of higher education has decreased, and its accessibility has increased, the question arises of raising the generally accepted standards of good education.

Key problems that have accumulated over the past few years in the post-graduate education system include:

- Weak orientation towards international activities, insufficient joint educational programs, and mobility of faculty and students;
- Low share of international students;
- Insufficient integration of the educational process with science, production, and high-tech business;
- Underdeveloped marketing systems and tools in various areas of university activities;
- Obsolescence of the educational and material base of educational institutions.

In this regard, it becomes relevant to improve the quality of scientific research, increase the number of publications with impact factors, participate in international competitions for grant research, and so on.

Distance education is an excellent alternative to traditional lessons but also has its own characteristics that can jeopardize the success of the entire concept. Common problems that arise in distance education include:

- Lack of computer literacy;
- Nature of the educational material. Providing identical materials to rural and urban students who have different needs, experiences, and learning conditions;
- Lack of multimedia instructions: materials written for students are usually authored by teachers from the traditional system, and therefore, these materials typically lack teaching methodologies;
- Lack of social interaction: students involved in distance education are not socially engaged and may not be able to answer social questions;
- Lack of knowledge in time management basics: the freedom offered by online learning often lulls vigilance and creates a false sense of unlimited time;
- Lack of motivation – a common problem for all types of students. The online format requires strong discipline and focus to independently complete tasks, stay engaged, and make progress.

Online learning is a current trend in education. Satbayev University keeps pace with global trends and transitions to distance learning. This is especially relevant during the pandemic. The entire educational process is based on distance learning. This opportunity is provided by the Institute of Distance Education and Professional Development. The management system of the educational process is built on the university's own educational portal, Satbayev University: <https://polytechonline.kz/>. The educational process is implemented through the interaction of remote teachers and students. All students at the institute have their own virtual "personal accounts." Lectures and other instructional materials are available to them at any time. During the learning process, students can form their own learning trajectory, complete and send assignments for review, receive individual study plans, any reference information, and schedules of classes and exams.

The programs offered by the Institute of Distance Education and Professional Development include:

- Mining Engineering;
- Engineering Physics and Materials Science;

- Metallurgy and Mineral Processing.

The distance education programs provided by the Institute of Distance Education and Professional Development give students a boost for development and help them become strong leaders, effective managers, and competent technical specialists.

The entry threshold for admission to the master's program, which was set at 6.0 IELTS in 2021, jeopardizes the recruitment process. This threshold is completely disconnected from the real English language proficiency of students; the lack of specialized disciplines in the curricula of master's and doctoral programs; insufficient funding for research practices and internships; due to the lack of workload in the departments, it is impossible to hire newly graduated doctoral students for employment and to fulfill the required work as per the regulations.

3.1.3 Analysis of the state of activities, key problems, and their causes in science

Research activities at Satbayev University are focused on the development of fundamental and applied scientific research in the field of high-tech technologies and are concentrated on 10 scientific areas that are a priority for the economic development of the Republic of Kazakhstan. The institute actively attracts private investments and uses public-private partnership tools, creating an efficient technological corridor "from scientific discovery to commercial results."

Over the past three years, there has been a positive trend in the volume of funding for scientific and innovative activities at the institute. However, in the current year, the number of won grants and funding volumes have sharply decreased. In 2022, there were 31 GF projects and 15 commercial contracts, while in 2023, there were 51 GF projects plus PCF and 16 commercial contracts.

To create a fertile environment for innovation generation, the institute monitors and analyzes domestic and global science development trends in the university's key scientific and educational areas and creates motivating conditions to involve university staff and students in scientific research. The university attracts funding for research in its key areas of work, facilitates international research collaborations with leading universities and research centers worldwide, and helps publish the results in international journals indexed in Web of Science and Scopus.

The educational (academic) process at the university is closely linked with the research process. The university's research activities can be systematized by subject (participants):

- Research activities of the faculty and teaching staff (FTS);
- Research activities of students (bachelor's, master's, and doctoral students).

The demand for the university's research services and research projects comes from:

- The government;
- Private enterprises, firms, and companies;
- International organizations.



The following scientific research works are being carried out at the institute: Program-targeted funding for scientific and scientific-technical programs for 2023-2025, BR21881939 "Development of resource-saving energy-generating technologies for the mining and metallurgical complex and the creation of an innovative engineering center," includes 1 project with a funding amount of 4 billion tenge. Additionally, there are two program-targeted funding (PCF) projects for 2023-2025: BR21882179 "Development of forecasting and exploratory solutions for geological mapping of ore deposits using ground-based and space-based methods" (Project leader: Orynbasarova E.O.) and BR21882366 "Development of the geoid model of the Republic of Kazakhstan as the basis for a unified state system of coordinates and heights" (Project leader: Kasymkanova K.-K.M.) with a total funding of 1 billion 750 million tenge.

In 2023, the institute also carried out commercial contracts with the following enterprises:

LLP "Kazakhmys Coal", LLP "Mining enterprise 'ORTALYK', "(NAC"Kazatomprom"), JSC "AK Altynalmas", NGO AKF "PIT", LLP "Semizbay-U", LLP GRK "BORLY", LLP "OralElectroService", LLP "Zhanna Arka Manganese" the total amount of these contracts is 240,775,702 tenge.

Along with the funding for science, the quality aspects of the university's research activities include:

- Obtaining patents and their commercialization;
- Publications in high-ranking national and international journals.

3.1.4 Analysis of the State of Activity, Key Problems, and Their Causes in Financial and Economic Activities

The financial and economic activities of the institute are focused on financing all types of expenditures and investments in development. The main growth of the budget has occurred due to the receipt of funds from educational grants and contracts for providing educational services to individuals.

The transformation of the Institute includes the following stages:

- Transition from functional management to innovative process management;
- Modernization of the institute's structure (reengineering) to optimize it and enhance the efficiency of internal resource usage.

Functional management forces employees to perform functions well but does not orient them towards achieving results, which is the measure of the institute's success. The goal of process management at the institute is to plan performance indicators at various levels of management and achieve them through uninterrupted, rhythmic, and mutually coordinated actions of the business process owners in line with the development goals of the institute.

As a tool for managing business processes, strategic indicative planning will be used, implemented based on the Results-Oriented Management (ROM) concept. This will allow the institute to manage outcomes through key indicators that characterize the results of business processes. At the same time, the indicators of all business processes are top-level goals, and through their implementation, the global goal of the institute will be achieved – to enter the top 300 universities in the world according to QS.

Special attention will be given to the commercialization of our knowledge. Institutes and departments are expected to be intermediaries for interaction with the external world, ensuring access to external consumers and offering various commercial educational services in the market.

The institute conducts targeted work to improve the qualifications of the faculty and staff at partner enterprises and at international centers.

At the same time, institutes and departments will implement the principles of professionally-oriented training: creating educational and research platforms, university departments at large industrial enterprises, and attracting practicing teachers from the real sector of the economy, as well as implementing interdisciplinary educational programs with a strong research component.

Based on the experience of global centers like Edx (MIT) and Coursera (Harvard), Satpayev University implements Massive Open Online Courses (MOOCs) on the Polytech online platform.

Special attention will be paid to improving the system for analyzing labor market demands and employer needs, and translating them into main and additional educational programs.

The implementation of continuous practical training principles, and the integration of science, education, and business, contributes to the successful employment of Satpayev University graduates and their demand not only in Kazakhstan but also abroad. The stable reputation of the institute among employers and the growth of employment rates indicate the competitiveness of graduates in the labor market.

The university has developed and implemented a social package, through which students from socially vulnerable groups benefit from social support in the form of discounts on tuition fees, targeted financial assistance, and the provision of job placements. Over the past three years, dozens of new jobs have been created.

The number of students employed within the institute for additional work has increased.

3.1.5 Analysis of the State of Activity, Key Problems, and Their Causes in Infrastructure and Communication Activities

KazNTU has historically established scientific schools and operates affiliated research institutes, most of which hold leading positions in Kazakhstan. KazNTU is the base organization of the Almaty branch of the Kazakhstan National Academy of Natural Sciences, and the "Earth Sciences" department of the National Academy of Sciences of the Republic of Kazakhstan also operates within KazNTU.

KazNTU possesses a well-developed information and technological infrastructure, which includes a supercomputer designed for solving scientific tasks, server equipment based on Windows and UNIX systems, a powerful computer park with over 4,000 workstations, and modern teaching tools.

The KazNTU scientific library is a member of the Public Association "Association of University Libraries of the Republic of Kazakhstan" and holds a leading position among the 93 universities of Kazakhstan in terms of the quantity and quality of electronic documents provided.

The university needs to improve its scientific and technological infrastructure through the development of international relations with leading technical universities worldwide and foreign companies, including by creating world-class mirrored laboratories and international centers of well-known companies. Additionally, it is important to develop a unified information and telecommunications space for KazNTU's educational, scientific, and administrative activities and support the formation of KazNTU's electronic library fund, which includes access to leading foreign databases.

Communication activities depend on the annual improvement of language skills and mobility of scientists and faculty. At the moment, the funding for this task is insufficient, and there is a need for a more extensive organization of courses for faculty and students. The creation of creative communities for young scientists, a scientists' club with participation from representatives of leading industrial enterprises, partner foreign universities, scientific centers, and invited scientists is necessary. Furthermore, there is a need to increase the number of structural unit leaders who have undergone professional development and retraining in educational management. Increasing the number of joint educational, scientific, innovative, and socio-cultural projects with foreign enterprises and organizations (including educational institutions) and attracting international students is also essential.

- An expert review of the results of research and development, graduate theses, and dissertations for plagiarism is conducted;
- There is an extensive scientific library that meets the needs of the university's faculty, students, and researchers.

3.2 Assessment of the Innovative Potential of the Team

The quality of research work is confirmed by the presence of scientific schools in the processing of gold-arsenic ores, pyrite concentrates, vanadium and rare metal

raw materials, as well as extraction and sorption processes in hydrometallurgy. The innovative potential of the team is high, but it is necessary to increase the proportion of young staff with strong scientific motivation joining the team.

The most important strategic resource of the institute is human resources (HR). From 2016 to 2020, the number of HR experienced a slight decrease. The innovative potential of the institute's team can be characterized by the following trends:

- The level of academic qualifications of the faculty;
- The level of foreign language proficiency among the faculty;
- Funding for R&D per faculty member;
- Publication activity per faculty member.

The main goal in the development of the institute's human capital is to reduce the average age and maintain a high level of academic qualifications among the faculty.



Human capital development

3.2.1 Assessment of the Innovative Potential of the Team in Science

The faculty of the institute's departments, based on their experience in scientific and pedagogical work, are capable of conducting fruitful scientific research activities. The percentage of faculty with academic degrees is 85%. The faculty members regularly participate in various research competitions, serve as supervisors for master's and PhD students, and publish in international journals indexed in Scopus with a non-zero impact factor. They also publish monographs based on the results of their research.

Around half of the faculty members in the departments are involved in scientific research work and the execution of grant-funded projects.

3.2.2 Assessment of the Innovative Potential and Quality in Education

In modern conditions, when a large share of scientific research and development, as well as science-intensive products, are concentrated in universities, education becomes an essential element of this system, as it prepares qualified personnel.

The scientific supervisors of master's and doctoral students at the institute meet the requirements of the state educational standards (GOOS), meaning they have relevant work experience, academic degrees, and are authors of scientific articles in

international peer-reviewed journals. The percentile score for CiteScore should be at least 25 in the Scopus database for supervisors of master's students. For doctoral supervisors, it is required to have at least 2 articles in international peer-reviewed journals, ranked in the 1st, 2nd, or 3rd quartiles according to the Journal Citation Reports (JCR) in the Web of Science Core Collection, or having a CiteScore percentile of at least 35, or an H-index of 2 or more.

Courses are taught by faculty with at least 3 years of experience. Master's and doctoral students are taught only by faculty members with academic degrees and titles.

3.2.3 Assessment of the Innovative Potential of the Institute's Team

The innovative potential and quality in education are evaluated based on the following tasks:

Development of strategic partnerships with international organizations and educational institutions through the signing and extension of agreements on creative cooperation in the fields of education and scientific activity.

Development of 100% Syllabi and Teaching and Methodological Complexes (TMC) for bachelor's students, and 100% Syllabi for master's and doctoral students in the subjects taught by the department, in accordance with the working curricula of educational programs.

Improving the Quality of Higher Professional Education and Ensuring Highly Qualified Personnel for the Metallurgical Industry of the Republic of Kazakhstan from 2023 to 2027 through a Three-Step Specialist Training Program in Metallurgy (Bachelor's - Master's - PhD) with the Aim of Achieving the Following Results:

- An average GPA of at least 3.0;
- More than 70% of students and master's students completing industrial internships at industrial enterprises, based on the contingent assigned to the department;
- Increasing the participation of students in research projects on state budget topics to 40% of the temporary labor collective scientific projects.
- Integration of Scientific, Educational, and Innovative Activities from 2023 to 2027 through Increasing:
 - The number of funded research projects to 8 projects within the departments;
 - The number of scientific articles in publications recommended by the Committee for Control of the Ministry of Education and Science of the Republic of Kazakhstan to 15-20 articles;
 - The number of scientific articles in high-ranking international journals to 10-12 articles;
 - The number of patent applications for innovations to at least 5 applications;
 - Participation in international conferences to at least 15 reports.

Enhancing the Scientific and Pedagogical Potential of Department Staff to Ensure the Innovative Development of the Department from 2023 to 2027 by Maintaining and Increasing the Proportion of Master's, PhD, and Doctor of Philosophy Degrees Among the Department Staff:

- Faculty members with a degree: 100%;

- Auxiliary teaching staff: up to 70%.

3.3 Forecast of Labor Market Trends and Demand for Personnel

The demand for personnel in the mining and metallurgical complex (MMC) sector is high. By 2027, there will be a need for metallurgical technologists, specialists in the processing of gold-bearing ores, rare metal raw materials, and specialists in metallurgical recycling. According to the ranking conducted by Atameken OP, the educational program 6B07303 - Geospatial Digital Engineering ranked 1st. The educational program 6B07203 - Metallurgy and Enrichment of Minerals, V171 Satbayev University received a score of 3.55 for 2019 and 3.17 for 2020. In general, there is a trend of strengthening positions based on statistical data and student achievements. In 2020, the program improved its ranking from 5th place to 4th place, the average salary increased, and the duration of job search (in months) decreased compared to 2019.

All other indicators that show slight decreases are the result of the Covid-19 pandemic in 2020. All recruiting companies were under quarantine for a long time and were not hiring staff.

The economic systems of the Republic of Kazakhstan are based on the optimal, effective, and intensive use of four types of strategic resources:

- Natural resources (raw materials);
- Capital;
- Human resources;
- Entrepreneurial capacity.

The leading fundamental basis for the functioning and development of the economic system is human resources, which shape the regional labor market. The main target orientation is the national labor market. All labor resources are divided into two categories: employed and unemployed.

The O.A. Baykonurov Mining and Metallurgical Institute is ready to develop educational programs within the framework of the national project “Atlas of New Professions” to train specialists with the awarding of the “Bachelor” degree in new professions that are in demand in the labor market:

- Composite Materials Designer;
- Recycling Technologist.

The institute is taking all necessary measures to improve the quality of training for personnel in Kazakhstan’s industrial sector. To achieve this, radical changes have been made to the educational process, and many educational programs have been updated to include courses in accordance with the Atlas of New Professions.

4. Vision

The vision for the development of the departments of the institute is as follows:

- Harmonization of the department's management system in accordance with the principles of Total Quality Management (TQM) and the requirements of the international standard ISO 9001:2015;
- Development of innovative technologies in education and scientific activity based on modern information technologies;

- Integration of scientific, educational, and innovative activities;
- Priority development of scientific activities as the foundation of the department's innovative activity;
- Enhancement of the scientific and pedagogical potential of staff to ensure the staffing of the university's innovative development processes;
- Strategic partnerships with national companies, foreign universities, and industrial enterprises;
- Creation of conditions for studying state, Russian, and foreign languages to implement the cultural project "Triunity of Languages";
- Fostering Kazakh patriotism, tolerance, high culture, and respect for human rights and freedoms in students;
- A systemic approach to managing the department and the educational process;
- Compliance with legislative requirements in the field of education;
- Continuous improvement of the quality management system's effectiveness, focusing on compliance and timely execution of internal regulatory documents.

5. Mission

The mission of the institute is derived from the mission of the university: to contribute to global prosperity and expand the boundaries of knowledge through advanced research and excellence in educational activities.

The mission of the departments of the GMI is to remain an effective unit within the organizational structure of KazNITU by organizing academic potential and scientific technologies at the level of global standards in the field of metallurgy and developing a three-tier training system (bachelor - master - PhD) for metallurgical industries and scientific organizations in the Republic of Kazakhstan.

6. Strategic block

6.1 Place and role of the institute as a regional center of science and quality education

Globalization, regionalization, and internationalization as global trends in the development of higher education determine key processes such as: the introduction of new educational technologies, among which information and telecommunications technologies hold significant importance; deepening the integration of education and science, reflecting the essence of university education and preserving its fundamental nature.

The Mining and Metallurgical Engineering department at KazNITU is undoubtedly a center of national and regional significance for Kazakhstan. The Metallurgy and Mineral Processing educational program in its development strategy includes the following indicators:

- Training of specialists through educational programs in accordance with international standards, industry qualification frameworks, employer requirements, and the Atlas of New Professions;
- Multilingual education;
- Involvement of foreign faculty in the educational process;
- Development of student academic mobility practices;
- Increasing the number of scientific projects to a target of 8 projects by 2027.

6.2 Academic Policy

The academic strategy of KazNITU is aimed at implementing student-centered learning and improving the quality of education.

In organizing the learning process, KazNITU focuses on active learning rather than passive learning. Emphasis is placed on critical and analytical study and understanding, as well as increasing responsibility and accountability on the part of students. Conditions are created to ensure greater autonomy for students, interdependence between the instructor and the student, and mutual respect in the relationships between students and instructors.

All conditions have been created to improve the transparency of learning outcomes and processes.

The principle of the learning process at KazNITU is academic integrity, the implementation of which is one of the main directions of the academic strategy.

Currently, all educational programs at KazNITU are being improved in accordance with a new educational model, which involves transitioning to new educational technologies that ensure activity-based learning, as opposed to simply acquiring knowledge.

The academic policy of the departments of the institute includes the following:

- Acquiring new knowledge through conducting original research;
- Adherence to academic ethics;
- Relevance of the developed educational programs and research topics to increase the demand for graduates and improve employment rates;
- Involvement of foreign partner universities for reviewing educational programs;
- Granting the status of "beginning researcher" to bachelor's students who are capable of making a key contribution to the generation of new knowledge in line with the university's research university model;
- Achieving a "critical mass" to ensure innovation—this should contribute to the development of international, national, and regional cooperation between higher educational institutions;
- Ensuring adequate funding for educational programs.

6.3 Development of the Institute's Innovative Potential and Its Achievement

The innovative potential of the institute, reflecting both the resource and result-oriented components of the activities of a higher educational institution, is the foundation for successful cooperation with enterprises from both the real and financial sectors of the economy, as well as effective participation in national and international grants.

By 2027, the institute plans to increase the percentage of professors and lecturers with academic degrees to 100%.

- **Promotion of Innovative Educational Program Structures:** This principle focuses on the need to provide interdisciplinary training and develop the corresponding skills and competencies of students. The goal will be achieved by introducing interdisciplinary subjects into the curriculum, accounting for no less than 40% of the total number of courses in the respective educational program.

- **Financial Support for Innovative Projects:** The institute will provide financial support for projects related to the processing of rare metal ores, gold-bearing and radioactive materials, the development of powder metallurgy, and the development of hydrometallurgical projects, including sorption processes and intensification of extraction processes. Additionally, the university will organize an association of donors for educational programs, attracting financial resources based on 1% of the tax payments from subsoil users. These funds will be allocated to support innovative projects of the institute's faculty members and students.

6.4 Commercialization of Scientific and Technical Developments

Commercialization is the process of developing and implementing a range of activities through which the results of scientific research and experimental design work can be offered in the markets for goods and services with commercial goals.

By 2026, the institute plans to increase the number of research and development (R&D) projects to 4.

- **Attracting funds from the mining and metallurgical complex (GMC) sector:** The institute aims to attract financial support from the GMC sector for solving industry-specific challenges, based on 1% of tax payments from subsoil users. This financial support will be allocated to address practical problems faced by the sector.

- **Sponsorship of educational programs by the GMC sector:** The institute will organize mentorships from the GMC sector for educational programs, allowing for closer cooperation and the application of scientific developments to real-world industrial needs. This will enhance the practical relevance of the educational programs and foster collaboration between academia and industry.

7. Ways to achieve your goal

Main problems and their causes:

1. Decrease in enrollment in educational programs of all EP GMI

The reason is the increase in the UNT threshold score, the total enrollment in groups of educational programs from 65 to 70 points, and is also associated with difficulties in online learning; the most important problem is that the content of career guidance work, which is carried out in schools with teaching staff, parents and students, does not provide significant assistance to students in wisely choosing professions.

Solutions: Improve work with schools on career guidance and strengthen individual work with applicants.

The department is the main educational and scientific structural unit of the institute, carrying out educational, methodological and research work in one or more related disciplines, educational work among students, as well as training of scientific and pedagogical personnel and improving their qualifications.

The teaching staff of the institute's departments in basic education and scientific specialty corresponds to the profile of undergraduate, graduate and doctoral programs.

The staff of the department is determined based on the standard teaching load and current methodological recommendations for planning the teaching load.

The number of teaching staff at the State Medical Institute for the 2021-2022 academic year was only 78, of which 63 are full-time, 9 doctors of science, 25 candidates of science, 16 PhD doctors, 13 masters. The degree of teaching staff is 79.3% (excluding masters), the average age is 49.9.

The number of teaching staff at the State Medical Institute for the 2022-2023 academic year was only 110, of which 88 were full-time, 13 doctors of science, 36 candidates of science, 21 PhD doctors, 18 masters. The degree of teaching staff was 76.6% (excluding masters), the average age was 46.5.

The number of teaching staff at GMI for the 2023-2024 academic year is only 94, of which there are 16 Doctors of Science, 36 Candidates of Science, 27 PhDs, 1 DBA, 14 Masters of Technical Sciences, 1 without a degree. The teaching staff degree is 84.0% (excluding masters), the average age is 46.5.

Both in terms of personal experience in scientific and pedagogical work, and in terms of age composition, teaching staff of departments are capable of conducting fruitful research activities.

The staff of the O.A. Baikonurov Mining and Metallurgical Institute for the 2023-2024 academic year is 93 teaching staff, of which 15 doctors of technical sciences, 35 candidates of science, 26 PhD doctors, 1 DBA, 15 masters of technical sciences, 1 teacher without a degree.

By department:

The staff of the Department of Mining is 15 teaching staff, of which 3 doctors of technical sciences, 8 candidates of technical sciences, 4 PhD doctors.

The staff of the Department of Metallurgy and Mineral Processing is 17 teaching staff, of which 1 Doctor of Technical Sciences, 9 Candidates of Technical Sciences, 7 PhD Doctors.

The staff of the department “Metallurgical Processes, Heat Engineering and Technology of Special Materials” is 7 teaching staff, of which 1 Doctor of Technical Sciences, 2 Candidates of Technical Sciences, 3 PhD Doctors, 1 Master of Technical Sciences.

Personnel of the department “Materials Science, Nanotechnology and Engineering Physics” - 7 teaching staff, of which 1 Doctor of Technical Sciences, 1 Candidate of Technical Sciences, 2 Candidates of Physical and Mathematical Sciences, 2 PhD Doctors, 1 Master of Technical Sciences.

The staff of the department “Mine surveying and geodesy” is 26 teaching staff, of which 4 doctors of technical sciences, 7 candidates of technical sciences, 7 PhD doctors, 8 masters of technical sciences.

The staff of the department “Chemical Processes and Industrial Ecology” is 21 teaching staff, of which 5 doctors of science, 6 candidates of science, 3 PhD doctors, 1 DBA, 5 masters of technical sciences, 1 teacher without a degree.



Fig.2 Human resource potential

The main target in the field of human capital development of the institute is to reduce the average age and maintain a high degree of teaching staff.

The winners of the title of the Republican competition “Best University Teacher - 2022” were:

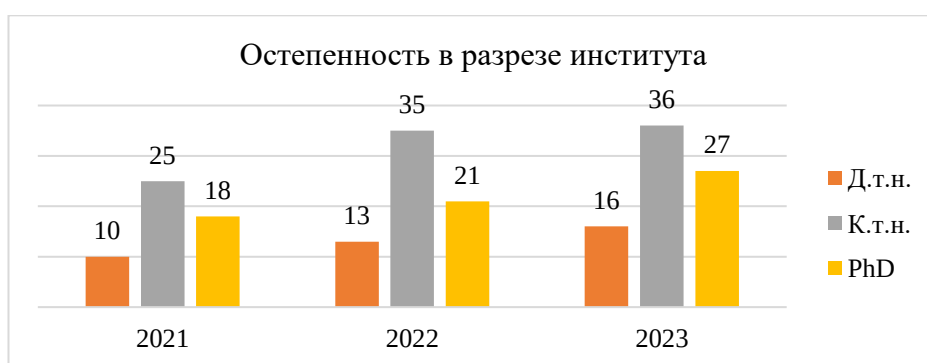
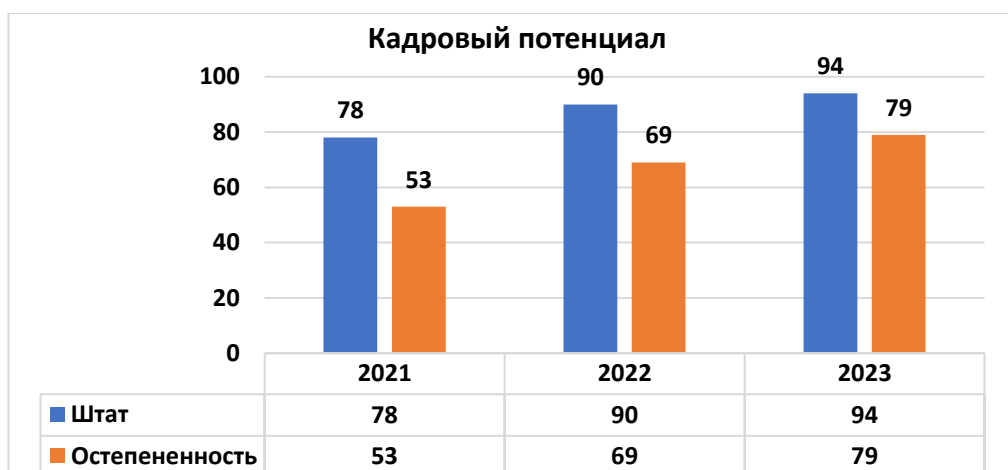
1. Rysbekov Kanai Bakhytovich;
2. Chepushtanova Tatyana Aleksandrovna;
3. Orynbasarova Elmira Orynbasarovna;
4. Abildina Ainaz Kairatovna;
5. Koishina Gulzada Myngyshkyzy

A total of 775 candidates from 71 higher educational institutions across the country participated in the competition. The competition evaluated factors such as the development and publication of electronic educational resources, teaching materials, scientific publications in domestic and international journals, and the presence of patents for inventions, among other criteria. The quality of the candidate's teaching was also assessed, including their work in preparing personnel at the bachelor's, master's, and doctoral levels.

The academic title of "Professor" in the field of Metallurgy has been awarded to Nurlan Kalievich Dosmukhamedov (Order No. 92 dated 24.11.2022 "On the conferral of the academic title"). The academic title of "Professor" in the field of Geodesy and Surveying has been awarded to Kanai Bakhytovich Rysbekov (Order No. 10 dated 19.01.2023 "On the conferral of the academic title"). The academic title of "Associate Professor" in the field of Environmental Engineering has been awarded to Madina Bogembaevna Barmenshinova (Order No. 126 dated 17.03.2023 "On the conferral of the academic title").

The winners of the title of the Republican competition “Best University Teacher - 2023” were:

1. Abdiev Kaldybek Zhamshaevich;
2. Kyrgyzbaeva Guldana Meirambekovna;
3. Aitkazinova Shynar Kasymkanovna;
4. Zhursumbayeva Mariyamkul Burkanovna;



Problems: Not all departments have 100% regular teaching staff;

The total number of students studying at GMI is:

The contingent of bachelors for the 2023-2024 academic year is 1619 students;

The number of undergraduates for the 2023-2024 academic year is 171;

The number of doctoral students for the 2023-2024 academic year is 73;

The annual increase in publications in international journals, according to Thomson Reuters data, is 20%, with plans to increase this figure to 10-12 articles per year.

The development prospects of the Institute are closely linked to the University's infrastructure within the framework of the Development Program, in order to meet the modern requirements for universities in terms of infrastructure provision and equipment.

The development of modern infrastructure is mainly funded by research projects from the faculty, the university itself, and sponsorship funding from enterprises.

Thanks to sponsors, our Institute was one of the first in the university to open a business room in 243GMK.

In late 2021 and the first quarter of 2022, repairs were carried out at the TTK with funds from investors such as LLP “Leica-geosystems Kazakhstan”, LLP “Geostroiinvest”, LLP “Geomaster”, LLP “Kazferrosteel”, LLP “Delma”, JSC

“TNK Kazchrome”, and private investors Bitimbaev M.Zh., (alumnus), Batiev R.A., (alumnus), Kaidarova D.R., for a total of 30,000,000 KZT.

The main support from sponsors came in the form of building materials under the Sponsorship Agreement.

At the Training Polygon, the interior walls of two separate buildings were restored, geological sections were applied, an 11-ton underground contact electric locomotive was mounted on a pedestal, and all excess rails and ties were stacked for the next stage of work. Currently, work has been completed on the creation of a mechanical handcar.

Some of the construction materials intended for TTK and the Training Polygon were transferred to the DUI for the repair of dormitories.

Repairs were also carried out at the Mining and Metallurgical building in the following classrooms: A. Mashanov auditorium 252GMK, classrooms 250GMK, 230GMK, 134GMK, 136GMK, 113GMK, 243GMK (business room), 257GMK (aud. named after Rakhishev B.R.). All work was completed in the shortest possible time (from 2 weeks to 1 month), ahead of schedule. The total amount was 30,000,000 KZT.

Sponsors provided investment software ArcGIS for 50 seats worth 35,000,000 KZT.

Funding for project № 446-PCF-23-25 dated 15.11.2023 is being used for the creation of laboratories in the Engineering Center and classrooms. Repair works are being conducted in the Mining and Metallurgical building, rooms № 147, 118, 122, 127, 130, 141, 143, for a total of 30,000,000 KZT.

The renovation of the Engineering Center premises is being carried out in phases. Equipment purchases for 2023 have been made, and further equipment procurement is planned for 2024. After the full procurement of equipment and the accreditation of eight laboratories, the official opening of the center will take place (to coincide with the 90th anniversary of the university).

Sponsorship funds are being used for the renovation of classrooms in the Mining and Metallurgical building, including rooms 124, 126, 128, 244, 264, 263, 140, 140a, and 308.

Plans include the renovation of eight classrooms (314-326 GMK) on the third floor of the Mining and Metallurgical building, two classrooms (241-242 GMK) on the second floor, and one classroom (120 GMK) on the first floor, with a total cost exceeding 70,000,000 KZT.

Sponsorship (LLP "Delma") has provided dry mixtures worth 1,085,500 KZT, with 856,000 KZT in 2023 and 229,500 KZT in 2024.

Electrical equipment has been provided for the cafeteria tenant, valued at 908,000 KZT.

The total amount of sponsorship assistance for the reporting period amounted to 196,993.5 KZT.

Future plans include obtaining sponsorship support for the equipment of material resources on a permanent annual basis through patronage according to the national roadmap.

Annual improvement of language training and mobility for scholars and faculty members is being carried out. In the future, this will include training faculty members in English and having them pass IELTS and TOEFL exams, as well as increasing faculty mobility through academic exchanges with international partner universities.

The number of joint educational, scientific, innovative, and socio-cultural projects with foreign enterprises and organizations (including educational institutions) has increased from 2 in 2016 to 6 in 2020-2021. The aim is to increase this number to 15 by 2027.

In the development of advanced educational programs (OP) and teaching technologies, the integration of OP into the global academic community is underway through collaboration with international partner universities. Currently, the Worcester Polytechnic Institute (USA) is an official reviewer of OP for Metallurgical Engineering. Educational programs support multilingual learning and an interdisciplinary approach.

Future plans include expanding international cooperation to align educational programs with international standards and increasing the number of international partners by an annual growth rate of 20%. There are also plans to develop academic exchange indicators, international internships, and student mobility. Organizing favorable conditions to attract international students at all levels of education is also a priority.

2.2 Description of the Institute's prospects in post-graduate innovative education

As part of post-graduate innovative education, it is planned to increase the number of master's and doctoral students, with the ratio of master's and doctoral students to bachelor's students reaching 5 (master's and doctoral students) / 1 bachelor's student. The development of international integration of educational programs (OP) will continue, through reviewing OPs by international experts. A practice-oriented approach in student education will be increased, as well as student involvement in research environments. The goal is to involve 80% of master's students in research projects and 95% of doctoral students in projects. The level of English proficiency among students will also be improved.

To develop the competencies of future specialists, the Institute has established an Employer Council with participation from industry representatives.

The objectives of this Council are as follows:

1. Ongoing communication with leading enterprises in Kazakhstan. To achieve this, the Institute has established a connection with the Public Association "Republican Association of Mining and Metallurgical Enterprises" of Kazakhstan (OIOL "AGMP").
2. Development of competencies based on data collected from enterprises.
3. Expert review of the Institute's RUPs (educational programs). With the assistance of the OIOL AGMP, expert opinions were obtained from leading enterprises in Kazakhstan.
4. Employment issues for graduates of the Institute.

The Chairman of the Employer Council is Tulegen Mukhanov, First Deputy Executive Director of the OIOL "Republican Association of Mining and Metallurgical Enterprises." This collaboration allows direct interaction with enterprises through a unified system.

As is well known, the new "Education Law" foresees direct participation of industry enterprises in assessing educational programs and certifying the staff of higher education institutions in Kazakhstan. The purpose of establishing a branch of the OIOL "Republican Association of Mining and Metallurgical Enterprises" (AGMP) is to create a "Certification Center for Graduates of the NAO "KazNITU named after K.Satpaev" and to enhance the qualification of staff from partner enterprises of the OIOL AGMP.

2.3 Description of the Institute's prospects in science

The organization of scientific work at the institute is carried out in accordance with the Regulations on research, development and technological work within the framework of the formation and implementation of scientific, scientific, technical and innovative projects and programs.

In 2023, scientists of the institute published 55 articles in rating publications. During the reporting period, 15 patents of the Republic of Kazakhstan were received.

During the reporting period, the following doctoral dissertations were defended:

Table 1 – List of doctoral students who defended their doctoral dissertations

2023			
1	Утешов Ержан Турсынович	6D070700 – «Mining»	18.04.2023
2	Кенжетаев Жигер Смадиевич	6D070700 – «Mining»	18.04.2023
3	Доненбаева Назгуль Сериковна	6D071100 – « Geodesy»	18.04.2023
4	Шонғалова Айгүл Қабылқызы	6D074000 – «Nanomaterials and nanotechnologies»	05.05.2023
5	Кенесбаева Айгуль	6D071100 – « Geodesy»	09.06.2023
6	Куандыков Тилепбай Алимбаевич	6D070700 – « Mining»	09.06.2023
7	Бахытулы Наурызбек	6D071000 – «Materials science and technology of new materials»	10.07.2023
8	Мейирбеков Мохаммед Нургазыұлы	6D071000 – «Materials science and technology of new materials»	10.07.2023
9	Сарыбаев Нуржигит Омарович	6D070700 – « Mining»	05.09.2023
10	Мусахан Ануар Бахытжанұлы	6D070700 – « Mining»	05.09.2023
11	Омарбеков Ернур Уразғалиевич	6D070700 – « Mining»	05.09.2023
12	Кемелбекова Айнагуль Ержановна	6D071000 – «Materials science and technology of new materials»	06.12.2023

In accordance with Article 15 of the Law of the Republic of Kazakhstan "On Science," in order to encourage scientists, researchers from scientific organizations, and higher and (or) postgraduate educational organizations who have contributed to the development of science and technology, the Ministry of Science and Higher Education of the Republic of Kazakhstan awarded the "Best Scientist of the Year" 2022 prize to Professor of the Department of "Metallurgy and Mineral Processing" Nurlan Kaliyevich Dosmukhamedov.

In 2023, the "Best Scientist of the Year" 2023 prize was awarded to the Head of the Department of "Mining" Serik Kurashovich Moldabaev.

The winner of the National Industry Competition "Golden Hephaestus" in the "Teacher of the Year" nomination was the Director of the Institute, Kanai Bakhytovich Rysbekov.

Based on the results of the competition held by the Committee for Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan and in accordance with the Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated December 28, 2022, No. 216, the state scientific scholarship for talented young scientists was awarded to Senior Lecturer of the Department of "Metallurgy and Mineral Processing" Eleyusiz Bolatovich Tajiev.

According to the results of the competition held by the Committee for Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan and in accordance with the Order of the Minister of Science and Higher Education of the Republic of Kazakhstan in 2023, the state scientific scholarship for talented young scientists was awarded to Professor of the Department of "Metallurgical Processes, Heat Engineering, and Technology of Special Materials" Omirserik Sabyrzhanovich Baygenzhenov.

Winners of the Bolashak scientific internship grant

- Associate Professor of the Department of Chemical Processes and Industrial Ecology, Doctor Ph.D Abildina Ainaz Kairatovna
- Associate Professor of the Department of "Metallurgical Processes, Heat Engineering and Technology of Special Materials", Doctor Ph.D Mamyrbaeva Kulzira Kaldybekovna

4.2 The total amount of funding for research work on GMI for 2023 is 2,935,923,824.23 tenge.

The number of research projects carried out under the GF, PCF, and RNTTD for the years 2021-2023, 2022-2024, and 2023-2025 is 46 projects. The funding amount for contract research in 2023 is 213,092,785.44 tenge.

The institute's scientists submitted 25 applications for the GF competition for the 2023-2025 period, of which 12 projects were won.

Under the GF competition for the most promising projects for the commercialization of scientific and (or) scientific-technical activities (RNTTD) for 2022-2024, 2 applications were won (Moldabaev S.K. and Bektaev E.). Professor of the Department of Mineral Processing and Metallurgy Dossymkhammedov N.K. is a member of the National Council for Commercialization.

For the GF competition for the most promising projects for the commercialization of scientific and (or) scientific-technical activities (RNTTD) for 2023-2025, 2 applications were won (Bektaev E.K. and Tatykhanova G.S.).

Based on the PCF for 2023-2025, BR21881939 "Development of resource-saving energy-generating technologies for the mining and metallurgical complex and creation of an innovative engineering center," 8 laboratories will be created with subsequent accreditation.

Table 2 – Name of laboratories by engineering center

№	Name of laboratories
1	Laboratory «Digital, computer modeling of ore mining technologies from complex structural blocks
2	Laboratory of Geomechanics and Geotechnologies
3	Laboratory of Chemical Analytical Research
4	Laboratory «Ore enrichment research
5	Laboratory «Pyro- and hydrometallurgical research methods
6	Laboratory of metallurgical processes, heat engineering and powder Metallurgy
7	Laboratory of nanotechnology and nanomaterials
8	Environmental monitoring laboratory at MMC

Head of the program Begentaev M.M., Scientific supervisor Rysbekov K.B.

By section (tasks, laboratories):

1. Scientific Leader of the Laboratory of Digital and Computer Modeling of Ore Extraction Technologies from Complex-Structured Blocks: Rakishev B., Responsible Executor: Orinbai A.A.

1.2. Scientific Leader of the Laboratory of Geomechanics and Geotechnology: Moldabaev S.K., Responsible Executor: Kyrgyzbaeva G.M.

1.3. Scientific Leader of the Laboratory of Chemical and Analytical Research: Kubekova Sh.N., Responsible Executor: Kapralova V.I.

1.4. Scientific Leader of the Laboratory of Ore Enrichment Research: Barmenshinova M.B., Responsible Executor: Motovilov I.Yu.

1.5. Scientific Leader of the Laboratory of Pyro- and Hydrometallurgical Research Methods: Tajiev E.B., Responsible Executor: Moldabaeva G.Zh.

1.6. Head of the Laboratory of Metallurgical Processes, Thermal Engineering, and Powder Metallurgy: Chepushtanova T.A., Responsible Executor: Yulusov S.

1.7. Head of the Laboratory of Nanotechnology and Nanomaterials: Azat S., Responsible Executor: Kudaybergenov K.

1.8. Head of the Laboratory of Environmental Monitoring in the Mining and Metallurgical Complex: Kezembraev G.B., Responsible Executor: Eligbaev B.K.

Table - 3 Projects financed from the state budget

IRN	Project name	Full name scientific supervisor	Contest	2023	2024	2025
AP09058297	Development of a new waste-free technology for recycling hot-dip galvanizing waste with	Koishina Gulzada Myngyshkyzy	GF young 21-23	18 000 000,00	0,00	0,00

	comprehensive recovery of valuable components					
AP09058620	Development of a Web-GIS based on complex geodynamic monitoring data for the Kazakhmys Corporation LLP field	Orynbasarova Elmira Orynbasarovna	GF young 21-23	18 000 000,00	0,00	0,00
AP09259631	Development of technology for the extraction and processing of sand from ancient large-volume placer deposits of depressions with a predominance of small, thin, free and bound gold (Takyr-Kaldzhirsky site)	Begalinov Abdrakhman -	GF 21-23	21 000 000,00	0,00	0,00
AP09259637	Development of highly efficient waste-free technology for recycling ash from coal combustion to produce marketable products	Dosmukhamedov Nurlan Kalievich	GF 21-23	24 038 263,60	0,00	0,00
AP09261035	Development of a highly effective system for diagnosing the stress-strain state of a rock mass and spatiotemporal analysis of the development of deformation processes throughout the deposit	Imansakipova Botakoz Beketovna	GF 21-23	24 862 380,00	0,00	0,00
AP09260644	Development of an effective multifunctional encapsulating composition to increase the yield of legumes	Kabdrakhmanova Sana Kanatbekovna	GF 21-23	24 548 380,00	0,00	0,00
AP13068028	Colloid-chemical approach to the creation of anti-turbulent materials based on surfactants with nanoparticles for oil pipelines	Sharipova Altynay Azigarovna	CYS 2022-2024	25 000 000,00	24 500 000,00	0,00
AP13067773	Development of the scientific basis and technology for the preparation of long-acting eye drops based on gellan and ofloxacin	Tatykhanova Gulnur Sayranovna	CYS 2022-2024	24 799 066,00	24 591 067,00	0,00
AP13268858	Study of technology for producing microdispersed high-purity silicon oxide and metallurgical silicon from asbestos production waste	Baygenzhenov Omirserik Sabyrzhanovich	YS 2022-2024	7 953 976,00	7 998 431,00	0,00
AP15473238	Diatomic catalysts for electrochemical production of hydrogen peroxide	Dalbanbai Amantay	YS 2022-2024	7 955 362,00	8 000 000,00	0,00
AP15473200	Development of technology for processing oxidized ores with preliminary high-temperature sulfidization	Merkibaev Erik Serikovich	YS 2022-2024	8 000 000,00	8 000 000,00	0,00
AP15473167	Study of the mechanism of intercalation processes at the anode of magnesium-ion batteries	Abildina Ainaz Kairatovna	YS 2022-2024	8 000 000,00	8 000 000,00	0,00
AP14871828	Research and development of a highly effective	Rysbekov Kanai Bakhytovich	GF	31 077 120,00	29 891 745,00	0,00

	technique for monitoring the geotechnical state of a rock mass for assessing and predicting deformation processes during field development		2022-2024			
AP14871694	Development of a technology for processing ash and slag waste from thermal power plants to obtain popular building materials	Kuldeev Erzhan Itemenovich	GF 2022-2024	32 986 425,00	32 919 848,00	0,00
AP14871587	Development of a comprehensive technology for reducing theft formation during liquid-liquid extraction of copper	Chepushtanova Tatyana Aleksandrovna	GF 2022-2024	30 000 000,00	30 000 000,00	0,00
AP14871266	Development of innovative methods for efficient and safe underground mining of thin inclined ore deposits	Serdaliev Erdulla Turganbekovich	GF 2022-2024	30 087 596,00	33 000 000,00	0,00
AP14871011	Creation of mining technologies for continuous and integrated use of the subsoil massif in a controlled mode and closed cycle	Yusupov Khalidilla Abenovich	GF 2022-2024	31 309 044,00	31 309 044,00	0,00
AP14870189	Intensification of the process of underground borehole leaching of uranium by bioactivation of leaching solutions	Turysbekova Gaukhar Seythanovna	GF 2022-2024	28 921 036,00	28 599 378,00	0,00
AP14870070	Development of technology for complex extraction of noble and rare earth metals during uranium mining	Bektay Erkin	GF 2022-2024	28 900 527,00	28 238 589,00	0,00
AP14869802	Development of innovative technologies for gravity enrichment and mineralogical analysis of ordinary geological samples for gold	Begalinov Abdrakhman -	GF 2022-2024	29 200 000,00	29 800 000,00	0,00
AP14869304	Design of new biomaterials based on silk fibroin with film-forming properties	Sharipova Altynay Azigarovna	GF 2022-2024	33 000 000,00	33 000 000,00	0,00
AP14869083	Ensuring the completeness of extraction of deposit reserves based on a new approach to volumetric geomechanical modeling of deep open-pit mine workings along the entire perimeter	Moldabaev Serik Kurashovich	GF 2022-2024	33 000 000,00	33 000 000,00	0,00
AP14869499	Plasma water purification for the decomposition of persistent polymeric and organic pollutants: from micro-to-nanoparticles to molecules.	Azat Seythan	GF 2022-2024	29 853 170,00	29 827 410,00	0,00
AP14870286	New polymer biocidal compounds: synthesis and study of properties	Zhursumbayeva Mariyamkul Burkanovna	GF 2022-2024	31 212 438,75	31 255 399,30	0,00

AP148036/0222	For official use	Imansakipova Botakoz Beketovna	GF 2022- 2024	23 505 792,00	22 505 792,00	0,00
AP19175733	Development of a universal polymer clay composite with high antiseptic characteristics based on modified bentonite clays of Kazakhstan and polymers for water purification	Beisebekov Madiyar Maratovich	YS 2023- 2025	8 000 000,00	7 500 000,00	7 500 000,00
AP19577049	Synthesis, characterization and physicochemical study of sorbents of biomass origin for purification of industrial waters from radionuclides	Kudaibergenov Kenes Kakimovich	CYS 2023- 2025	24 118 604,38	24 013 787,55	23 961 610,00
AP19576993	Intensification of the process of reclamation of disturbed lands during open-pit mining using hyperaccumulator plants and mycorrhizae	Zhakypbek Yryszhan	CYS 2023- 2025	24 999 209,00	24 996 342,00	24 998 396,00
AP19576987	Creation of an effective method for strengthening a weakly stable rock mass with the construction of a modified advance support from high-tech materials ensuring safe mining of ore bodies	Iskakov Erkin Ersultanovich	CYS 2023- 2025	25 000 000,00	25 000 000,00	25 000 000,00
AP19576391	Development of innovative technology for producing new alloys from accumulated substandard multicomponent chromium-, manganese-containing waste using Big Data	Tazhiev Eleusiz Bolatovich	CYS 2023- 2025	25 000 000,00	25 000 000,00	25 000 000,00
AP19680477	Development of a comprehensive technology for processing nickel-cobalt-containing ores using pyro- and hydrometallurgical processes.	Mamyrbaeva Kulzira Kaldybekovna	GF 2023- 2025	19 814 375,00	24 927 100,00	25 218 700,50
AP19680182	Development of an effective technology for complex enrichment and processing of refractory gold-bearing raw materials from the Aktobe deposit	Barmenshinova Madina Bogembaevna	GF 2023- 2025	25 000 000,00	35 000 000,00	35 000 000,00
AP19680130	Ensuring industrial, environmental safety and completeness of the extraction of minerals in conditions of the danger of collapse of the earth's surface	Aitkazinova Shynar Kasymkanovna	GF 2023- 2025	23 724 548,50	31 684 100,00	30 352 944,00
AP19679911	Increasing the efficiency of uranium leaching during the development of complex hydrogen deposits	Aben Erbolat Khalidillauly	GF 2023- 2025	27 629 949,00	34 886 291,00	35 353 167,00
AP19677216	Research and development of technology and equipment for electrodialysis of solutions of tungstate and	Baimbetov Bolotpay Sagynovich	GF 2023- 2025	20 000 000,00	30 000 000,00	30 000 000,00

	sodium sulfate with regeneration of alkali and acid					
AP19676951	Development of resource-saving, combined technology for complex processing of multi-component non-ferrous metallurgy dust to obtain marketable products	Dosmukhamedov Nurlan Kalievich	GF 2023-2025	27 750 000,00	35 800 000,00	35 800 000,00
AP19676884	Development of effective methods for crushing rock mass when mining ore from a complex structured massif by controlling explosion energy parameters	Iskakov Erkin Ersultanovich	GF 2023-2025	27 750 000,00	35 800 000,00	35 800 000,00
AP19676591	Development of innovative technologies for the complete extraction of scattered conditioned ores from complex structural blocks of benches	Rakishev Bayan	GF 2023-2025	27 000 000,00	35 000 000,00	35 000 000,00
AP19679937	Synthesis and properties of hybrid gels based on cellulose and alginate nanofibers with CuO/tetracycline nanoparticles	Kudaibergenov Kenes Kakimovich	GF 2023-2025	24 999 440,00	34 977 950,00	34 790 200,00
AP19679572	Development of a new technology for recycling zinc dust from steelmaking to obtain marketable products	Koishina Gulzada Myngyshkyzy	GF 2023-2025	27 750 000,00	35 800 000,00	35 800 000,00
AP19678114	Synthesis and study of the properties of environmentally friendly surfactants from natural raw materials	Abdiev Kaldibek Zhamshaevich	GF 2023-2025	26 636 344,00	35 512 866,00	35 430 492,00
AP19676107	Development of technology for complex processing of technogenic waste from vanadium production	Yulusov Sultan Baltabaevich	GF 2023-2025	27 749 993,54	35 800 000,00	35 800 000,00
BR21882366	Development of a geoid model of the Republic of Kazakhstan as the basis of a unified state system of coordinates and heights.	Kasymkanova Haini-Kamal Mikhailovna	PTF 2023-2025	893 602 120,00	301 190 720,00	303 217 050,00
BR21882179	Development of forecasting and search solutions for geological mapping of ore deposits using ground-space methods	Orynbasarova Elmira Orynbasarovna	PTF 2023-2025	46 611 923,33	131 611 923,33	125 109 548,33
BR21881939	Development of resource-saving energy-generating technologies for the mining and metallurgical complex and creation of an innovative engineering center	Rysbekov Kanai Bakhytovich	PTF 2023-2025	1 000 000 000,00	1 500 000 000,00	1 500 000 000,00

The plans include maintaining the involvement of up to 80% of the faculty members (PPS) in scientific projects; increasing the number of applied/contract

topics from enterprises; increasing the publication activity of the faculty members to 10-12 articles per year; promoting scientific projects for commercialization and implementation in production; conducting parallel applied research in the field of processing gold-containing and rare metal ores, as well as fundamental scientific research on technogenic waste; and attracting the patronage of corporations and enterprises for the specialty within the framework of 1% from subsoil use.

Research Quality Improvement Framework



Table – 4 Target indicators of the institute

№ п/п	Target indicators	Unit of measure ment					
			Stage I		Stage II		
			2022	2023	2024	2025	2026
Objectives 1: Development of human resources of the institute’s research staff							
1	Proportion of graduate faculty involved in research and development activities	%	68,75	73,75	77,5	82,5	85
2	Share of participation of young scientists in funded projects	%	32,5	35	38,75	41,25	43,75
3	Total number of dissertation councils	Advice	3	3	3	4	5
Tasks 2: Development of the scientific infrastructure of the institute, maintaining its instrumentation in the required volume and at an up-to-date level							
4	Share of renewal of the scientific equipment fleet from the total number of scientific equipment	%	8	12,5	14,75	20	25
Objectives 3: Ensuring sufficient and stable funding for scientific activities through attracted budgetary and extrabudgetary funds							
5	Number of ongoing scientific projects/programs financed from the state budget	Projects	9	15	16	19	19
Objectives 4: Increasing activity in publishing and inventive activities							
6	Number of patents received/supported	Patents	6/5	7/5	8/6	9/6	10/8
7	Number of publications in scientific journals of the Republic of Kazakhstan recommended by COXON MES RK	Publicati ons	43	52	53	57	64
8	Number of own scientific publications	Magazin e	4	5	5	6	6

Objectives 5: Strengthening integration into world science							
9	Share of scientific projects carried out jointly in collaboration with foreign scientists	%	1,66	2	2	2,75	3
10	Number of publications in foreign publications indexed by the international Scopus database	Publications	17	19	20	23	25
11	Number of publications in foreign journals indexed by the international database Web of Science	Publications	9	11	13	14	14
12	Number of publications, reports and speeches at republican and international conferences, symposia	Publications	40	49	55	63	71
Objectives 6: Increasing the share of scientific and educational programs culminating in research and development work at the departments of the institute							
13	Number of scientific research results introduced into the educational process	Acts	13	15	19	20	18
14	Total number of accredited research laboratories	Laboratory	1	1	2	2	2
Objectives 7: Strengthening the interaction of the University with the industrial sector and the public administration system (central and local authorities)							
15	Number of ongoing scientific projects/programs financed from extrabudgetary funds	Projects	5	7	7	8	8
16	Number of projects received funding aimed at commercializing research results per year	projects	1	2	2	3	3
17	Number of operating, created and registered joint ventures with domestic and international companies	Enterprises	0	0	1	1	1
18	Agreement on cooperation in the field of science and education with foreign and regional universities	Agreements	10	11	14	16	17

2.4 Description of the economic prospects of the institute

Attracting the production and mining-metallurgical (GMC) sector to fund the specialty within the framework of 1% from subsoil use; attracting investors for the development of the material base of the specialty.

One of the main tasks for the future development of the Institute is to play a key role in the "Centers of Academic Excellence" project within the engineering direction, as part of the KazNITU flagship project.

By 2027, the Institute plans to establish a Center for Academic Excellence based on the most competitive regional universities of the country, aimed at supporting science and developing intellectual potential within the framework of the State Program for Regional Development for 2020-2025.

Table – 5 Joint training of personnel with regional universities

Doctoral educational programs (master's, bachelor's)	Regional universities
8D07204 – Metallurgical Engineering Targeted training of doctoral students	Targeted training of doctoral students for Aktobe Regional University named after. K. Zhubanova"
8D07203 – Mining Engineering Targeted training of doctoral students 8D07204 – Metallurgical Engineering Targeted training of doctoral students	Targeted training of doctoral students for Zhezkazgan University named after O. Baikonurov

Table – 6 Joint training of personnel with international universities in the field of metallurgy

Doctoral educational programs (master's, bachelor's)	Regional universities
8D07204 – Metallurgical Engineering	Worcester Polytechnic Institute (USA), Firat University (Türkiye), Murdoch University (Australia), Moscow Technological University (MITHT).
7M07204 – Metallurgy and mineral processing	Worcester Polytechnic Institute (USA)
6B07203— Metallurgy and mineral processing	Worcester Polytechnic Institute (USA)

Table - 7 Scientific directions of the Institute for the development of relations with regions in the field of metallurgy

Direction of research	Regions for possible implementation	Brief information
1. Joint research projects in the field of processing gold-arsenic raw materials	Kordai district - Zhambyl region, Eastern Kazakhstan (Bakyrchik, Sayak, etc.).	Gold extraction technology, carbon suppression using pyrometallurgy methods, transfer of arsenic into safe storage forms.
2. Intensification of processing processes for copper heap leaching solutions	Aktogay is a village in the Ayagoz district of the East Kazakhstan region of Kazakhstan.	Intensification of processes for processing copper heap leaching solutions, solving problems of theft formation, testing extractants.
3. Development of technology for producing titanium dioxide from ores at the Obukhovskoye deposit	North Kazakhstan region	Development of a technology for producing titanium dioxide and a technological scheme for the complex processing of titanium-containing concentrate from the Obukhovskoe deposit.
4. Extraction of precious metals from electronic scrap using hydrometallurgy methods.	Central, Northern Kazakhstan, Large cities (Almaty, Nur-Sultan, Karaganda), Southern and Eastern Kazakhstan.	Development of a fundamental new low-waste technology for the extraction of noble metals from electronic scrap using iodide solutions and subsequent extraction of noble metals by sorption or precipitation methods with the condition of regeneration of spent iodide solutions.
5. Development of technology for the integrated development of	Zhambyl region, Southern Kazakhstan	Integrated development of polymetallic carbon-silica ores of the Greater Karatau,

polymetallic carbon-silica ores of the Greater Karatau		extraction of vanadium and rare earth metals.
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Table - 8 Communication with regions in the field of work in the field of metallurgy

№	Region	University	Direction of cooperation
1	Aktyubinsk	Aktobe Regional University named after. K. Zhubanova"	Targeted training of doctoral students, internship of master's students, research work
2	Zhezkazgan	Zhezkazgan University named after O. A. Baikonurov	Targeted training of doctoral students, internship of master's students, research work
3	All regions of Kazakhstan	- East Kazakhstan Technical University named after D. Serikbayev (EKGTU named after D. Serikbayev); - South Kazakhstan State University named after M. Auezov; - Karaganda State Technical University; - Karaganda State Industrial University; - Pavlodar State University named after S. Toraigyrov.	Conducting internships for master's students for regional universities.
4	All regions of Kazakhstan	- East Kazakhstan Technical University named after D. Serikbayev (EKGTU named after D. Serikbayev); - South Kazakhstan State University named after M. Auezov; - Karaganda State Technical University; - Karaganda State Industrial University; - Pavlodar State University named after S. Toraigyrov.	Admission to the master's program according to the OP: 7M07203-Mining Engineering; 7M07204 – Metallurgy and mineral processing.
5	All regions of Kazakhstan	- East Kazakhstan Technical University named after D. Serikbayev (EKGTU named after D. Serikbayev); - South Kazakhstan State University named after M. Auezov; - Karaganda State Technical University; - Karaganda State Industrial University; - Pavlodar State University named after S. Toraigyrov.	Participation in Olympiads and research competitions, 6B07205 – Mining engineering; 6B07203 – Metallurgy and mineral processing.
6	All regions of Kazakhstan	- - East Kazakhstan Technical University named after D. Serikbayev (EKGTU named after D. Serikbayev); - South Kazakhstan State University named after M. Auezov; - Karaganda State Technical University;	Research activities. 8D07204 – Metallurgical engineering; 7M07203-Mining engineering; 7M07204 – Metallurgy and mineral processing, 6B07205 – Mining engineering;

		- Karaganda State Industrial University; - Pavlodar State University named after S. Toraigyrov.	6B07203 - Metallurgy and mineral processing.
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Table – 9 Interaction with regional universities

Name of the university	Admission to undergraduate studies. master's, doctoral studies	Internship for master's students	Academic mobility	Scientific projects
East Kazakhstan State Technical University named after. D.Serikbaeva (EKSTU)	+	+		MMI is ready to conduct joint scientific projects
Karaganda State Technical University (KarSTU)	+	+	+	MMI is ready to conduct joint scientific projects
Karaganda Industrial University	+	+		
Pavlodar State University named after. S. Toraigyrova		+		
Zhezkazgan University named after O.A. Baikonkrov	+		Studying for a doctorate	
Aktobe Regional University named after K. Zhubanov	+	+		
Kyzylorda State University named after Korkyt Ata		+		
South Kazakhstan State University named after M. Auezov		+		
State Public Enterprise "Aktobe College of Transport, Communications and New Technologies"	+			
Kostanay College of Automobile Transport	+			

7.1 Paths to Achieving the Set Goal in Education and Improving Education Quality
– Having a personnel policy for the academic staff (PPS) that supports the high-quality implementation of educational programs in line with national qualification requirements (Ministry of Education and Science of Kazakhstan) (Order of the

Ministry of Education and Science of Kazakhstan No. 634 dated November 16, 2018) and international standards.

- The personnel policy for PPS should ensure alignment with the directions and fields of the PPS's research activities; regulate the maximum workload for PPS; define qualification requirements for both scientific supervisors and consultants, including those from the production or industrial sectors, for educational programs.
- Creating conditions for the scientific and research activities of the PPS (financing of the material base and research infrastructure).
- Applying modern pedagogical methods and innovations in the educational process, and establishing a teaching and methodological council at KazNITU.
- invitation and financing of highly qualified specialists from leading domestic and foreign educational organizations, research centers and manufacturing companies for scientific leadership.
- creation of conditions for advanced training of teaching staff, annual funding of advanced training courses in the amount of at least 72 hours.

7.2 Paths to Achieving the Set Goal in Postgraduate Innovative Education

- Ensuring the content of the master's and doctoral dissertations aligns with the legislation of the Republic of Kazakhstan and international requirements.
- The research work of master's students and PhD candidates must meet the standards of the State Educational Standards of the Republic of Kazakhstan (GOCO RK).
- Ensuring the practical orientation of the educational programs (OP) and the research work of both doctoral and master's students.
- Conducting doctoral research within an interdisciplinary approach and fostering international cooperation through inter-university collaboration and cooperation with other partners.
- Participating in scientific internships in accordance with the legislation of Kazakhstan and international requirements, as well as increasing funding for scientific internships.
- Developing skills in doctoral students such as academic writing, public speaking, research methodology, big data management, networking, project management, grant proposal writing, working in team-based projects, public presentation skills, and more.
- Increasing doctoral student involvement in group research projects aimed at production and grant funding.
- Evaluating the level of plagiarism in all written works and doctoral dissertations of PhD candidates using plagiarism-checking software like "Antiplagiat."

7.3 Paths to Achieving the Set Goal in Science

- Availability and effective use of material and technical resources for conducting research and implementing the educational program in accordance with the requirements of the Ministry of Education and Science of the Republic of Kazakhstan (MES RK).

- Support and periodic update of material-technical and experimental laboratory bases.
- Increase in inter-university cooperation agreements that provide opportunities for doctoral students to conduct experimental work in laboratories and with equipment from other institutions, particularly if the university cannot provide its own modern laboratory infrastructure.
- Organization of technical support for master's and doctoral students, including the presence of measurement instruments, glassblowing laboratories, and other necessary services.
- Establishment of a technical translation support service to increase publication activity.

7.4 Paths to Achieving the Set Goal in Information Provision, Infrastructure Development, and Communication Activities

- Creation and organization of interactive and communication platforms and events to facilitate discussions, exchange of opinions and experiences, as well as opportunities for doctoral students to share and validate research results with peers within expert communities or with other interested parties both within and outside the university and the country.

7.5 Paths to Achieving the Set Goal in International Cooperation and Scientific Collaboration

- Establishing a policy that regulates the mechanisms and sources of funding for doctoral students, including financial resources for scholarships, conducting research, purchasing equipment, and participation in national and international conferences, meetings, and symposia.
- Promoting our actions, achievements, and messages through social media.
- Participation in international conferences, symposia, and organizations.
- Organization of online/offline meetings and presentations for external representatives.
- Providing business trips for faculty and management to meet with potential collaborators, funded by the university.

8. Description of expected results

8.1 Expected results in improving the quality of education:

- Full compliance of the personnel policy regarding the teaching staff (PTS) with national qualification requirements (Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 634 of November 16, 2018) and international standards.
- Compliance with the time load norms for PTS, considering 6 full credits for one discipline.
- Involvement of industry professionals for delivering lectures.
- Transparent budgeting of departments, with each department having its own budget.

- Funding for the material base and research infrastructure.
- Application of modern teaching methods and innovations.
- Inviting high-qualified specialists from leading domestic and international educational organizations, with the annual involvement of at least one professor for the educational program.
- Annual professional development of the PTS for at least 72 hours.

8.2 Expected results in postgraduate innovative education:

- The content of dissertation works of master's and doctoral students complies with the legislation of the Republic of Kazakhstan and international requirements.
- The research work of master's and doctoral students (PhD) fully meets the requirements of the State Educational Standard of the Republic of Kazakhstan (GOCO RK).
- Ensuring the practical orientation of educational programs (OII) and research work of master's and doctoral students.
- Ensuring an interdisciplinary approach in educational programs, with at least 40% of interdisciplinary courses in the curricula.
- Development of skills among doctoral students such as academic writing, public speaking, research methodology, working with big data, networking, project management, grant proposal development, working in group and team projects, and public presentations.
- 100% participation of doctoral students in group research projects for production and grant funding.
- Verification of all scientific works using the "Antiplagiat" program.

8.3 Expected results in science and commercialization of technologies:

By 2027, increase the number of implemented scientific projects under GΦ/PCF to 18.

- Increase the share of publications in international journals to 25% of the total number of publications.
- Increase the number of contract-based projects to 9 by 2027.
- Effective use of material and technical resources for conducting research in accordance with the requirements of the Ministry of Education and Science of the Republic of Kazakhstan.
- Update the material and technical experimental laboratory base in metallurgy by 60% by 2026.
- Increase the number of inter-university cooperation agreements in metallurgy.
- Availability of control and measuring instruments, glass-blowing laboratories, and other technical services for the needs of students and teaching staff.
- Creation of a technical translation support service to increase publication activity.

8.4 Expected results in information support, infrastructure development, and communication activities:

- Creation of a communication platform for interaction with the mining and metallurgy sector (GMK) based on the educational program in metallurgy.

8.5 Expected results in international relations:

- Increase in student mobility, ensuring both geographical and interdisciplinary mobility, and development of international cooperation through inter-university cooperation and cooperation with other partners.
9. Information on the implementation progress. Sources and volumes of funding:
- KazNITU budget.
 - Grant funding budget.
 - Budget for contractual topics.

Appendix 1
to the Development Program
non-profit joint stock
society "Kazakh National
research technical
University named after K.I. Satpayev"
for 2023 – 2027

№ п/п	Target indicators	Unit of measurement	In the planning period				
			2023	2024	2025	2026	2027
1	2	3	4	5	6	7	8
Objective 1. Integration of scientific activity and educational process at all levels of higher and postgraduate education							
1.	Share of innovative educational programs developed at the request of industry associations and enterprises	%	17,00	17,14	17,25	17,40	17,50
2.	The share of invited foreign scientists and teachers from the total number of teachers of the institute	%	0,04	0,04	0,06	0,06	0,08
Objective 2. Training of leaders of the new generation – 10% of PhD students from the total number of students							
3.	Number of double degree programs with foreign universities	units	5	7	7	8	8
4	Number of agreements/memorandums of cooperation with foreign universities from the top 700	units	6	9	10	11	12
5.	Number of PhD students defended during the year	units	13	17	21	21	22
Objective 3. Fame and recognition at the international level through publications in the best journals Q1 and Q2 – 315 scientific publications							
6.	Number of publications in foreign scientific journals indexed by Scopus	units	21	24	31	34	39
7.	University citation level indicator by industry (FWCI - Field-Weighted Citation Impact)	coeff	0,76	0,77	0,79	0,80	0,82

8.	Share of university expenses for the development of educational and scientific laboratories	%	1,5	2	2,5	3	3,2
Objective 4. Quality education through research - at least 10% of graduates receive over 1,000,000 tenge in salary							
9.	Share of funding for scientific activities from the total funding of the university	%	17	17,10	17,20	17,25	17,30
10.	Creation of a prototyping and startup school	units	0	0	1	2	3
11.	Number of projects financed from the state budget	units	45	50	54	60	66
12.	Share of those employed in the first year after completion of training from the total number of graduates	%	78,20	79,33	79,83	80,66	81,33
Objective 5. Innovation, transfer and commercialization of new technologies (research into production) - the amount of contract research is at least 2 billion tenge per year							
13.	Number of new scientific laboratories created	units	0	0	8	8	8
14.	Number of commercialized research projects	Quantity	4	7	8	10	10
15.	The share of young scientists from the total number of scientists and researchers carrying out R&D and R&D	%	32,50	35,00	38,75	41,25	43,75
Objective 6. Effective management – increasing the level of satisfaction with quality, state of infrastructure, research, level of digitalization of at least 90%							
16.	Improving living conditions for students through renovation and construction of new dormitories	units	0/0	0/0	0/0	0/0	0/0
17.	Number of electronic resources introduced into the educational process	units	34 535	37 600	45 300	50 000	51500
18.	Satisfaction of students, staff and teaching staff with university services	%	75	80	85	87	90

Appendix 2
to the Development Program
non-profit joint stock
society "Kazakh National
research technical
University named after K.I. Satpayev"
for 2023 – 2027

**Action plan for the implementation of the Development Program of the O.A. Baikonurov Mining and Metallurgical Institute
for 2023 – 2027**

№ п/п	Events	Unit of measurement	Direct Outcome Indicators					Completion form	
			2023	2024		2025	2026	2027	
1	2	3	4	5		6	7	8	
Objective 1. Integration of scientific activity and educational process at all levels of higher and postgraduate education									
1.	Increasing the share of invited practitioners from production from the total number of teaching staff	%	5	7	9		11	15	Reporting information
2.	Increasing the share of students and teaching staff sent for internships as part of cooperation with foreign universities	%	1	1,5	2		2,5	3	Reporting information
Objective 2. Training of leaders of the new generation – 10% of PhD students from the total number of students									

3.	Allocation of additional intra-university funded grants for research	units	10	10	15	20	25	Reporting information
4.	Increasing number of postdoctoral programs	units	10	12	15	17	20	Reporting information, orders
Objective 3. Fame and recognition at the international level through publications in the best journals Q1 and Q2 – 315 scientific publications								
5.	Increasing the annual volume of incentive payments for publication activity in high-ranking publications	million tenge	20	30	40	50	80	Reporting information
6.	Increase in seminars and courses on research methodology, statistical analysis, laboratory methods, scientific writing and citation management	units	20	25	35	45	60	Reporting information
7.	Increasing the number of scientific publications indexed by Scopus or Web of Science databases	units	1	1	2	2	3	indexed publications
Objective 4. Quality education through research - at least 10% of graduates receive over 1,000,000 tenge in salary								
8.	Increasing the number of scientific development fairs and conferences with the	units	5	7	10	15	20	reporting information

	participation of industry and business							
9.	Increasing the number of start-up projects among students and university staff	units	5	5	10	15	20	contracts
10.	Increasing the level of employer satisfaction with the quality of graduate training	%	65	70	75	80	90	survey results
Task 5. Innovation, transfer and commercialization of new technologies (research into production) - the amount of contract research is not less than 2 billion tenge per year								
11.	Increasing the number of patents and other protection documents received (industrial designs, utility models and copyrights)	units	12	15	20	25	30	patents, copyright certificates
12.	Increase in the number of scientific/testing laboratories with accreditation from the 2023 level (2023 – 3)	units	1	1	1	2	3	accreditation certificates
13.	Annual increase in the number of projects for commercialization of the results of scientific and (or) scientific and technical activities	units	2	3	3	4	5	contracts, reporting information

Objective 6. Effective management – increasing the level of satisfaction with quality, state of infrastructure, research, level of digitalization of at least 90%								
14.	Improving the state of infrastructure based on assessments or feedback from teaching staff, staff and students	%	65	70	75	80	90	survey results
15.	Increasing funding for repairs and modernization of existing dormitories	million tenge	50	50	100	100	120	reporting information
16.	Increase in teaching staff income	thousand tenge	539	569	598	606	618	reporting information

Key indicators	unit of measurement	2023	2024	2025	2026	2027	Responsible department
		Approved plan/Updated plan	Approved plan/Updated plan	Approved plan/Updated plan	Approved plan/Updated plan	Approved plan/Updated plan	
Increase in publications in rating publications	Quantity	55/55	60	70	77	84	DS Publication Activity Department
Department of Mining	Quantity	5	6	7	8	10	
Department of Metallurgy and Mineral Processing	Quantity	8	9	9	10	11	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	Quantity	5	10	15	18	19	
Department of Materials Science, Nanotechnology and Engineering Physics	Quantity	18	14	15	16	17	

Department of Mine Surveying and Geodesy	Quantity	12	13	14	15	15	
Department of Chemical Processes and Industrial Ecology "	Quantity	7	8	10	10	12	
Share of graduates employed in the first year after graduation	%	78,20	79,33	79,83	80,66	81,33	Career
Department of Mining	%	70,80	72,00	73,00	74,00	75,00	
Department of Metallurgy and Mineral Processing	%	83,60	84,00	84,00	84,50	84,50	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	%	83,60	84,00	84,00	84,50	84,50	
Department of Materials Science, Nanotechnology and Engineering Physics	%	69,10	72,00	73,00	74,00	75,00	
Department of Mine Surveying and Geodesy	%	83,30	84,00	85,00	86,00	87,00	
Department of Chemical Processes and Industrial Ecology "	%	0,00	80,00	80,00	81,00	82,00	
University position in the QS WUR ranking	место						department of science/ Publication Activity Department
Educational services in the field of higher and postgraduate education *	people	1903	1935	1965	1991	2020	registrar's office
Department of Mining	people	237	240	245	246	250	

Department of Metallurgy and Mineral Processing	people	210	215	220	225	230	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	people	65	70	75	80	85	
Department of Materials Science, Nanotechnology and Engineering Physics	people	95	100	105	110	115	
Department of Mine Surveying and Geodesy	people	1124	1130	1135	1140	1145	
Department of Chemical Processes and Industrial Ecology "	people	172	180	185	190	195	
Number of programs included in QS-BY SUBJECT, TOP-100 (according to the list)		3	3	3	6		department of science/ Publication Activity Department
Number of PhD students defended during the year	quantity	13	17	21	20	22	Department of Doctoral Studies
Department of Mining	quantity	6	6	6	6	6	
Department of Metallurgy and Mineral Processing	quantity	0	2	3	3	3	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity	0	2	3	3	3	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity	4	4	4	4	4	

Department of Mine Surveying and Geodesy	quantity	2	2	3	3	3	
Department of Chemical Processes and Industrial Ecology "	quantity	1	1	2	1	3	
Number of educational programs within the framework of double-degree education with partner universities from the Top-700 QS rankings	quantity	5	8	10	13	14	registrar's office
Department of Mining	quantity		1	1	1	1	
Department of Metallurgy and Mineral Processing	quantity	2	2	2	3	3	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity	1	2	2	3	3	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity	1	2	2	3	3	
Department of Mine Surveying and Geodesy	quantity			1	1	1	
Department of Chemical Processes and Industrial Ecology "	quantity	1	1	2	2	3	
Number of agreements/memorandums of cooperation with foreign universities from the top 700	quantity	6	9	10	11	12	office of commercialization and international cooperation
Department of Mining	quantity	0	2	2	2	2	
Department of Metallurgy and Mineral Processing	quantity	2	2	2	2	2	

Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity	1	1	1	1	1	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity	1	2	2	3	3	
Department of Mine Surveying and Geodesy	quantity	1	1	1	1	1	
Department of Chemical Processes and Industrial Ecology "	quantity	1	1	2	2	3	
Number of double degree programs with foreign universities	quantity	5	8	10	13	14	registrar's office
Department of Mining			1	1	1	1	
Department of Metallurgy and Mineral Processing		2	2	2	3	3	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "		1	2	2	3	3	
Department of Materials Science, Nanotechnology and Engineering Physics		1	2	2	3	3	
Department of Mine Surveying and Geodesy				1	1	1	
Department of Chemical Processes and Industrial Ecology "		1	1	2	2	3	

The share of students who went abroad under the academic mobility program for a period of at least trimester, semester, academic year from the total number of students	%	0,004	0,006	0,008	0,010	0,012	registrar's office
Department of Mining	quantity		1	1	2	2	
Department of Metallurgy and Mineral Processing	quantity			1	2	2	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity		1	2	3	4	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity		1	2	2	3	
Department of Mine Surveying and Geodesy	quantity	7	7	8	8	9	
Department of Chemical Processes and Industrial Ecology "	quantity	1	1	2	3	4	
Share of foreign experts involved in teaching activities	%	4	4	6	6	8	office of commercialization and international cooperation
Department of Mining	quantity			1	1	1	
Department of Metallurgy and Mineral Processing	quantity			1	1	1	

Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity			1	1	1	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity	2	2	1	1	2	
Department of Mine Surveying and Geodesy	quantity		1	1	1	1	
Department of Chemical Processes and Industrial Ecology "	quantity	2	1	1	1	2	
Number of international educational programs of the university		0	1	3	4	5	registrar's office
Department of Mining	quantity		1	1	1	1	
Department of Metallurgy and Mineral Processing	quantity			1	1	1	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity			1	1	1	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity				1	1	
Department of Mine Surveying and Geodesy	quantity					1	
Department of Chemical Processes and Industrial Ecology "	quantity						

Share of teaching staff teaching in English from the total number of teaching staff	%	0,13	0,16	0,22	0,29	0,33	registrar's office
Department of Mining	quantity	2	2	3	3	3	
Department of Metallurgy and Mineral Processing	quantity	0	1	2	2	3	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity	2	3	3	3	3	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity	1	2	2	3	3	
Department of Mine Surveying and Geodesy	quantity	5	5	6	6	7	
Department of Chemical Processes and Industrial Ecology "	quantity	2	2	5	10	12	
Creation of a prototyping and startup school	quantity	0	0	0	2		department of science
Number of new scientific laboratories created	quantity	0	8	8	9	9	department of science
Department of Mining	quantity		1	1	1	1	
Department of Metallurgy and Mineral Processing	quantity		2	2	2	2	

Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity		1	1	1	1	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity		1	1	2	2	
Department of Mine Surveying and Geodesy	quantity		1	1	1	1	
Department of Chemical Processes and Industrial Ecology "	quantity		2	2	2	2	
Number of articles and reviews by OVPO/Research Institute employees in high-ranking publications Q1, Q2 Journal Citation Reports JCR	quantity	21	24	31	34	39	department of science/ Publication Activity Department
Department of Mining	quantity	3	3	4	4	5	
Department of Metallurgy and Mineral Processing	quantity	3	3	4	4	4	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity	1	2	2	3	3	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity	4	5	7	9	10	
Department of Mine Surveying and Geodesy	quantity	2	3	4	4	5	
Department of Chemical Processes and Industrial Ecology "	quantity	8	8	10	10	12	

University citation level indicator by industry (FWCI - Field-Weighted Citation Impact)		0,86	0,88	0,91	0,93		department of science/ Publication Activity Department
Department of Mining		0,36	0,38	0,56	0,62	0,64	
Department of Metallurgy and Mineral Processing		0,2	0,4	0,4	0,5	0,5	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "		22	25	30	35	40	
Department of Materials Science, Nanotechnology and Engineering Physics							
Department of Mine Surveying and Geodesy							
Department of Chemical Processes and Industrial Ecology "		0	0	0	0	0	
The share of foreign students in the university from the total number of students (in accordance with the coefficient*)	%	0,10	0,09	0,09	0,09	0,09	registrar's office
Department of Mining	people	30	30	30	30	30	
Department of Metallurgy and Mineral Processing	people	45	45	45	45	45	

Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	people	14	14	14	14	14	
Department of Materials Science, Nanotechnology and Engineering Physics	people	17	17	17	17	17	
Department of Mine Surveying and Geodesy	people	66	66	66	66	66	
Department of Chemical Processes and Industrial Ecology "	people	9	9	9	9	9	
Share of teaching staff engaged in research work (in accordance with the coefficient)	%	79,00	85,50	89,00	90,33	91,33	department of science
Department of Mining	%	80,00	92,00	92,00	100,00	100,00	
Department of Metallurgy and Mineral Processing	%	89,00	89,00	90,00	90,00	91,00	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	%	100,00	100,00	100,00	100,00	100,00	
Department of Materials Science, Nanotechnology and Engineering Physics	%	70,00	80,00	90,00	90,00	95,00	
Department of Mine Surveying and Geodesy	%	55,00	60,00	70,00	70,00	70,00	
Department of Chemical Processes and Industrial Ecology "	%	80,00	92,00	92,00	92,00	92,00	

The amount of income from research and development from the total income of the university	tenge	2 935 923 824,23	1 547 431 692,00	1 194 689 687,00	820 994 990,03	970 994 990,03	department of science
Department of Mining	tenge	549 539 312,00	531 764 174,00	136 153 167,00	140 000 000,00	150 000 000,00	
Department of Metallurgy and Mineral Processing	tenge	757 000 554,60	114 337 967,00	161 600 000,00	994 990,03	994 990,03	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	tenge	114 160 580,00	190 000 000,00	200 000 000,00	220 000 000,00	240 000 000,00	
Department of Materials Science, Nanotechnology and Engineering Physics	tenge	230 656 201,38	150 000 000,00	170 000 000,00	200 000 000,00	250 000 000,00	
Department of Mine Surveying and Geodesy	tenge	1 031 800 189,50	489 483 085,00	483 677 938,00	200 000 000,00	250 000 000,00	
Department of Chemical Processes and Industrial Ecology "	tenge	252 766 986,75	71 846 466,00	43 258 582,00	60 000 000,00	80 000 000,00	
The volume of private co-financing of commercialized projects of RSNTD and applied scientific research (LAE, business representatives)	thousand tenge	213 092 785,44	96 854 393,00	30 000 000,00	0,00	0,00	department of science / office of commercialization and international cooperation
Department of Mining	tenge	180 892 785,44	96 854 393,00	30 000 000,00			
Department of Metallurgy and Mineral Processing	tenge	32 200 000,00					
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	tenge						

Department of Materials Science, Nanotechnology and Engineering Physics	tenge						
Department of Mine Surveying and Geodesy	tenge						
Department of Chemical Processes and Industrial Ecology "	tenge						
Number of young teaching staff engaged in research work	quantity	43	45	48	52	57	department of science
Department of Mining	quantity	11	11	8	8	8	
Department of Metallurgy and Mineral Processing	quantity	10	10	10	11	11	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity	9	10	11	12	13	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity	3	3	5	6	7	
Department of Mine Surveying and Geodesy	quantity	5	6	7	8	8	
Department of Chemical Processes and Industrial Ecology "	quantity	5	5	7	7	10	
Number of projects financed from the state budget	quantity	46	50	54	60	66	office of commercialization and international cooperation / department of science

Department of Mining	quantity	8	7	7	7	7	
Department of Metallurgy and Mineral Processing	quantity	16	16	16	17	17	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity	7	8	9	10	15	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity	5	5	7	8	9	
Department of Mine Surveying and Geodesy	quantity	5	6	7	8	8	
Department of Chemical Processes and Industrial Ecology "	quantity	5	8	8	10	10	
Number of patents obtained as part of research work, implemented at the expense of the state budget	quantity	13	19	23	28	31	office of commercialization and international cooperation
Department of Mining	quantity	7	10	12	14	14	
Department of Metallurgy and Mineral Processing	quantity	0	1	1	2	2	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity	1	2	2	3	4	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity	2	3	3	4	5	
Department of Mine Surveying and Geodesy	quantity	1	1	2	2	2	

Department of Chemical Processes and Industrial Ecology "	quantity	2	2	3	3	4	
Share of income received from scientific activities, innovative developments and commercialized projects	%	15,50	16,00	18,50	19,00		department of science
Department of Mining							
Department of Metallurgy and Mineral Processing		25,00	25,00	25,00	26,00	26,00	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "							
Department of Materials Science, Nanotechnology and Engineering Physics		25,00	30,00	33,00	35,00	40,00	
Department of Mine Surveying and Geodesy		0,00	0.1	0.2	0.3	0.3	
Department of Chemical Processes and Industrial Ecology "							
Number of commercialized research projects	quantity	4	7	8	10	10	office of commercialization and international cooperation
Department of Mining	quantity	1	1	1	1	1	
Department of Metallurgy and Mineral Processing	quantity	2	2	2	2	2	

Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity		1	1	1	1	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity		0	1	1	1	
Department of Mine Surveying and Geodesy	quantity		1	1	2	2	
Department of Chemical Processes and Industrial Ecology "	quantity	1	2	2	3	3	
Increase in the number of electronic resources introduced into the educational process	quantity	10	17	24	25	28	scientific library
Department of Mining	quantity	4	8	10	10	11	
Department of Metallurgy and Mineral Processing	quantity			1	1	1	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	quantity	3	5	6	7	8	
Department of Materials Science, Nanotechnology and Engineering Physics	quantity			1	1	1	
Department of Mine Surveying and Geodesy	quantity	1	2	3	3	3	
Department of Chemical Processes and Industrial Ecology "	quantity	2	2	3	3	4	

Share of educational programs in which the world's digital libraries are used	%	100	100	100	100	100	scientific library
Department of Mining	%	100	100	100	100	100	
Department of Metallurgy and Mineral Processing	%	100	100	100	100	100	
Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	%	100	100	100	100	100	
Department of Materials Science, Nanotechnology and Engineering Physics	%	100	100	100	100	100	
Department of Mine Surveying and Geodesy	%	100	100	100	100	100	
Department of Chemical Processes and Industrial Ecology "	%	100	100	100	100	100	
Share of students using global digital libraries in the educational process	%	51,67	51,67	53,33	53,33	54,17	scientific library
Department of Mining	%	50	50	50	50	50	
Department of Metallurgy and Mineral Processing	%	50	50	50	50	50	

Department of Metallurgical Processes, Heat Engineering and Technology of Special Materials "	%	50	50	50	50	50	
Department of Materials Science, Nanotechnology and Engineering Physics	%	50	50	50	50	50	
Department of Mine Surveying and Geodesy	%	50	50	50	50	50	
Department of Chemical Processes and Industrial Ecology "	%	60	60	70	70	75	