Mining and Metallurgical Institute named after O.A. Baikonurov

Department of "Mining"

EDUCATIONAL PROGRAM

7M07203 - "Mining Engineering"

Code and classification of the field of education:	7M07 - Engineering, Manufacturing and Construction industries
Code and classification of training areas:	7M072 - Manufacturing and Processing industries
Group of educational programs:	M116 – Mining
The level of the NRK:	Level 7 - higher education and practical experience
ORC Level:	Level 7 - A wide range of special (theoretical and practical) knowledge (including innovative). Independent search, analysis and evaluation of professional information
Duration of training:	2 years
Volume of credits	120

Almaty, 2023

The educational program 7M07203 – «Mining Engineering» was approved at a meeting of the Academic Council of KazNRTU named after K.I. Satpayev

protocol no. 5 from "24" 11 2022

Considered and recommended for approval at the meeting of the educational and methodological Council of KazNRTU named after K.I. Satpayev

protocol no. 3 from "14" 11 2022

The educational program 7M07203 – «Mining Engineering» was developed by the academic committee in the direction of "Manufacturing and processing industries"

Full name	Academic degree/academic title	Post	Place of work	Signature
Chairman of the Academic Committee:				
Moldabayev S.	doctor of technical sciences, professor	Head of the Department	Kaz NRTU named after K. I. Satpayev	
Teaching staff:				
Yusupov Kh.	doctor of technical sciences, professor	professor	Kaz NRTU named after K.I. Satpayev	
Sandibekov M.	candidate of technical sciences	professor	Kaz NRTU named after K.I. Satpayev	
Employers:				
Amankulov M.		Executive Director	Antal LLP	
Orynbayev B.		Senior Engineer of the Department	NP Interrin LLP	
Students:				
Sakhypova K.		2nd year doctoral student		
Seytkazinova B.		2nd year master's student		
Kusan A.		4th year students		
Alseytov O.		3rd year students		

Table of contents

List of abbreviations and designations

NAO "Kazakh National Research Technical University named after K.I. Satpayev" - NAO KazNITU named after K.I. Satpayev;

GOSO - The State compulsory standard of education of the Republic of Kazakhstan;

EOM RK - Ministry of Science and Higher Education of the Republic of Kazakhstan;

OP - educational program;

SRO - independent work of a student (student, undergraduate, doctoral student);

SROP - independent work of a student with a teacher (independent work of a student (undergraduate, doctoral student) with a teacher);

RUP - a working curriculum**;**

QED - catalog of elective disciplines;

VK - university component;

KV - component of choice;

NRK - National Qualifications Framework;

ORC - Industry qualifications framework;

RO - learning outcomes;

CC - key competencies.

1Description of the educational program

It is intended for the implementation of specialized bachelor's degree training in the educational program 7M07203 - "Mining Engineering" at Satbayev University and was developed within the framework of the direction "Manufacturing and processing industries".

This document meets the requirements of the following legislative acts of the Republic of Kazakhstan and regulatory documents of the Ministry of Education and Science of the Republic of Kazakhstan:

- The Law of the Republic of Kazakhstan "On Education" with amendments and additions within the framework of legislative changes to increase the independence and autonomy of universities dated 04.07.18 No. 171-VI;
- The Law of the Republic of Kazakhstan "On Amendments and Additions to Some Legislative Acts of the Republic of Kazakhstan on the expansion of academic and managerial independence of higher educational institutions" dated 04.07.18, No. 171-VI;
- Order of the Minister of Education and Science of the Republic of Kazakhstan dated 30.10.18, No. 595 "On approval of Standard Rules for the activities of educational organizations of appropriate types";
- State mandatory standard of higher education (Appendix 7 to the Order of the Minister of Education and Science of the Republic of Kazakhstan dated 31.10.18 No. 604;
- Resolution of the Government of the Republic of Kazakhstan dated 19.01.12 No. 111 "On approval of Standard rules for admission to education organizations implementing educational programs of higher education" with amendments and additions dated 14.07.16 No. 405;
- Resolution of the Government of the Republic of Kazakhstan dated December 27, 2019 No. 988 "On approval of the State Program for the Development of Education and Science of the Republic of Kazakhstan for 2020-2025";
- Resolution of the Government of the Republic of Kazakhstan dated 31.12.2019 No. 1050 "On approval of the State Program of Industrial and Innovative Development of the Republic of Kazakhstan for 2020-2025";
- "National Qualifications Framework", approved by the Protocol of 16.06.2016. Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations;
- Industry qualification Framework "Mining and Metallurgical Complex" dated 30.07.2019 No. 1;
- Strategy "Kazakhstan-2050": a new political course of the established state. Message of the President of the Republic of Kazakhstan - Leader of the Nation N.A. Nazarbayev to the people of Kazakhstan. Astana, 14.12.2012;
- "New development opportunities in the conditions of the Fourth Industrial Revolution". Message of the President of the Republic of Kazakhstan N. Nazarbayev to the people of Kazakhstan. 10.01.2018;
- "The third modernization of Kazakhstan: global competitiveness".

Message of the President of the Republic of Kazakhstan N.Nazarbayev to the people of Kazakhstan. 31.01.2017

The educational program 7M07203 - "Mining Engineering" takes into account

The field of professional activity of graduates who have mastered the bachelor's degree program includes:

- the bowels of the Earth, including production facilities, equipment and technical systems for their development;
- equipment and technologies for ensuring safe and effective implementation of geotechnologies for extraction, processing of solid minerals and rational use of natural resources;
- mining machines and equipment of various functional purposes (for open and underground mining);
- measures to ensure the safe operation of mining machinery and equipment and to reduce their anthropogenic impact on the environment.

Types and tasks of the graduate's professional activity

List of types of professional activity and their corresponding professional tasks:

Organizational and managerial:

- organization, planning and management of mining and construction works;
- carrying out organizational and planned calculations for the creation (reorganization) of production sites;
- development of operational work plans for production units;
- preparation of initial data for the selection and justification of scientific, technical and organizational solutions based on economic calculations.

Production and technological:

- organization of the production process during the construction, operation and reconstruction of mining enterprises, various objects on the surface and underground;
- ensuring the performance of mining and construction works in accordance with projects, technical requirements and safety rules;
- selection of equipment and materials to ensure production processes;
- efficient use of materials, equipment, algorithms and programs for the selection and calculation of process parameters.

Experimental research:

- collection and systematization of scientific and technical information of domestic and world experience in relation to solving mining production problems;
- mathematical modeling of mining production processes and mining facilities based on standard computer-aided design and research packages;
- planning, conducting experiments according to specified methods, mathematical processing and analysis of the results.

Design and analytical:

- formation of the goals and objectives of the project (program), providing a modern level of technology for the construction, operation and reconstruction of

mining enterprises;

- collection and analysis of information source data for design;
- development of design documentation for the construction, operation and reconstruction of mining enterprises;
- conducting a preliminary feasibility study of design calculations;
- implementation of projects in production and author's supervision.

The subjects of the bachelor's professional activity are the improvement of mining technology, the development and creation of new mining equipment and technology, taking into account the needs of the mining and nuclear industry of the Republic of Kazakhstan.

The specific types of professional activity for which the bachelor is mainly preparing are determined by the higher educational institution together with students, scientific and pedagogical staff of the higher educational institution and employers' associations.

2 The purpose and objectives of the educational program

The objectives of OP 7M07203 - "Mining Engineering" are:

- training of a highly qualified specialist in the field of solid minerals development, meeting the requirements of modern high-tech production, capable of carrying out design and production and technological activities in this field at a high technical level, engaging in organizational and managerial activities in the public and private sector, mining enterprises, nuclear industry, design, educational and scientific-research organizations of any form of ownership
- provision of training for mining enterprises of professionally educated and competent specialists capable of working in primary engineering and technical positions;
- effectively conduct the extraction of natural resources in various mining and geological and mining engineering conditions based on the study of general education, basic and specialized disciplines
- providing in-depth knowledge of natural science, general technical and economic nature as the foundation of professional education.
- formation of the graduate's theoretical knowledge and practical skills in the field of
- formation of the graduate's skills to apply the acquired knowledge in their professional activities.

The objectives of OP 7M07203 - "Mining Engineering" are:

- study of a cycle of general education disciplines to provide social and humanitarian education based on the laws of socio-economic development of society, history, modern information technologies, the state language, foreign and Russian languages;
- the cycle of core disciplines is focused on the study of key theoretical aspects of engineering and technology to ensure the safe and effective implementation of various technologies for the extraction, processing of solid minerals and rational use of natural resources;

- study of disciplines on the development of uranium deposits, extraction of natural resources by open and underground methods based on advanced technologies, planning the construction of industrial facilities at mining enterprises and urban underground structures for various purposes;
- study of disciplines that form knowledge, skills and abilities of planning and organization of research, design of mining operations;
- familiarization with the technologies and equipment of enterprises during the period of various types of practices;
- acquisition of skills and abilities of laboratory research, technological calculations, equipment selection and design using modern computer technologies and programs.
- combining the efforts of the university and industrial enterprises to conduct scientific research, training and retraining of personnel in the field of studying the principles and patterns of functioning and development of cities and megacities, the features of anthropogenic impacts on urban environment objects, the principles of sustainable development of urbanized territories and measures of their organizational and legal support with the provision of true interdisciplinary education in these areas;
- formation of skills and abilities to choose and evaluate methods of environmental protection from anthropogenic impact in urbanized areas;
- strengthening the technological component of classical natural science education, to provide knowledge on modern technologies without lowering the bar of the level of fundamental education;
- fundamentals of the development and implementation of fundamental and applied research and R&D in the field of geological exploration and mineral processing, mining and metallurgy using new technological achievements, new generation equipment and eco-monitoring of enterprises;
- ensuring the interaction of fundamental and applied science with the educational process at all its stages, including the use of the results of joint research work in lecture courses, an experimental base for the implementation of educational research, laboratory and course work, production and pre-graduate practice;

3 Requirements for the evaluation of learning outcomes of the educational program

The graduate of this educational program is awarded the academic degree "Master of Technical Sciences" in the direction 7M07203 - Manufacturing and processing industries (Mining Engineering).

A graduate who has mastered master's degree programs must have the following general professional competencies:

- the ability to independently acquire, comprehend, structure and use new knowledge and skills in professional activities, develop their innovative abilities;
- the ability to independently formulate research goals, establish the sequence of solving professional tasks;

- the ability to apply in practice the knowledge of fundamental and applied sections of disciplines that determine the orientation (profile) of the master's degree program;
- the ability to professionally choose and creatively use modern scientific and technical equipment to solve scientific and practical problems;
- the ability to critically analyze, present, defend, discuss and disseminate the results of their professional activities;
- proficiency in the preparation and execution of scientific and technical documentation, scientific reports, reviews, reports and articles;
- willingness to lead a team in the field of their professional activities, tolerantly perceiving social, ethnic, confessional and cultural differences;
- readiness to communicate orally and in writing in a foreign language to solve the tasks of professional activity.

A graduate who has mastered the master's degree program must have professional competencies corresponding to the types of professional activities that the master's degree program is focused on:

research activity:

- the ability to form diagnostic solutions

to professional problems by integrating fundamental sections of sciences and specialized knowledge acquired during the development of the master's degree program;

- the ability to independently conduct scientific experiments and research in the professional field, generalize and analyze experimental information, draw conclusions, formulate conclusions and recommendations;

-the ability to create and explore models of the studied objects based on the use of in-depth theoretical and practical knowledge in the field of mineral deposits development, innovative technologies in the design and operation of quarries, mines, mines, capable of implementing their professional knowledge, skills and abilities in public and private management, mining enterprises, nuclear industry in design and scientific- research organizations of any form;

- scientific and production activities:
- the ability to independently carry out production and scientific-production field, laboratory and interpretive work in solving practical problems;
- the ability to professionally operate modern field and laboratory equipment and devices in the field of the master's degree program;
- the ability to use modern methods of processing and interpreting complex information to solve production problems;
- project activities:
- the ability to independently draw up and submit projects of research and scientific-production works;
- readiness to design complex research and scientific-production works in solving professional tasks;
- organizational and managerial activity:
- readiness to use practical skills of organization and management of research and scientific-production works in solving professional tasks;

- readiness for the practical use of regulatory documents in the planning and organization of scientific and production work;
- scientific and pedagogical activity:
- ability to conduct seminars, laboratory and practical classes;
- the ability to participate in the management of scientific and educational work of students in the field of development of mineral deposits.

When developing a master's degree program, all general cultural and general professional competencies, as well as professional competencies related to those types of professional activities that the master's program is focused on, are included in the set of required results of mastering the master's program.

4 Passport of the educational program

4.1 General information

№	Field name	Note
1	Code and ification of the field ucation	7M07 - Engineering, manufacturing and construction industries
2	Code and ification of training areas	7M072 - Manufacturing and processing industries
3	Group of educational programs	M116 - Gornoye delo i dobycha poleznykh iskopayemykh
4	Name of the educational program	Mining Engineering
5	Brief description of ucational program	Mining operations in open-pit, underground and geotechnological mining, construction of mines and underground structures. The main technological processes: preparation of rocks for excavation, excavation and loading operations, transportation, unloading and dumping operations, primary processing of extracted minerals.
6	Purpose of the EP	The purpose of the educational program is to train a highly qualified specialist in the field of solid minerals development, meeting the requirements of modern high-tech production, able to carry out design and production and technological activities in this field at a high technical level, engage in organizational and managerial activities in the public and private sector, mining enterprises, nuclear industry, design, educational and research organizations of any form of ownership
7	Type of EP	New
8	The level of the NRK	Level 7 - higher education and practical experience
9	ORC Level	Level 7 - a wide range of special (theoretical and practical) knowledge (including innovative).
10	Distinctive features of the EP	No
11	List of competencies educational program:	
12	Learning outcomes of the educational am:	1) Organize technical management of mining and blasting, as well as work to ensure the functioning of equipment and technical; 2) Prepare technical documentation on the procedure for conducting mining, blasting, as well as work related to the primary processing of solid minerals, construction and operation of underground structures, describe the procedure for their implementation) 3) Apply new knowledge in mathematical and physical modeling of scientific problems to be solved) 4) Propose science-based solutions to ensure the completeness and integrated development of field reserves 5) Develop and apply measures to improve and increase the technical level of mining, ensure the competitiveness of the

		6) Describe the procedure for eliminating accidents during the production and primary processing of solid minerals, as well as during the construction and operation of underground facilities; 7) Organize your work and labor relations in a team based on modern methods, management principles, advanced production experience, technical, financial, social and personal factors; 8) Analyze and evaluate the actions of subordinates, manage a team of performers, including in emergency situations; 9) Plan laboratory and production experiments and evaluate their results in relation to the problem being solved
13	Form of training	Full - time full
14	Duration of training	2 years
15	Volume of loans	120
16	Languages of instruction	Kazakh/Russian
17	Academic degree awarded	Master of Technical Sciences
18	Developer(s) and authors:	Moldabaev S.K.

4.2 The relationship between the achievability of the formed learning outcomes according to the educational program and academic disciplines

№	Name of the discipline	Brief description of the discipline	Number of credits	Generated learning outcomes (codes)								
				LO**1**	LO**2**	LO**3**	LO**4**	LO**5**	LO**6**	LO**7**	LO**8**	LO**9**
Cycle of basic disciplines (university component)												
1	English language (professional)	The course is designed for undergraduates of technical specialties to improve and develop foreign language communication skills in professional and academic fields. The course introduces students to the general principles of professional and academic intercultural oral and written communication using modern pedagogical technologies	5			X						
2	History and philosophy of science	The subject of philosophy of science, dynamics of science, specifics of science, science and pre-science, antiquity and the formation of theoretical science, the main stages of the historical development of science, features of classical science, non-classical and post-non-classical science, philosophy of mathematics, physics, engineering and technology, specifics of engineering sciences, ethics of science, social and moral responsibility of a scientist and engineer	3							X	X	
3	Higher school pedagogy	Undergraduates will master the methodological and theoretical foundations of higher school pedagogy, plan and organize the processes of teaching and upbringing, master the communicative technologies of subject-subject interaction between a teacher and a master in the educational process of a university	3							X		
4	Psychology of management	The discipline studies the modern role and content of psychological aspects in managerial activity. The improvement of the psychological literacy of the student in the process of implementing professional activities is considered. Self-improvement in the field of psychology and studying the composition and structure of management activities, both at the local level and abroad. The psychological feature of modern managers is considered.	3							X	X	
5	Management	The purpose of the discipline is the formation of a scientific understanding of management as a form of professional activity; mastering the general theoretical provisions of the management of socio-economic systems by students; mastering the skills and abilities of practical solution of managerial problems; studying the world experience of management, as well as the peculiarities of Kazakhstani management, training in solving practical issues related to the management of various aspects of the activities of organizations	2					X				X
Cycle of basic disciplines (optional component)												
6	Innovative methods of drilling and blasting operations	The course is aimed at familiarization with the methodology of research to improve the quality of crushing rocks, innovative technological solutions for the design features of the charge of explosive diseases, the mathematical justification of the parameters of drilling and blasting after performing laboratory, experimental and theoretical studies using numerical simulation of the explosive impact on massive rock structures.	5	X	X	X		X		X		X

7	Innovative installation and commissioning methods for machines and equipment	Advanced methods of installation, adjustment, diagnostics of technological equipment, innovative methods of testing, methods and types of diagnostics, installation work using modern methods and monitoring of the technical condition (welding, rolling, basic plumbing work, adjustment and adjustment work).	5	X				X		X		X
8	Geotechnological processes in the development of mineral deposits	The course is aimed at studying non-traditional approaches to the implementation of geotechnological processes (mechanical, thermal, based on chemical reactions), methodology for identifying and evaluating the influence of physical and geological factors on the course of geotechnological processes, establishing requirements for the physical and geological conditions of the deposit, which determine the possibility of using geotechnological methods.	5		X	X	X	X				X
9	Process regulations and mining planning	The course will provide competencies in drawing up technological regulations for the implementation of new types of mining operations and planning mining operations to ensure the completeness and integrated development of the deposit reserves in accordance with the Unified Rules for the Protection of Subsoil. Upon completion of the course, undergraduates should know the procedure, content and requirements for the development of technological regulations and a plan for the development of mining operations.	5		X		X	X	X			
10	Technology of integrated development of underground space	The course, as an important geo-resource in the system of scientific and technological potential of the country, is aimed at familiarizing the problems of integrated development of subsoil, best practices for the integrated use of underground space as underground industrial enterprises, engineering and transport communications and environmental facilities, as well as the development of technologies for the construction of workings of a large cross section.	5		X		X	X				
11	Test methods for mining machines and stationary units	The course will provide the study of methods for testing mining machines and stationary installations for reliability and durability, solving problems of resources and durability, for load modes and operating conditions of technological machines, for maintaining maximum loads that cause static damage (from vibrations, fatigue, etc.), for checking load modes and gaining skills to perform load measurement.	5	X						X		X
Profile training module (university component)												
12	Digital technology in mining SMART Mine	The course is aimed at mastering digital technologies in mining, up to the creation of a smart mine - Smart Mine. As a result, undergraduates will be able to master the structure and content of works on automated production of mining operations and maintenance of technical, technological, economic, financial documentation. To do this, they will study data flows, data processing, storage and visualization, the SQL and Python programming language, data collection using MES systems, the concept of LIMS, the collection and calculation of finished products using software products, and the technology of situational centers.	5			X		X				X
13	The Code on Subsurface Resources and legal regimes in subsurface use	The course will improve the legal literacy of undergraduates through familiarization and use with the regime of subsoil use, the procedure for exercising state administration and regulation in the field of subsoil use, the peculiarities of the emergence, exercise and	5	X			X			X		

		termination of rights to subsoil plots, the legal status of subsoil users, the conduct of relevant operations, issues of subsoil use and disposal of the right to subsoil use and other relations related to the use of subsoil resources, the contract and license for subsoil use, the termination of the right to subsoil use.											
14	Rational technologies of vertical mining operations	The course will allow you to master advanced technologies for conducting vertical mine workings, methods for designing the construction of vertical mine workings using software products in relation to specific operating conditions, selected materials and technological schemes for construction, and recommend science- based solutions to the problems of building vertical mine workings.	5		X	X		X	X			
15	Continuous Career Design Methodology	The course is aimed at mastering the methodology of continuous design of open pits in market conditions, taking into account existing and new methods of intensive construction, technical re-equipment, phased development of deposits, adjustment of the mining transport system, reconstruction and operation of open pits.	5		X	X	X	X				
Profile training module (optional component)													
16	Design of underground mines	The course is aimed at instilling the skills of computer design of underground mines in their design and operation using integrated mining and geological information systems, including working with database files, creating and analyzing points, strings, frames, digital surface models and block models, drawing underground workings.	5		X			X				
17	Methodology of designing of underground construction	The course covers a set of methods for designing the construction of underground structures for mining and technological, mining, financial and economic, labor protection and safety of parts, taking into account the peculiarities of mining and geological conditions of the occurrence of an array of rocks, carrying out the necessary scientific research.	5		X	X		X				
18	Technology of construction of metropolitan	The course is aimed at instilling skills in the selection and calculation of structures of underground metro facilities based on the study of methods of fastening underground structures and sinking of construction shafts, the preparatory period of construction, technology and organization of construction of approach and inclined workings, distillation tunnels with the help of mining shields, technological schemes for the construction of metro stations, including three-vaulted.	5		X	X		X	X			X
19	Modernization of the processes of horizontal and inclined mine workings	The course is aimed at studying advanced technologies for horizontal and inclined mining based on the improvement of basic technological processes, the practice of sinking workings using selective and drilling combines, technology for the construction of inclined workings from top to bottom and vice versa, from bottom to top.	5	X	X			X		X		
20	Highly rhythmic safe production of mining operations in deep quarries	The course introduces the theory and practice of implementing advanced technologies in the open-pit mining of mineral deposits to great depths with an in-depth study of the method of mining operations with steep-slope layers on quarry fields of elongated and rounded shape, the method of automated establishment of optimal calendar volumes of mining operations when working off ledges of rock overburden and ore from top to bottom with transverse panels in adjacent steep-slope layers and a set of studies on the completeness of safe extraction of near-contour and deep reserves based on optimization	5		X	X	X	X				X

		of the final contours of the quarry and the use of innovative technological complexes in the zone of completion of deep quarries.											
21	Intensification of reclamation of lands disturbed by open mining operations	The course is aimed at studying methods of restoring the fertile soil layer and measures to protect the environment based on provisions on the use of natural resources with a limited anthropogenic impact on the environment, scientific aspects of mining and biological reclamation and includes a set of studies on the restoration of saline lands.	5	X	X	X		X				X
22	Technology of laying-of the develped space	The course is aimed at studying the latest achievements in the application of development systems with the laying of the developed space, covering the processes of preparation and methods of transportation of the laying mixture with the technology of its placement on the border of the treatment excavation. Particular attention is paid to reducing the cost of preparing the filling mixture in the process of improving their characteristics: hydraulic, pneumatic, hardening, gravity and mechanical.	5		X	X		X	X			X
23	Rational technologies for development of placer deposits	The course is aimed at studying the ways to improve the efficiency of the development of placer deposits by open, underwater and underground methods. Based on the results of scientific research and the main provisions for the development of placers, examples of gold extraction at the junction of geology, geotechnology and mineral processing are presented.	5		X	X	x	X				X
24	Resource-saving complex development of mineral resources	The course will provide knowledge on solving the problem of depletion of subsoil reserves through the completeness of extraction and resource-saving their integrated development based on the analysis of advanced technologies and ways to reduce costs with additional separate extraction and redistribution of associated minerals involved in the development, establishing design features and planning of mining operations in integrated development subsoil and performing a feasibility study on the feasibility of involving associated minerals in the development of advanced developments in this area.	5		X	X	X	X				
25	Methods of coal mining in sections	The course covers the latest achievements in the field of open-cast mining of coal deposits, including the features of the introduction of in-line and cyclic-in-line technologies with inclined occurrence of coal seams, averaging and loading complexes to stabilize the quality of marketable coal, the use of combined road and rail transport, two-stage coal mining technology with averaging over conveyor belt and internal dumping with a change in the order of mining sections of a quarry field.	5		X	X	X	X				

5 Учебный план образовательной программы

KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I.SATPAYEV

SATBAYEV UNIVERSITY

APPROVED
Chairman of the Management Board-
Rector of KazNRTU named after K.Satpayev
M.M. Begentayev
« ___ » _________ 2023 y.

CURRICULUM
of Educational Program on enrollment for 2023-2024 academic year

Educational program 7M07203 - "Mining Engineering"
Group of educational programs M116 - "Mining Engineering"

Form of study: full-time | Duration of study: 2 year | Academic degree: master of technical sciences

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	Classroom amount lec/lab/pr	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training based on courses and semesters			
								I course		2 course	
								1 semester	2 semester	3 semester	4 semester
CYCLE OF BASIC DISCIPLINES (BD)											
M-1. Module of basic training (university component)											
LNG210	English (professional)	BD UC	5	150	0/0/3	105	E			5	
HUM214	Management Psychology	BD UC	3	90	1/0/1	60	E	3			
HUM212	History and philosophy of science	BD UC	3	90	1/0/1	60	E	3			
HUM213	Higher school pedagogy	BD UC	3	90	1/0/1	60	E			3	
Component of choice											
Module methods of scientific research											
MIN258	Innovative methods of drilling and blasting operations	BD CCH	5	150	2/0/1	105	E			5	
TEC297	Innovative installation and commissioning methods for machines and equipment										
MIN260	Geotechnological processes in the development of mineral deposits	BD CCH	5	150	2/0/1	105	E			5	
MIN280	Process regulations and mining planning										
MIN278	Technology of integrated development of underground space	BD CCH	5	150	2/0/1	105	E		5		
TEC281	Test methods for mining machines and stationary units										
CYCLE OF PROFILE DISCIPLINES (PD)											
M-2. Module of professional activity (university component, component of choice)											
Mining Production Support Module											
MIN268	Digital technology in mining SMART Mine	PD UC	5	150	1/0/2	105	E			5	
MIN299	The Code on Subsurface Resources and legal regimes in subsurface use	PD UC	5	150	2/0/1	105	E			5	
MIN297	Rational technologies of vertical mining operations	PD UC	5	150	2/0/1	105	E	5			
MIN704	Continuous Career Design Methodology	PD UC	5	150	2/0/1	105	E		5		
Module for implementing innovations in mining											
MIN273	Design of underground mines	PD CCH	5	150	2/0/1	105	E		5		
MIN211	Methodology of designing of underground construction										
MIN253	Technology of construction of metropolitan	PD CCH	5	150	2/0/1	105	E	5			
MIN285	Modernization of the processes of horizontal and inclined mine workings										
MIN700	Highly rhythmic safe production of mining operations in deep quarries	PD CCH	5	150	2/0/1	105	E	5			
MIN701	Intensification of reclamation of lands disturbed by open mining operations										
MIN295	Technology of laying-of the develped space	PD CCH	5	150	2/0/1	105	E		5		
MIN296	Rational technologies for development of placer deposits										

MIN298	Resource-saving complex development of mineral resources	PD CCH	5	150	2/0/1	105	E		5		
MIN294	Methods of coal mining in sections										
M-3. Practice-oriented module											
AAP229	Pedagogical practice	BD UC	6					6			
AAP269	Research practice	PD, CCH	8								8
M-4. Experimental research module											
AAP251	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	2							2	
AAP241	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	3					3			
AAP254	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	5						5		
AAP255	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	14								14
M-5. Module of final attestation											
ECA205	Preparation and defense of a master's thesis	FA	8								8
	Total based on UNIVERSITY:							30	30	30	30
								60		60	

Number of credits for the entire period of study					
Cycle code	Cycles of disciplines	Credits			
			university component (UC)	component of choice (CCH)	Total
BD	Cycle of basic disciplines		20	15	35
PD	Cycle of profile disciplines		28	25	53
	Total for theoretical training:	*0*	*48*	*40*	*88*
	RWMS				*24*
FA	Final attestation	8			8
	TOTAL:	8	48	40	120

Decision of the Academic Council of Kaznu named after K.Satpayev. Protocol № 3 "27" october 2022 y.

Decision of the Educational and Methodological Council of Kaznu named after K.Satpayev. Protocol № 2 "21" october 2022 y.

Decision of the Academic Council of the Mining and Metallurgical Institute. Protocol № 2 "17" october 2022 y.

Vice-Rector for Academic Affairs — **B. Zhautikov**

Director of the Institute of Mining and — **K. Rysbekov**

Head of the Department "Mining" — **S. Moldabayev**

Council representative from employers — **B. Bakhramov**

Change registration sheet

Sequence number of the change	Section, paragraph of the document	Type of change (replace, cancel, add)	Number and date of notification	The change has been made	
				Date	Surname and initials, signature, position