



Mining and Metallurgical Institute named after O.A. Baikonurov

Department «Metallurgy and Mineral Processing»

EDUCATIONAL PROGRAM

7M07234 – Mineral processing

Code and classification of the field of education:	7M07 – Engineering, manufacturing and construction industries
Code and classification of training directions:	7M072 – Manufacturing and processing industries
Group of educational programs:	M118 – Mineral processing
Level based on NQF:	7
Level based on IQF:	7
Study period:	1,5 years
Amount of credits:	90

Almaty 2025

Educational program «7M07234 – Mineral processing» was approved at the meeting of K.I. Satbayev KazNRTU Academic Council.

Protocol № 4 dated « 12 » 12 2024 y.

was reviewed and recommended for approval at the meeting of K.I. Satbayev KazNRTU Educational and Methodological Council.

Protocol № 3 dated « 20 » 12 2024 y.

Educational program «7M07234 – Mineral processing» was developed by Academic committee based on direction «7M072 – Manufacturing and processing industries»

Full name	Academic degree/ academic title	Position	Workplace	Signature
Chairperson of Academic Committee:				
Barmenshinova M.B.	c.t.s., associate professor	Head of the Department of MaMP	KazNRTU named after K.I. Satpaeva	
Teaching staff:				
Motovilov I. Yu.	PhD doctor, associate professor	Professor of the Department of MaMP	KazNRTU named after K.I. Satpaeva	
Employers:				
Dzhetybayeva U.K.	c.t.s.	Main enrichment	«Kaz Minerals» LLP	
Students:				
Abushakhmanov A.K.	bachelor of engineering and technology	2 nd year master's student	«Kaz Minerals» LLP	

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List of abbreviations and designations

NCJS K.I. Satbayev KazNRTU – NCJS «Kazakh National Research Technical university named after K.I.Satbayev»

NQF – national qualifications framework;

IQF – industry qualifications framework;

LO – learning outcomes;

KC – key competencies;

EP – educational program;

IWS – independent work of a student (student, undergraduate, doctoral student);

IWST – independent work of a student with a teacher (independent work of a student (undergraduate, doctoral student) with a teacher);

WC – working curriculum;

CED – catalog of elective disciplines;

UC – University component;

CC – component of choice;

SDGs – Sustainable Development Goals

1. Описание образовательной программы

The volume of completed academic credits determines the duration of master's studies. When mastering the established volume of academic credits and achieving the expected learning outcomes for obtaining a master's degree, the master's degree program is considered fully mastered. In the specialized master's program there are 90 academic credits with a duration of study of 1.5 years.

Planning of the content of education, the method of organizing and conducting the educational process is carried out by the university and scientific organization independently based on credit education technology.

Master's programs in the relevant field implement postgraduate educational programs for the training of management personnel with in-depth professional training.

The meaningful educational program includes several modules:

- M-1. Training module (university component, elective component);
- M-2. Module of specialized training (university component, optional component);
- M-3. Practice-oriented module;
- M-4. Experimental research module;
- M-5. Final certification module.

The educational program includes the following stages of undergraduates' training: Foreign language (professional), Management, Management Psychology, Chemistry of surface phenomena of the flotation process, Theory and practice of processing non-ferrous metal ores, Promising areas of mineral processing, Testing and control of technological processes of enrichment, Thickening and dehydration of mineral raw materials, Labor and environmental protection in the enrichment processes mineral resources.

The opportunity to choose the following disciplines from the catalog of elective disciplines at Satbayev University: New gravity methods of mineral processing, Theory and practice of flotation processes, Ore preparation and preconcentration, Modern and promising technologies for processing ore and man-made raw materials, Intellectual property and scientific research, Theory and practice of polymetallic ore processing, Automated control systems for mineral processing processes, Design management, Modeling of uranium mining and metallurgy processes, Wastewater treatment and conditioning of recycled water, Theory and practice of processing rare metal ores, Design and operation of tailings farms of processing plants.

2. Purpose and objectives of educational program

The goal of the EP is «7M07234 – Mineral processing» training of highly qualified specialists in the field of mineral processing, capable of developing and implementing innovative, resource-saving and environmentally friendly technologies in accordance with the goals of sustainable development.

Tasks of EP «7M07234 – Mineral processing»:

- the competence of graduates in design and technological work when carrying out projects to improve and optimize the processes of mineral processing, increase their productivity and improve the quality of products;
- the competence of graduates in the implementation of the development and implementation of technological processes for processing mineral, natural and man-made raw materials;
- the competence of graduates in assessing innovation and technological risks in the implementation of new technologies;
- the competence of graduates in the digitalization system of mineral processing industries. Acquisition of competencies in production management at all stages of the product lifecycle;
- competence in marketing high-tech technologies.
- providing affordable and high-quality education, developing professional skills, eliminating gender inequality, and supporting sustainable development and inclusive learning environments.

3. Requirements for evaluating the educational program learning outcomes

The requirements for the master's degree level are determined on the basis of the Dublin Descriptors of the second level of higher education (Master's degree) and reflect the acquired competencies expressed in the achieved learning outcomes.

Learning outcomes are formulated both at the level of the entire Master's degree program and at the level of individual modules or academic disciplines.

A graduate who has completed a Master's degree program must have the following general professional competencies:

- the ability to independently acquire, comprehend, structure and use new knowledge and skills in professional activities, to 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 focus (profile) of the master's degree program;
- the ability to professionally select 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, tolerant of social, ethnic, religious and cultural differences;
- willingness to communicate orally and in writing in a foreign language to solve the tasks of professional activity;
- critical thinking and problem solving based on the principles of sustainable development.

Requirements for the core competencies of graduates of a specialized master's degree. The graduate must:

1) have an idea:

- about current trends in the development of scientific knowledge;
- on current methodological and philosophical problems of natural (social, humanitarian, economic) sciences;
- contradictions and socio-economic consequences of globalization processes;
- on the current state of the economic, political, legal, cultural and technological environment of the global business partnership;
- about the organization of strategic enterprise management, innovation management, leadership theories;
- about the main financial and economic problems of the functioning of enterprises.

2) To know:

- methodology of scientific knowledge;
- the main driving forces of changing the structure of the economy;
- features and rules of investment cooperation;
- at least one foreign language at a professional level, allowing for scientific research and practical activities.

3) be able to:

- apply scientific methods of cognition in professional activities;
- critically analyze existing concepts, theories and approaches to the study of processes and phenomena;
- integrate knowledge gained in different disciplines, use it to solve analytical and managerial tasks in new unfamiliar conditions;
- to carry out a microeconomic analysis of the economic activity of the enterprise and use its results in the management of the enterprise;
- to put into practice new approaches to the organization of marketing and management;
- to make decisions in complex and non-standard situations in the field of organization and management of business activities of the enterprise (company);
- to apply in practice the norms of the legislation of the Republic of Kazakhstan in the field of regulation of economic relations;

- think creatively and be creative in solving new problems and situations;
- to carry out information-analytical and information-bibliographic work involving modern information technologies;
- to summarize the results of experimental research and analytical work in the form of a master's thesis, an article, a report, an analytical note, etc.

4) have the skills:

- solutions to standard scientific and professional tasks;
- scientific analysis and solution of practical problems in the organization and management of economic activities of organizations and enterprises;
- research problems in the field of management and marketing and use the results obtained to improve enterprise management methods;
- professional communication and intercultural communication;
- public speaking, the correct and logical formulation of their thoughts in oral and written form;
- expanding and deepening the knowledge necessary for daily professional activities and continuing education in doctoral studies;
- the use of information and computer technologies in the field of professional activity.

5) be competent:

be competent:

- in the field of research methodology in the specialty;
- in the field of modern problems of the world economy and the participation of national economies in world economic processes;
- in the organization and management of the company's activities;
- in the implementation of industrial relations with various organizations, including government agencies;
- in ways to ensure continuous updating of knowledge, expansion of professional skills and abilities;
- in matters of international cooperation, the introduction and dissemination of environmentally sound technologies.

4. Passport of the educational program

4.1. General information

№	Field name	Comments
1	Code and classification of the field of education	7M07 – Engineering, manufacturing and construction industries
2	Code and classification of training directions	7M072 – Manufacturing and processing industries
3	Educational program group	M118 – Mineral processing
4	Educational program name	7M07234 – Mineral processing
5	Short description of educational program	A specialized educational program focused on the industrial need for personnel, including experimental and production activities in the field of mineral processing; including gravity and flotation methods of processing mineral raw materials, modern and promising technologies for processing ore and man-made raw materials, labor and environmental protection in the processes of mineral processing. They are also aimed at overcoming the direct relationship between economic growth and environmental degradation, increasing resource efficiency and encouraging a more sustainable lifestyle.
6	Purpose of EP	Training of highly qualified specialists in the field of mineral processing, capable of developing and implementing innovative, resource-saving and environmentally friendly technologies in accordance with the goals of sustainable development.
7	Type of EP	New
8	The level based on NQF	7
9	The level based on IQF	7
10	Distinctive features of EP	no
11	List of competencies of educational program	Professional competencies; Research competencies; Basic competencies and knowledge; Communication competencies; Universal human competencies; Managerial competencies; Cognitive competencies; Creative competencies; Information and communication competencies.
12	Learning outcomes of educational program	LO 1 – They understand the principles of operation and are able to work on modern scientific equipment when conducting scientific research in the field of mineral processing, participate in innovative projects for the sustainable development of the industry.; LO 2 – They master and apply modern software tools and programming languages (for example, Python, MATLAB) for mathematical modeling of mineral processing processes, processing and visualization of experimental data, as well as for automating the collection, storage and analysis of information in the framework of independent

		scientific research; LO 3 – Analyze scientific literature, identify and analyze problems, plan a strategy for their solution; they are aware of modern research directions in the field of mineral processing; PO4 – speak a foreign language (primarily English) in the field of professional activity and interpersonal communication; LO4 – Speak a foreign language (primarily English) in the field of professional activity and interpersonal communication; LO5 – Analyze and interpret the psychological characteristics of individual and group behavior in management activities; assess psychological risks and resources in making managerial decisions; develop strategic management decisions taking into account psychological factors, including intercultural and organizational features, both in domestic and international practice; LO 6 – Analyze modern models of project management; apply international and national standards (PMI PMBOK, IPMA ICB, standards of the Republic of Kazakhstan) in the development of design solutions; evaluate and develop integration models of business management based on strategic, design and operational approaches; LO7 – Possess the theoretical foundations and practical skills of physical and experimental research methods in mineral processing; LO8 – Have professional experience in scientific discussions, develop projects that create high-tech jobs in the enrichment industry, taking into account the SDGs.
13	Education form	Full-time
14	Period of training	1,5 year
15	Amount of credits	90
16	Languages of instruction	Kazakh, Russian
17	Academic degree awarded	Master of Engineering and Technology in the educational program «7M07234 – Mineral processing»
18	Developer and author:	Barmenshinova M.B.

4.2. Relationship between the achievability of the formed learning outcomes based on educational program and academic disciplines

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)							
				LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8
Cycle of basic disciplines University component											
1	LNG212 Иностранный язык (профессиональный)	The purpose of the discipline is to acquire and improve competencies in accordance with trade standards of foreign education, capable of competing in the labor market, because through a foreign language, the future master gains access to academic knowledge, new technologies and modern information, allowing the use of a foreign language as a means of communication in the intercultural, professional and scientific activities of the future master.	2			v	v				
2	MNG726 Менеджмент	To form a scientific understanding of management as a type of professional activity. Contents: Mastering the general theoretical principles of managing socio-economic systems; acquiring skills and abilities in practical problem-solving of managerial issues; studying global management practices and the specificities of Kazakhstani management; training in solving practical issues related to managing various aspects of organizational activities.	2			v	v				
3	HUM211 Психология управления	To acquire skills in making strategic and managerial decisions, taking into account the psychological characteristics of the individual and the team. Content: the modern role and content of psychological aspects in management activities, methods for improving psychological literacy, the composition and structure of management activities, both at the local and foreign levels, the psychological feature of modern managers.	2				v	v			

Cycle of basic disciplines Component of choice											
4	MEI291 Theory and practice of flotation processes	Purpose: to study the theory and practice of flotation processes aimed at the effective enrichment of mineral raw materials Contents: physico-chemical principles of flotation enrichment; types of flotation reagents, mechanisms of their action on the surface of minerals (types of adsorption, distribution over the surface of minerals); thermodynamic and kinetic patterns of particle adhesion to air bubbles; flotation technology, the role of particle sizes in flotation; machine designs and their features; flotation schemes and briefly about the technology of enrichment different types of ores.	4	v		v				v	v
5	MEI290 New gravitational methods of mineral processing	Purpose: to research and develop new gravity-based methods for processing mineral raw materials aimed at improving the efficiency of enrichment processes Contents: theoretical foundations of gravity enrichment; hydraulic and pneumatic classification processes and apparatuses; enrichment in heavy media; enrichment by jigging; enrichment in a stream of water flowing along an inclined surface; pneumatic enrichment; ore washing.	4	v		v				v	
6	MEI293 Current and future technology for the processing of ore and technogenic raw materials	Purpose: to study modern and promising technologies for processing ore and man-made raw materials aimed at improving the efficiency and environmental safety of enrichment processes Contents: introduction to modern technologies for processing ore and man-made raw materials; theoretical foundations of mineral processing; gravity methods for processing ore raw materials; flotation processes and technologies for flotation enrichment; methods of enrichment in heavy media; modern methods of pneumatic enrichment; new technologies for processing man-made raw materials; technologies for processing rare	5	v		v					v

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		and small minerals; automation and digitalization of processing processes mineral raw materials; environmental aspects of processing of ore and man-made raw materials; prospects of nanotechnology in the processing of mineral raw materials; prospects and development of technologies for processing coal and carbon materials; the future of mineral resource processing: innovations and trends									
7	MEI292 Ore preparation and pre-concentration	Purpose: to study the processes of ore dressing and to develop effective methods and technologies for pretreatment of raw materials. Contents: basic methods of physical, chemical and flotation processing of ores; analysis of modern technologies and equipment used in mining and ore preparation; processes of enrichment, concentration and purification of ore; laboratory and pilot studies to optimize technological processes.	5	v		v				v	
8	MNG781 Intellectual property and research	The aim of this course is to provide undergraduates with the knowledge and skills necessary to understand, protect, and manage intellectual property (IP) in the context of scientific research and innovation. The course is aimed at training specialists who are able to work effectively with IP, protect the results of scientific research and apply them in practice.	5	v	v	v					v
Cycle of profile disciplines University component											
9	MEI285 Theory and practice of processing of non-ferrous metals	Purpose: to study the basic principles and technologies of processing non-ferrous metal ores, as well as to master practical skills in working with equipment and materials necessary for the production of high purity metals. Contents: basic methods of ore processing; thermal and chemical treatment; various methods of separating metals from ores and concentrates; fundamentals of design and operation of enterprises for processing non-ferrous	5	v		v				v	v

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		metals; modern technologies and innovative methods in the field of enrichment and metallurgy of non-ferrous metals.									
10	MEI284 Surface chemistry flotation process	Purpose: to study the theoretical and practical foundations of chemical processes occurring on the surface of particles and at phase boundaries during flotation. Contents: introduction to the chemistry of surface phenomena of the flotation process; fundamentals of the theory of surface phenomena; the role of ionization and electrical properties of the surface in flotation; adsorption of surfactants in flotation; molecular and colloidal processes in flotation; hydrophobization and hydrophilization of minerals; theory of coagulation and stabilization in flotation systems; physico-chemical methods of analysis surface properties of particles; reactions on the surface during flotation; stabilization and destruction of bubbles in flotation; surface phenomena in the flotation of complex and multiphase systems; environmental and economic aspects of flotation chemistry; modern developments and innovations in flotation chemistry	5	v		v				v	v
11	MEI286 Prospective directions of mineral processing	Purpose: to study modern methods and technologies of mineral resource enrichment, including hydrometallurgical, pyrotechnic, and flotation-adsorption processes. Contents: introduction to promising areas of mineral processing; new methods and technologies for processing mineral raw materials; hydrometallurgical methods of processing; pyrogenation of mineral raw materials; flotation and flotation-adsorption processes; environmental aspects and sustainable enrichment; modernization of equipment for processing mineral raw materials; technologies for processing rare and valuable minerals; technologies for processing complex and poor	5	v		v				v	

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		ores; recycling of secondary resources and waste; the future of mineral processing: trends and innovations; global challenges and opportunities for mineral enrichment									
12	MEI287 Testing and control of technological processes of enrichment	Purpose: to master the basics of testing minerals and their processing products, as well as control of technological processes at processing plants. Contents: basic concepts of the process of testing minerals, their enrichment products, and control of technological processes at processing plants; list of controlled parameters; methods and technical means of sampling from stationary materials and moving masses; determination of the minimum amount of sample from the mass of the tested batch; minimum mass of a point sample; minimum mass of a sample for conducting analyses: chemical, granulometric, fractional; sample preparation; control of enrichment processes; technological and commodity balance; organization of testing and control.	5	v		v				v	
13	MEI288 Thickening and dehydration of mineral raw materials	Purpose: to study the basic principles and technologies of thickening and dewatering of mineral raw materials, as well as their application in production practice Contents: introduction to the processes of thickening and dewatering of mineral raw materials; principles and mechanisms of thickening processes; equipment for thickening mineral suspensions; technological schemes of thickening; processes of dewatering of mineral raw materials; methods of dewatering: filtration, centrifugation, drying; equipment for dewatering of mineral materials; efficiency and optimization of thickening and dewatering processes; kinetics of thickening processes and dewatering; environmental aspects and waste management; innovations in thickening and dewatering technology; the future of thickening and	5	v		v				v	

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		dewatering technologies									
14	MEI289 Labor and environmental protection in mineral processing processes	Purpose: to develop knowledge and skills to ensure occupational safety and environmental protection in the process of mineral processing Contents: introduction to labor and environmental protection in the mining and metallurgical industries; fundamentals of labor protection in the mining and processing industries; hazardous and harmful production factors in mineral processing; means of individual and collective protection in processing processes; assessment of the impact of enrichment processes on the environment; methods of waste treatment and disposal in the enrichment process; energy saving and resource efficiency in enrichment processes; environmental risks during the operation of enrichment plants; regulatory regulation in the field of occupational safety and environmental protection; environmental management system at enrichment enterprises; occupational safety and health management system; current trends in occupational safety and environmental protection	5	v		v					v
Cycle of profile disciplines Component of choice											
15	MEI295 Automated control systems for mineral processing processes	Purpose: to study automated control systems for mineral processing processes aimed at improving the efficiency and accuracy of technological processes Content: methods and means for analytical control of parameters of enrichment processes; systems and means of organization of measurements, development and implementation of control actions; automatic control of parameters and control of technological processes of enrichment; modern methods of management of enrichment production; creation and implementation of an automated process control system at enrichment plants	5	v		v				v	
16	MEI294 Theory and practice of	Purpose: to develop effective technologies and processes	5	v		v				v	v

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	processing of polymetallic ores	for the extraction of valuable metals from raw materials with a high content of various metals. Contents: introduction to polymetallic ore processing; theoretical foundations of polymetallic ore processing; gravity methods of polymetallic ore processing; flotation processes and technologies of flotation enrichment of polymetallic ores; methods of enrichment in heavy media; methods of hydrometallurgical processing of polymetallic ores; magnetic methods of polymetallic ore processing; pneumatic and gas methods of polymetallic ore processing; modern processing technologies complex polymetallic ores; automation and digitalization of polymetallic ore processing processes; environmental and economic aspects of polymetallic ore processing; innovations in polymetallic ore processing: new approaches and materials; the future of polymetallic ore processing: trends and challenges									
17	MNG705 Project Management	Objective: To gain knowledge about the components and methods of project management based on modern models and standards. Objectives: to study behavioral models of project-based business development management; to master international standards PMI PMBOK, IPMA ICB and national standards of the Republic of Kazakhstan in the field of project management; to analyze the features of organizational business development management through the integration of strategic, project and operational management.	5				v		v		
18	MEI297 Design and operation of tailings farms and processing factories	Purpose: to study the process of designing and operating tailings farms of processing plants in order to increase the efficiency of their operation and minimize environmental risks. Contents: introduction to the design and operation of tailings facilities of processing plants; structure and	4	v		v				v	

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		composition of tailings of processing plants; technological processes of tailings facilities; design of tailings facilities: basic principles and stages; geotechnical aspects of tailings storage design; tailings monitoring systems; environmental problems of tailings facilities and methods of their minimization; innovative technologies for processing tailings of processing plants; tailings management: organizations and processes; energy and economic aspects of tailings farm operation; design of water supply and sanitation systems in tailings farms; legal regulation and standards for tailings farm design; development prospects and innovations in tailings farm design									
19	MEI296 Theory and practice of processing of ores of rare metals	Purpose: to study the theory and practice of processing rare metal ores, aimed at the development of technologies for the enrichment and integrated use of rare earth resources. Contents: types and deposits of rare ores; technical characteristics of rare ores and their classification by chemical and mineralogical composition; preliminary processing of ores and placers of rare metals; ore preparation operations during processing of ores and placers of rare metals; technology of enrichment and integrated use of the main types of ores and placers (tungsten and tungsten-molybdenum, tin and tin-polymetallic ores, titanium-zirconium ores and placers, tantalum-niobium ores and placers, etc.)	4	v		v				v	v
20	MEI244 Modeling of uranium mining and metallurgy processes	Purpose: to study the basics of modeling techniques for uranium mining and metal-lurgy processes, principles of model construction, and analysis of the results obtained. Contents: The main stages of field development and the stages of their mathematical modeling. An overview of modeling application packages. Reservoir permeability, mineral content. Construction of geological models of	5	v	v	v				v	

		deposits. Interpolation of borehole data. Balance sheet and off-balance sheet ores. Counting stocks. Theo-retical foundations and mathematical models of filtration of the solution in the res-ervoir. Darcy's law. The Dupuy formula. Fundamentals of computational mathe-matics. Methods for modeling the flow of solution in a reservoir. Current lines. Spreading of the solution outside the block. The distribution of the flow rate along the filter. (Distribution through BP production rates by wells). Chemical model of the process. Building a mathematical model of chemistry. Types of colmation. Simulation of colmatation. Technical and economic models. Simulation modeling of mining scenarios and forecasting of the mining process. Ways to intensify the process of underground borehole leaching of uranium.									
21	MEI245 Wastewater treatment and conditioning of recycled water	Purpose: to provide undergraduates with deep theoretical knowledge and practical skills necessary for the development and application of effective wastewater treatment and recycled water conditioning technologies in industry. Contents: Fundamentals of wastewater treatment and conditioning of recycled water in industry; Mechanical methods of wastewater treatment: filtration, precipitation, flotation; Physico-chemical methods of wastewater treatment: coagulation, flocculation, ion exchange; Mathematical modeling of wastewater treatment processes; Design and optimization of equipment for water treatment and conditioning; Environmental aspects and disposal waste from wastewater treatment; Use of renewable energy sources for wastewater treatment; Analysis of the effectiveness of wastewater treatment processes: assessment and monitoring methods; Modern approaches to wastewater treatment and treatment in the mining and metallurgical industries; Prospects and	5	v		v				v	v

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		innovations in the field of wastewater treatment and recycled water conditioning; Practical research and experimental work in the field of wastewater treatment.										
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5. Curriculum of educational program



**SATBAYEV
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«APPROVED»
Decision of the Academic Council
NPJSC «KazNRTU»
named after K.Satbayev»
dated 20.02.2025 Minutes № 9

WORKING CURRICULUM

Academic year	2025-2026 (Autumn, Spring)
Group of educational programs	MI18 - "Mineral processing"
Educational program	7M07234 - "Mineral processing"
The awarded academic degree	Master of engineering and technology
Form and duration of study	full time (professional track) - 1,5 years

Discipline code	Name of disciplines	Block	Cycle	Total ECTS credits	Total hours	Lek/lab/pr Contact hours	in hours SIS (including TSIS)	Form of control	Allocation of face-to-face training based on courses and semesters			Prerequisites
									1 course		2 course	
									1 sem	2 sem	3 sem	
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)												
CYCLE OF BASIC DISCIPLINES (BD)												
M-1. Module of basic training (university component)												
LNG212	Foreign language (professional)		BD, UC	2	60	0/0/30	30	E	2			
MNG726	Management		BD, UC	2	60	15/0/15	30	E	2			
HUM211	Psychology of management		BD, UC	2	60	15/0/15	30	E	2			
MEI291	Theory and practice of flotation processes	1	BD, CCH	4	120	15/0/15	90	E	4			
MEI290	New gravitational methods of mineral processing	1	BD, CCH	4	120	15/15/0	90	E	4			
MEI293	Current and future technology for the processing of ore and technogenic raw materials	2	BD, CCH	5	150	30/0/15	105	E	5			
MEI292	Ore preparation and pre-concentration	2	BD, CCH	5	150	15/15/15	105	E	5			
MNG781	Intellectual property and research	2	BD, CCH	5	150	30/0/15	105	E	5			
CYCLE OF PROFILE DISCIPLINES (PD)												
M-2. Module of professional activity												
MEI285	Theory and practice of processing of non-ferrous metals		PD, UC	5	150	30/0/15	105	E	5			
MEI284	Surface chemistry flotation process		PD, UC	5	150	30/0/15	105	E	5			
MEI286	Prospective directions of mineral processing		PD, UC	5	150	15/15/15	105	E	5			
MEI287	Testing and control of technological processes of enrichment		PD, UC	5	150	15/15/15	105	E		5		
MEI288	Thickening and dehydration of mineral raw materials		PD, UC	5	150	30/15/0	105	E		5		
MEI289	Labor and environmental protection in mineral processing processes		PD, UC	5	150	15/15/15	105	E		5		
MEI295	Automated control systems for mineral processing processes	1	PD, CCH	5	150	30/15/0	105	E		5		
MEI294	Theory and practice of processing of polymetallic ores	1	PD, CCH	5	150	30/0/15	105	E		5		
MNG705	Project Management	1	PD, CCH	5	150	30/0/15	105	E		5		
MEI296	Theory and practice of processing of ores of rare metals	2	PD, CCH	5	150	30/0/15	105	E		5		
MEI297	Design and operation of tailings farms and processing factories	2	PD, CCH	5	150	30/0/15	105	E		5		
MEI244	Modelling of uranium mining and metallurgy processes	1	PD, CCH	4	120	30/0/15	75	E			4	
MEI245	Wastewater treatment and conditioning of recycled water	1	PD, CCH	4	120	30/0/15	75	E			4	
M-3. Practice-oriented module												
AAP248	Internship		PD, UC	5				R		5		
M-4. Experimental and research module												
AAP249	Experimental research work of a master student, including an internship and the implementation of a master's project		ERWMS	18				R			18	
M-5. Module of final attestation												
ECA213	Design and defense of the master's project		FA	8							8	

NON-PROFIT JOINT STOCK COMPANY «KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY
named after K.I.SATBAYEV»

Total based on UNIVERSITY:	30	30	30	
	60		30	

Number of credits for the entire period of study					
Cycle code	Cycles of disciplines	Credits			
		Required component (RC)	University component (UC)	Component of choice (CCH)	Total
GED	Cycle of general education disciplines	0	0	0	0
BD	Cycle of basic disciplines	0	6	9	15
PD	Cycle of profile disciplines	0	35	14	49
Total for theoretical training:		0	41	23	64
RWMS	Research Work of Master's Student				0
ERWMS	Experimental Research Work of Master's Student				18
FA	Final attestation				8
TOTAL:					90

Decision of the Educational and Methodological Council of KazNRTU named after K.Satpayev. Minutes № 4 dated 03.02.2025

Decision of the Academic Council of the Institute. Minutes № 5 dated 23.01.2025

Signed:
Governing Board member - Vice-Rector for Academic Affairs Uskenbayeva R. K.

Approved:
Vice Provost on academic development Kalpeyeva Z. B.
Head of Department - Department of Educational Program Management and Academic-Methodological Work Zhumagaliyeva A. S.
Director - Mining and Metallurgical Institute named after O.A. Baikonurov Rysbekov K. .
Department Chair - Metallurgy and mineral processing Barmenshinova M. .
Representative of the Academic Committee from Employers Dzhetbayeva U. K.
____Acknowledged____

