

**MINISTRY OF SCIENCE AND EDUCATION
OF THE REPUBLIC OF KAZAKHSTAN**

«APPROVED»

**by the decision of the meeting of the Academic Council of the
Institute**

protocol № _____ dated _____ 2019

Chairman of the Academic Council **A. Naizabekov**

MODULAR EDUCATIONAL PROGRAM

7M07200 - Manufacturing and processing industries
code and name of the educational program

7M07203 – Mining
Period of education – 2 years

Educational program level: Master's degree

Developers:

Head of the Department, Candidate of Technical Sciences

Kuzmin S. L. _____
sign date

Members of the working team on the development of the educational program

Senior lecturer, Candidate of Technical Sciences

Fionin E. A. _____
sign date

1. Passport of the educational program

The graduate of the scientific and pedagogical master's degree in the field of training “7M072 Manufacturing and processing industries” is awarded the academic degree “Master of Technical Sciences”.

The educational program of the scientific and pedagogical magistracy contains:

- 1) theoretical education, including the studying of cycles of basic and core disciplines;
- 2) practical training in the form of pedagogical and research practice;
- 3) research work of a master's student, including internship and completion of a master's thesis;
- 4) final certification.

The educational program “Mining” is implemented according to two training trajectories: 1 – “Modern technologies in the design of open-pit mining”; 2 – “Modern technologies in the design of underground mining”.

The purpose of the educational program is to train competent highly qualified specialists in relevant areas of mining, who possess research methods, teaching and learning skills, modern computer design and progressive organization of mining technologies, with professional and personal competencies sufficient for successful work at enterprises of domestic and international labor markets.

Requirements for the *key competencies* of graduates of the scientific and pedagogical master's degree: a graduate of the educational program must:

- *have an idea*: about the latest achievements and discoveries in the field of mining and the prospects for their use; about the directions of higher school pedagogy, research activities; about modeling systems in the design and technology of mining production;
- *know*: state, Russian and foreign languages that provide communication in professional activities; methods of solving problems in the design of a mining enterprise, international and domestic standards; the main factors influencing the structure of the economy in the mining and metallurgical sector, the basics of pedagogy and psychology, methods of research, achievements of science and technology, standards in the field of management product quality, advanced achievements of science and technology;
- *be able to*: formulate and solve practical tasks, perform managerial functions, conduct bibliographic work with the involvement of modern information technologies; integrate knowledge of various disciplines to solve production and management tasks in new conditions for mining enterprises; creatively approach problem solving and make effective decisions in non-standard situations when organizing the activities of a mining enterprise;
- *have the skills*: design and reconstruction of mining facilities, the use of information and computer technologies in the field of professional activity; the use of scientific methods of research;
- *be competent*: in matters of scientific methodology, the use of modern software products, processing of the results and forms of their presentation.

The scope of professional activity of the Master of Technical Sciences is related to the design and operation of mining enterprises; engineering research for mining; conducting scientific research and educational activities.

Types of activities of Masters of Technical Sciences:

- settlement and design and technical and economic;
- organizational and managerial;
- production, technological and operational;
- expert and consulting;
- research;
- educational (pedagogical).

The objects of professional activity of the Master of Technical Sciences are: organizations of higher and secondary vocational education; research and design institutions; companies, firms and organizations (enterprises) of the mining complex; organizations (enterprises) of other economic infrastructures.

The graduate of the educational program must have general cultural competencies:

- the ability to abstract thinking, analysis, synthesis;
- willingness to act in non-standard situations, to bear social and ethical responsibility for the decisions made;
- readiness for self-development, self-realization, use of creative potential.

As a result of mastering the educational program, the graduate must have general *professional competencies*:

– readiness to communicate in the state, Russian and foreign languages to solve the tasks of professional activity;

– willingness to lead a team in the field of professional activity, tolerantly perceiving social, ethnic, confessional and cultural differences; ability to use in practice skills and abilities in the organization of scientific and production work, team management, to assess the quality of performance results;

– the ability and willingness to navigate in the formulation of the problem, apply knowledge about modern research methods, analyze, synthesize and critically summarize information;

– the ability to demonstrate knowledge of fundamental and applied disciplines of the master's degree program;

- the ability to independently acquire new knowledge and skills with the help of information technology and use in practice; expand and deepen their scientific worldview;

– the ability to use in practice skills and abilities in the organization of scientific research and scientific production work, in team management, to influence the formation of team goals, to influence the socio-psychological climate to achieve goals, to evaluate the quality of activities;

- the ability to demonstrate skills in the scientific team, the ability to generate new ideas;

– the ability to understand the main problems of their subject area, when solving which there is a need for complex selection tasks requiring the use of quantitative and qualitative methods;

- the ability and willingness to conduct scientific experiments using modern research equipment and instruments, to evaluate research results;

- the ability to design, present and report the results of the performed works.

As a result of mastering the educational program, the graduate must have *professional competencies*:

- knowledge and skills of using methods of design and reconstruction of mining enterprises, their calculation using specialized software products;

– willingness to carry out a technological assessment of an operating mining enterprise;

– the ability to develop technical projects of quarries and mines, including the use of computer-aided design systems;

– the ability to develop methods, plans and programs for research and development, prepare tasks for performers, organize experiments and tests, analyze and summarize the results;

– the ability to collect, analyze and systematize information on the research topic, prepare scientific and technical reports, reviews of publications on the research topic;

– the ability to develop physical and mathematical (computer) models of phenomena and objects related to the profile of activity ;

– possession of methods of protection of intellectual property objects, management of the results of research activities and commercialization of intellectual property rights;

- ability, based on knowledge of pedagogical techniques, to take a direct part in the educational activities of structural units of an educational organization in the profile of the field of training.

1	2	3	4	5	6	7	8	9	10	11
SGT. Modern mining technologies	Knowledge of resource-saving technologies in mining in order to reduce the loss of minerals and conduct complex mining technology. Mastering the basic provisions of open-pit mining of low-power deposits and monitoring the work of a mining enterprise. Mastering the methods of modern control over the stability of the sides of the quarry, preventing the formation of landslides and the movement of rocks. Knowledge of advanced technologies, using self-propelled equipment, when conducting underground mining operations.	14	2	MRTGD 1204	Low-waste and resource-saving technologies in mining	PD	IC	5	E	professional
			2	PORKM 1205 /TMGP 1205	Problems of open-pit mining of complex deposits / Technological monitoring of mining enterprises	PD	CC	5	E	
			2	SMKUU MGP 1206 / NTRRM PS 1206	Modern methods of control and management of rock mass stability / New technological solutions for underground mining	PD	CC	4	E	

1	2	3	4	5	6	7	8	9	10	11
NIRM. Research work of a master's student	Relevance, scientific novelty and practical significance of the work. The use of modern methods of scientific research, theoretical, methodological and technological achievements, advanced international experience. The content of research (methodological, practical) sections.	24	2	NIRM 1301	Research work of a master's student, including internship and completion of a master's thesis	RWoMS		3		general cultural, general professional professional
			3					3		
			4					18		

1	2	3	4	5	6	7	8	9	10	11
Pra. Practicum	Consolidation of theoretical knowledge gained in the learning process, formation of practical skills of teaching and learning methods. Knowledge of the latest theoretical, methodological and technological achievements of domestic and foreign science, modern methods of scientific research, processing and interpretation of experimental data.	20	2	PP 1107	Pedagogical practice	BD	IC	3	D C	general cultural, general professional, professional
			3	IP 220 8	Research practice	PD	IC	17	D C	
OZMD. Preparation and defense of a master's thesis	Knowledge of key competencies.	12	2	IA (OZMD) 2401	Final certification (preparation and defense of a master's thesis)	FC (PaDoMT)		12		general cultural, general professional, professional

3. Summary table on the scope of the educational program

Course of study	Semester	Number of modules to be mastered	Number of subjects studied		Number of ECTS credits						Total in hours	Quantity and form of control	
			IC	CC	theoretical training	research work of a master's student	pedagogical practice	research practice	final certification	total		exam	differentiated credit
1	1	2	5	2	30	–	–	–	–	30	900	7	–
	2	4	3	3	24	3	3	–	–	30	900	5	1
2	3	+3	1	2	10	3	–	17	–	30	900	2	1
	4	1+1	–	–	–	18	–	–	12	30	900	–	–
Total		7	9	7	64	24	3	17	12	120	3600	14	2

4. Learning outcomes of the educational program

Graduates of the educational program have the following abilities:

- 1) demonstrate developing knowledge and understanding in the field of mining, based on advanced knowledge and methods of calculating mining equipment;
- 2) apply their knowledge, understanding and abilities at a professional level to solve problems in mining in a broader interdisciplinary context;
- 3) to collect and interpret information in the field of scientific and technical problems and prospects for the development of mining to form judgments taking into account social, ethical and scientific considerations;
- 4) clearly and unambiguously communicate information, ideas, conclusions, problems and solutions in the field of development, development and implementation of resource-saving mining technologies;
- 5) training skills necessary for independent continuation of further training in the field of mining.