KAZAKHSTAN REPUBLIC MINISTRY OF EDUCATION AND SCIENCE
SATPAYEV UNIVERSITY

MODEL OF SPECIALIST

Specialization 5B070600 – Geology and exploration for mineral resources
Code and name of specialization

Geology and exploration for mineral resources
Name of educational program

Degree of educational program: Baccalaureate

Almaty 2018

The Baccalaureate educational program: “Geology and exploration for mineral resources” was developed in accordance with the Law on Education of the Republic of Kazakhstan, State Program of the Industrial-Innovative development of the Republic of Kazakhstan, GOSO Baccalaureate of the Republic of Kazakhstan, Working Educational Program for Baccalaureate specialization 5B070600 – “Geology and exploration for mineral resources”, National Qualification Frameworks, with professional standards and meets the requirements of the Dublin Descriptors and the European Qualification Frameworks.

The Bachelor of Science in Technique and Technologies is awarded to those students who successfully complete the course of the *Baccalaureate on the educational program “Geology and exploration for mineral resources”.*

Objects of professional activity of the graduate

- enterprises engaged in subsoil use at all stages geological exploration and production;
- management and expertise of the subsoil use process;
- enterprises of mining industry;
- design and research organizations, laboratory;
- firms of different forms of ownership.

1 Competencies Bachelor graduates

Bachelor’s degree graduates of this educational program have the skills to perform all *key competencies* in the geology field:

1) Knowledge of *native language* (Kazakh/Russia). Ability to express and understand concepts, thoughts, feelings, facts, and opinions in the field of geology and exploration of mineral deposits in written and oral forms (to listen, speak, read, and write), and also to linguistically interact relevantly and creatively in a variety of social and cultural contexts (while studying, or working, or at leisure).

2) Knowledge of *foreign languages*. Knowledge of basic skills of communication in English: ability to understand, express and interpret thought, feelings, facts, and opinions, in the field of geology and exploration of mineral deposits in oral and written forms (to listen, speak, read, and write), in the relevant social and cultural contexts (while studying, Knowledge of basic skills of communication in English: ability to understand, express and interpret thought, feelings, and attitudes both at work and leisure), with skills in mediation and cross-cultural understanding.

3) Knowledge *of fundamental mathematical, scientific and technical* vocational training, ability to develop and use mathematical logic in the workplace and everyday life, use mathematical way of thinking (logic, spatial thinking) and presentations skills (formulas, models, constructs, graphs, and tables) in their professional activity; ability to use basic knowledge and methodology, explaining the global picture, to recognize problems and draw evidence-based conclusions, apply their knowledge and methodology to professional needs.

4) *Good level of computer literacy*, ability to confidently and critically use up-to-date technologies for work, leisure, and communications; basic knowledge of computers for information use, recovery, storage, production, presentation and exchange, for communication and engagement in cooperating networks over the internet in professional activities.

5) *Good level of professional training;* basic knowledge of basics of geology and exploration for mineral resources, of geological disciplines facilitating the development of

a highly educated professionals with a broader vision and ethical thinking. A graduate is aware of the need for continuous learning, is able to look for and find possibilities for further learning, and organize their own education, applying effective time and information management both individually, and in groups; promotes personal and professional development; fosters the acquisition of new skills necessary in the everyday professional activities and further education for a master of science degree;

6) Good level of *social training* (personal, cross-cultural, civic competences), knowledge of all sets of behaviour allowing effective and constructive participation in social and professional life, and in particular in increasingly diverse societies, enabling resolution of conflict situations where necessary, and facilitating full engagement in the civil life based on the awareness in the social and political concepts and structures and readiness to active and democratic participation. Graduates develop teamwork skills, bring skill, personality, and role to the family team, to society work, and are able and prepared to develop a culture of tolerance and valuing other people; they possesses sense of understanding of the increasingly interconnected nature of our world, communicativeness, ability to prevent and resolve conflicts; ability to find compromises, to comply with the opinion with other team members, adhere to a high standard of business ethics, and have knowledge of ethical and legal conduct.

7) Good level of *economic and business training.* Graduates have a basic understanding of economics, academic knowledge of management, marketing, finances, etc.; know and understand methods of state economic regulation, and the role of the public sector in economies. They are able to convert ideas into action, plan and manage projects to achieve professional goals, understand ethical values. The graduates have a great teamworking ability and experience; have customer knowledge, skills in personnel management, and interactions with clients.

8) Good level of *cultural training.* The graduates the know traditions and culture of Kazakhstan's people. They understand the importance of creative expression, experience, and emotions by various means. They are tolerant to the traditions, culture of other people in the world, understand and realize the rules of tolerant behaviour, means of preventing and counteracting domestic racism, xenophobia, and extremism; they are formed as tolerant personalities with understanding and acceptance of other cultures. Graduates are able to acquire knowledge; tolerant and communicable in social situations, not prejudiced, including intolerance to chauvinism, have high moral and spiritual qualities, and are formed as intelligent and cultured persons.

9) Good level of *general competencies*. The graduates have skills of critical thinking, power of observation, interpretation, analysis and conclusion-making and are able make just assessments. They are creative, capable of comfortable transit from one aspect to another, capable of proposing innovative ideas, different from evident, well-known, generally accepted or established notions, demonstrate insight in problem-solving, and are able to resist common stereotypes. Graduates are able to acquire and maintain proactive attitude, to act independently and sensibly towards other persons, are expected to be capable of leading a team safely and within regulatory practices. Our graduates can responsibly and effectively work in a team, being able to civilly promote their point of view, proposing new solutions; can adequately navigate in various social situations.

2 Characteristics of the professional activities of the graduate

Baccalaureate graduates in specialization 5B070600 – "Geology and exploration for mineral resources" have *competences in the following fields*:

knowledge of:

– processes and phenomena occurring in the living and non-living nature;

– material composition, structure, and evolution of the Earth's Crust and the Earth in general;

– patterns of spatial distribution of regional and local structures of the Earth's crust;

practical knowledge of:

- methods of study and analysis of the composition and properties of geological bodies and mineral resources in the Earth's interior;

- methodological basics of all kinds of mapping, exploration and prospecting work using remote sensing, drilling, mining, geophysical, geochemical, and laboratory methods;

- practical utility of geological maps of various kinds for prospecting and exploration of mineral resources;

- technical possibilities and conditions of effective use of drilling, geophysical, tunnelling and shaft sinking machinery, modern equipment and instruments;

- basics of economic theory, economics, and organization of up-to-date prospecting survey;

- legal basis of subsoil usage, occupational health and safety, environment, operating security in the conduct of geological prospecting;

ability:

- to analyse the composition and properties of geological bodies and natural mineral resources in the Earth's interior;

- to conduct competent documentation of geological works;

- methodologically competently organize and perform a broad range of geological, mapping, exploration and prospecting work using remote, drilling, mining, geophysical, geochemical, and laboratory studies;

- to be able to work with an array of data, systematize, classify, analyze, create queries, spatial distribution;

- Possess mathematical statistics and probability theory to analyze histograms, graphs, estimate the forecast and the error threshold;

- to create geological maps and charts characterizing the geological features of the studied region;

- practically use various kinds of geological maps to prospect and search for mineral resources;

- to be able to work critically with scientific literature, to track modern achievements in the field of geology;

- to use drilling, geophysical, tunnelling and shaft sinking equipment, modern laboratory and field instruments and tools;

- confidently use computers and the latest software;

- to draft projects for all kinds of geological prospecting works and economically calculate their effectiveness in today's environment;

- present the results of work

- to competently use the occupational safety legislation, environment, operating security in geological works

have the skills allowing:

- drafting, reading, and analysing of geological maps, field reports and final geological documentation using modern techniques and computer technologies;

- comprehensive study of geology in a research area;

- use of geological research methods, macroscopic and microscopic identification of the composition of texture and structure of rocks and ore, study of rock-forming and ore minerals;

- operational use of map-based, geodetic, surveying, and geophysical materials;

- designing, organization, and conducting comprehensive geological research in accordance with typical tasks and local conditions;

- tracing and contouring deposits using modern technologies, drafting prospecting map of deposits, conducting assessment of prospective, exploration and productive potential of resources.

to be competent:

- in a broad range of geology and exploration subjects, current state of geological industry and prospects of its development, legislative framework of the subsoil usage, and current requirement to the quality of the mineral commodities and the situation in the world, regions, and local markets.

The obtained competencies after studying each discipline and coordinating module, are discussed in greater detail in Appendices 1 and 2. Appendix 3 contains the data on the size of the educational program, and Appendix 4 gives a short description of all disciplines of the educational program "Geology and exploration for mineral resources."

3 The educational program graduates have the following ***abilities:***

A graduate should:

- know technology of geological exploration works and be aware of requirement of the working environment quality control;
- know methods and techniques of surface and subsurface water study, prospecting, and future use;
- know advanced national and foreign experiences in the geological-prospecting work;
- know geological-technical conditions of drilling technologies, and well casing;
- be able to justify the methods and scopes of prospective geological-geophysical work;
- have basic knowledge in natural history, social humanitarian , and economical disciplines, facilitating the development of highly educated persons with a broad vision and cultured thinking;
- can formulate and practically solve tasks in the field of geology and exploration for mineral resources, be able to use informational technology in the professional activities, successfully conduct research and industrial tasks;
- be able to acquire new knowledge necessary for professional everyday activity and the future education in the master course.

4 List of positions for graduates

The chief geologist (geophysicist, hydrogeologist)	Technician-geologist, laboratory assistant
Deputy chief geologist (geophysicist, hydrogeologist)	Technician-geophysicist, operator
Senior geologist (geophysicist, hydrogeologist)	Technician-hydrogeologist
Geologist / engineer-geologist (geophysicist, hydrogeologist), GIS specialist, technologist	Operators of geological survey machines
Head of the geological (geophysical, hydrogeological) expedition (party)	Miners
Deputy head of the geological (geophysical, hydrogeological) expedition (party)	Logsman
Head of the geological (geophysical,	Tunneler, shaft sinkers

hydrogeological) department / unit	
A district geologist (geophysicist, hydrogeologist)	Drill runner
Drilling engineers	Rigger
Machinists of drilling rigs	Assistant-driller

Narrow specializations of the geologist: mineralogist, gemologist, sedimentologist, volcanologist, oceanologist, geomorphologist, geochemist, paleontologist, soil scientist, ecologist, glaciologist, speleologist, structural geology specialist, neotectonics specialist, active tectonics specialist, geodynamics specialist, specialist of remote sensing, geoinformation systems specialist.