

DEVELOPMENT PLAN

EP «6B07314 – Geodesy and cartography»

1 General Information

The educational program (EP) “6B07314 – Geodesy and Cartography” is developed in accordance with the National Qualifications Framework, complies with the Dublin Descriptors and the European Qualifications Framework, and is designed based on a modular system of studying disciplines that form general cultural and professional competencies.

The Geodesy and Cartography program contributes to achieving the priority Sustainable Development Goals (SDGs) approved by the UN through training highly qualified specialists who possess competencies in spatial positioning, environmental monitoring, and the creation of digital maps and geographic information systems (GIS). Graduates of the program play a key role in ensuring sustainable territorial development, efficient management of natural resources, and improving infrastructure safety. Within the framework of the EP, contributions are made to achieve the following SDGs:

SDG 4. Quality Education – formation of a sustainable system of high-quality, inclusive, and accessible education, providing lifelong learning opportunities.

SDG 9. Industry, Innovation, and Infrastructure – development of sustainable infrastructure and the introduction of scientific and technological innovations into the regional and national economy.

SDG 13. Climate Action – use of geospatial technologies to monitor environmental changes.

SDG 15. Life on Land – monitoring and assessment of land use aimed at the protection and restoration of natural ecosystems.

The development plan of the EP “6B07314 – Geodesy and Cartography” is aligned with the key performance indicators of the department development program of Mining and Geology (M&G), specifying strategic planning indicators, reflecting risk analysis and assessment, implementing activities based on identified risks, and ensuring the achievement of planned results (Appendix).

2 Educational Program Planning

The planning and management of the educational program “6B07314 – Geodesy and Cartography” are carried out based on the priority directions and strategic goals of Satbayev University named after K.I. Satpayev (<https://official.satbayev.university/ru/university/mission-strategy>) and the Mining and Metallurgical Institute named after O.A. Baykonurov, reflecting the vision, mission, strategic directions, and key performance indicators of their activities (<https://official.satbayev.university/ru/mining-metallurgy>).

3 Objective of the Educational Program

The objective of the educational program is to train graduates as competitive specialists in the field of geodesy and cartography, possessing critical thinking skills and capable of applying both theoretical and practical knowledge to perform geodetic, topographic, astrogeodetic, photogrammetric, and cartographic tasks using modern geodetic equipment and geospatial digital technologies to solve applied problems. The program also aims to ensure the openness, safety, resilience, and environmental sustainability of cities and settlements.

4 Tasks of the Educational Program

4.1 To prepare graduates for organizational activities that prevent negative phenomena in

professional practice, promote the development of spiritual values, moral and ethical norms as members of society, and ensure adherence to the legal and legislative framework of the Republic of Kazakhstan with a high level of professional culture and civic responsibility.

4.2 To prepare graduates for continuous self-improvement and personal development, mastering new knowledge, skills, and competencies in innovative areas of geodesy and cartography.

4.3 To train graduates with acquired competencies in performing calculations of geodetic and cartographic elements, preparing technical solutions, and participating in the development of technical assignments for topographic-geodetic, aerospace, and cartographic work based on a modern educational and material-technical base.

4.4 To prepare graduates, based on the diversity and dynamism of the elective course catalog, with a predominance of practical skills in competencies, capable of performing professional functions in one or more types of activities based on the learning outcomes, taking into account the specifics of these activities and market requirements for organizational, managerial, and professional competencies.

4.5 To train graduates as competitive specialists in geodesy and cartography, including enhancing the international aspect in educational and research programs, competent in advanced geodesy and cartography technologies, and in presenting the results of scientific research.

5 Risks of Educational Program Implementation (SWOT Analysis)

<i>S (strength) – strong features (potentially positive internal factors)</i>	<i>W (weakness) – weak sides (potentially negative internal factors)</i>
1. Recognition of the university brand and acknowledgment of the quality of training specialists in geodesy. 2. Positive image in the educational services market of the Republic of Kazakhstan. 3. Experience in applying interactive and geoinformation technologies in the educational process. 4. Use of modern information systems to ensure academic integrity. 5. Partnership relations with scientific organizations and foreign universities in the field of geodesy and cartography. 6. Developing material and technical base, modern equipment, and a high level of informatization of the educational process. 7. Expansion of classroom facilities and their equipment with modern technical tools (laser scanners, GNSS receivers, total stations). 8. Sufficient library resources, including specialized literature in geodesy and cartography. 9. Availability of educational and methodological complexes covering all disciplines of the department's educational program. 10. Stable financial position. 11. Involvement of teaching staff with experience in scientific educational activities and production. 12. Conducting classes at the department's branch facilities. 13. Increase in the quality of the department's staff through the recruitment of young and experienced specialists.	1. Insufficient volume of research work on a contractual basis in the field of geodesy. 2. Limited dormitory capacity for program students. 3. Lack of licenses for certain specialized geodetic work, restricting participation in tenders. 4. Low commercialization of research results. 5. Weak collaboration network with regional universities and industrial enterprises.
<i>O (opportunity) – favorable opportunities (potentially positive external factors)</i>	<i>T (threat) – threats (potentially negative external factors)</i>
1. High demand in the labor market for qualified specialists in geodesy and cartography. 2. Opportunity to introduce new courses and disciplines	1. Increase in the cost of modern geodetic equipment due to inflation and global economic factors.

in modern geoinformation technologies. 3. Conducting PR events and career guidance activities among school graduates. 4. The city of Almaty as a major financial, industrial, and socio-cultural center with stable demand for geodesy specialists. 5. Openness of industrial and construction enterprises for collaboration with universities and providing student internship opportunities. 6. Demand for graduates of the accredited educational program in the labor market, including work with GIS, GNSS, and modern geodetic technologies.	2. Limited financial capacity of enterprises to fund research projects and contractual work. 3. Unstable level of automation in business processes and preparation of data for practical classes. 4. Weak preparation of applicants in fundamental mathematics and geography, as well as a low level of foreign language proficiency for working with international literature and software.
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Long-term action plan for the development and improvement of the educational program

	Event content	Responsible performers	Deadlines for execution
1	Analysis of the competitive environment in geodesy and cartography, identification of the department's unique advantages.	Head of the Department, teaching staff	2025-2028
2	Implementation of digital marketing and promotion of the program through social media and online platforms.	Head of the Department, teaching staff	2025-2028
3	Conducting career guidance meetings with applicants, schools, and industrial enterprises.	Directorate, Head of the Department, teaching staff	2025-2028
4	Involvement of teaching staff from stakeholders in the educational process.	Head of the Department, teaching staff	2025-2028
5	Development of interactive teaching materials using GIS, GNSS, and 3D modeling.	Head of the Department, teaching staff	2025-2028
6	Provision of all disciplines with textbooks, teaching aids, and electronic resources in geodesy and cartography.	SL, Head of the Department, teaching staff	2025-2028
7	Creation of a database of practical cases and educational computer programs for working with geodetic data.	Head of the Department, teaching staff	2025-2028
8	Joint seminars with industrial partners and scientific organizations on the practical application of geodesy.	Head of the Department, teaching staff	2025-2028
9	Development of a digital rating system for assessing students' knowledge and ensuring accessibility of grades.	RO, DAA, Head of the Department, teaching staff	2025-2028
10	Participation of students and faculty in conferences, competitions, and exhibitions in geodesy.	Head of the Department, teaching staff	2025-2028
11	Commercialization of intellectual property related to geodesy and cartography.	Head of the Department, teaching staff	2025-2028
12	Effective positioning of scientific research in the intellectual property market.	Head of the Department, teaching staff	2025-2028

13	Involvement of foreign experts and lecturers to enhance the level of training.	Head of the Department, teaching staff	2025-2028
14	Regular professional development of faculty and students in modern geodetic technologies.	HR, Head of Department, teaching staff	2025-2028
15	Modernization of the department's laboratories, training fields, and classrooms.	Directorate, Head of the Department	2025-2028
16	Organization of internal and external academic mobility for students and faculty.	Directorate, Head of the Department	2025-2028
17	Expansion of multilingual education, including instruction in professional terminology.	Directorate, Head of the Department	2025-2028
18	Development of MOOCs for program disciplines and additional training.	Directorate, Head of the Department	2025-2028
19	Submission of applications for grant funding of departmental research projects.	Directorate, Head of the Department,	2025-2028
20	Ensuring safe and comfortable conditions for work, study, and extracurricular activities of students.	Directorate, Head of the Department	2025-2028
21	Collaboration with professional associations and industrial enterprises.	Directorate, Head of the Department	2025-2028
22	Development of an action plan to expand internal and external mobility of students and faculty using modern	Head of the Department, teaching	2025-2028
23	Creation of an alumni community and support for employment.	Head of the Department, responsible for employment and career guidance	2025-2028
24	Formation of a library of educational and scientific literature in geodesy and cartography.	Deputy Dean for Scientific Work, Head of Department, teaching staff	2025-2028
25	Equipping classrooms with modern computer technology, specialized software, and geodetic equipment.	Head of Department, teaching staff	2025-2028

Reviewed at the meeting of the Department of MSG Protocol №5 dated January 23, 2025y.

Head of MSG Department



Meirambek G.

Development plan of the educational program with specification of strategic planning indicators, reflecting risk analysis and assessment, implementation of activities based on identified risks, and guarantees for achieving the planned results

№	Target Indicators	Unit of Measurement	Risks					
			2025-2026	2026-2027	2027-2028	Analysis and Assessment	Strategies	Guarantees
1	Share of Graduates Employed in the First Year After Graduation	%	-	-	-	Loss of Contact with Graduates	Collaboration with Stakeholders and Business Partners. Feedback from Graduates.	Contact Information for Graduates, Business Partners, and Stakeholders. Graduate Employment. Internal Audit.
2	Number of Joint Educational Programs	Quantity	0	0	1	Analysis of the organization of the educational process in foreign universities and assessment of the possibility of creating joint educational programs (JEP)	Collaboration with national and foreign research centers, institutes, and universities. Involvement of highly qualified faculty members. To assess key indicators of learning effectiveness, develop and implement additional assessment methods. Develop an action plan for external and internal academic mobility of students and faculty.	Risk-oriented analysis (SWOT) of the implemented educational programs. Conclusion of agreements, approval and launch of educational programs, admission of students to new programs. Internal audit..

3	Number of Educational Programs Taught in English	Quantity	0	0	1	Insufficient level of English proficiency among academic staff	Organization and implementation of English language courses for academic staff at the university	Availability of international English proficiency certificates among academic staff and students. Internal audit. Semi-annual and annual departmental reports.
4	Increase in Enrollment for Distance Education	Quantity	-	-	-	Poor awareness among applicants	Intensify career guidance activities. Strengthen work on external and internal academic mobility of academic staff using modern distance learning technologies.	University digital resources. Internal audit.
5	Development and Implementation of Educational and Instructional Materials Reflecting the Results of Own Research and Best International Practices	Quantity	4	6	8	Insufficient integration of faculty research (R&D) results into the development of educational and instructional materials	Discuss at the department meeting the issues related to developing and integrating faculty research into the educational process in the field of teaching methodology, and develop methodological guidelines for the taught disciplines based on faculty research.	Faculty members with high qualifications and extensive scientific-pedagogical experience. KazNRTU Form 703-06. Annual plan for educational and methodological publications. Internal audit.

6	Share of renewal of scientific equipment as a percentage of the total number of scientific equipment, %*	Quantity	10	15	20	Increase in equipment costs due to inflationary expenses	Opening and equipping a scientific-educational laboratory for GDE	Conducting laboratory classes in accordance with the curriculum of the educational program
7	Increase in protection documents and Author's certificates*	Quantity	5	7	8	Insufficient patenting of R&D results by the teaching staff	Participation of teaching staff and students in grant funding competitions Ministry of Science and Higher Education of the Republic of Kazakhstan	Patenting of scientific developments. Patent Office
8	Number of faculty members proficient in English at a level sufficient for conducting scientific and educational activities	Quantity	4	5	6	Low level of English proficiency among senior teaching staff	Organization and implementation of English language courses at the university for senior teaching staff	Availability of international certificates confirming English proficiency among PPS and students
9	Share of faculty members holding academic degrees involved in research and in research and development (R&D) activities, %	Quantity	70	75	79	Kazakhstan's share of science funding is one of the lowest in the world (0.13% of GDP)	Increase the participation of teaching staff in grant competitions of the Ministry of Science and Higher Education of the Republic of Kazakhstan	Teaching staff with high qualifications and extensive research experience

10	Number of publications in scientific journals of the Republic of Kazakhstan recommended by COKSON of the Ministry of Education and Science of the RK	Quantity	15	18	22	Lack of or insufficient funding for research	Increase the participation of teaching staff and students in research and student research work (R&D and SRW)	TS with high qualifications and extensive experience in conducting research Published scientific articles
11	Number of ongoing research projects	Quantity	6	7	8	Kazakhstan's share of science funding is one of the lowest in the world (0.13% of GDP)	Increase participation of teaching staff in grant competitions of the Ministry of Science and Higher Education of the Republic of Kazakhstan	TS with high qualifications and extensive experience in conducting research
12	Number of research results implemented in the educational process	Quantity	6	7	8	Insufficient funding of research activities	Development and integration of R&D results into the core disciplines of the curriculum	Act of implementation of R&D results into the educational process. Open classes.
13	Number of publications in international journals indexed in Scopus / WoS	Quantity	20	23	25	Insufficient funding for research activities	Increase participation of teaching staff in grant competitions of the Ministry of Science and Higher Education of the Republic of Kazakhstan	TS with high qualifications and extensive experience in conducting research

14	Percentage of faculty holding academic degrees (%)	%	71,5	73	75	Insufficient number of grants for the training of master's and doctoral students	Recruitment and employment of new staff who have successfully defended their master's and doctoral theses	Awarding of academic and scientific degrees to graduates. Internal audit.
15	Increase in the proportion of faculty and research staff who have undergone professional development domestically and abroad	%	90	95	98	Insufficient funding	Participation of faculty in the "Bolashak" competition, organization of professional development courses for faculty. Within the framework of the Industrial Advisory Board for the educational program, sign a Memorandum and jointly develop, with various associations, an action plan for the proper preparation of students for professional certification of the program.	Certificate of professional development. Internal audit.

Reviewed at the meeting of the Department of MSG Protocol №5 dated January 23, 2025y.

Head of MSG Department



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