NJSC SHAKARIM UNIVERSITY OF SEMEY

EDUCATIONAL PROGRAM

6B07 - Engineering, Manufacturing and Civil engineering
(Code and classifcation of the feld of education)

6B073 - Architecture and Civil engineering
(Code and classifcation of the direction of training)

0730
(Code in the International Standard Classifcation of Education)

B074 - Urban planning, construction works and civil engineering
(Code and classifcation of the educational program group)

6B07301 - Geodesy and Cartography
(Code and name of the educational program)

Bachelor
(Level of preparation)

Semey

Educational program

6B07 -- Engineering, manufacturing and construction industries
(Code and classification of the field of education)

6B073 - Architecture and construction
(Code and classification of the direction of training)

0730
(Code in the International Standard Classification of Education)

B074 - Urban planning, construction works and civil engineering
(Code and classification of the educational program group)

6B07301 - Geodesy and Cartography
(Code and name of the educational program)

bachelor
(Level of preparation)

Semey 2024

PREFACE

Developed

The educational program 6B07301 - Geodesy and Cartography in the direction of preparation 6B073 - Architecture and construction on the basis of the State Compulsory Standards of Higher and Postgraduate Education approved by the Order of the Ministry of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No 2 (as amended by the order) was developed by the Academic Committee dated 20.02.2023 No 66).

Members of the Academic Committee	Full name	Academic degree, academic title, position
Head of the Academic Committee	Kozhakhmetova Dinara	Dean of the Graduate School of Artificial Intelligence and Construction, PhD, acting associate professor
Educational program manager	Baibossinova Kuralay	Senior lecturer of the Department of Civil Engineering and Geodesy
Member of the AC	Zhumadilov Iliyas	Head of the Department of Civil Engineering and Geodesy
Member of the AC	Seitkazina Gulnur	Senior lecturer of the Department of automation, information technology and urban planning
Member of the AC	Kemerbayev Nurgan	Director of LLP «GEOID», c.t.s.
Member of the AC	Toktassyn Nurlan	Head of the topographer group of LLP FDI «Remstroytrest»
Member of the AC	Turdina Nurgul	Student of the GK-101 group
Member of the AC	Aben Nurdaulet	Student of the GK-201 group

Reviewing

Full name of the reviewer	Position, place of work
Islamhanov Esengeldy	Director of LLP FDI «Remstroytrest»
Moldakhanova Aizhan	Head of the Department of Land Surveying, Geodetic Works and Technical Survey of Real Estate of the branch of NJSC "State Corporation "Government for Citizens" for the region of Abai

Reviewed

at a meeting of the Commission on Academic Quality of the Faculty of Engineering and Technology
Protocol №3 of January 15, 2024

at a meeting of the Commission on Academic Quality of the Higher School of Artificial Intelligence and Construction
Recommended for approval by the University Academic Council
Protocol №1 of June 6, 2024

Approved

at a meeting of the University Academic Council by protocol No. 6/1 of January 19, 2024.

at a meeting of the University Academic Council by protocol No. 11 of June 28, 2024.

Content

1.Introduction

1.1.General data

The educational program "6B07301 Geodesy and Cartography" in the direction of training "6B073 Architecture and Construction", implemented by the Shakarim State University of Semey, was developed taking into account the needs of the regional labor market.

The educational program "6B07301 Geodesy and Cartography" is designed to train bachelors of engineering and technology in the direction "6B073 Architecture and Construction", carrying out professional activities in the field of geodesy and cartography.

The state program "Digital Kazakhstan", adopted on December 12, 2017, covers all areas of activity from healthcare to industry, including the field of geodesy. Digital technologies have become a solution to the problem of faster and more reliable creation, transfer and storage of information, in contrast to analog technologies. With digitalization in Kazakhstan, more and more geo-information maps are emerging, focused on industry data.

The professions in demand in Kazakhstan change every year, but for several years the demand for surveyors has been growing. Currently, the profession "Geodesy" has become one of the most popular in the labor market.

When implementing the educational program, it is planned to use artificial intelligence tools in the educational process, thereby developing digital competencies among students in a rapidly changing technological environment.

The educational program provides for the education of a student with special educational needs in the conditions of a higher educational institution, as well as his socialization and integration into society.

1.2.Completion criteria

The main criterion of completion of the educational process by preparation of bachelors is the development of students not less than 205 credits of theoretical training and at least 27credits of practices, at least 8credits in the preparation, writing and protection of diploma work (project), as well as the preparation and submission of a comprehensive examination. Total 240 credits

1.3.Typical study duration: 3,5 years

2.PASSPORT OF THE EDUCATIONAL PROGRAM

2.1.EP purpose	Preparation of specialists with general cultural and professional competencies in the field of geodesy, cartography and geospatial data, etc., constituting the direction of training that meets the requirements of employers.
2.2.Map of the training profile within the educational program	
Code and classification of the field of education	6B07 - Engineering, manufacturing and construction industries
Code and classification of the direction of training	6B073 - Architecture and construction
Code in the International Standard Classification of Education	0730
Code and classification of the educational program group	B074 - Urban planning, construction works and civil engineering
Code and name of the educational program	6B07301 - Geodesy and Cartography
2.3.Distinctive features of the OP (double degree/joint, OVPO-partner, Double major, innovative)	-
2.4.Qualification characteristics of the graduate	
Degree awarded / qualification	Bachelor of Engineering and Technology in 6B07301 - Geodesy and Cartography educational program
Name of professional standard	Geodetic work in construction. Geodesy and cartography.
Atlas of new professions	-
Regional standard	-
Name of the profession / list of positions of a specialist	-engineer-surveyor, -assistant surveyor, -cartographer, -positions of managers, scientific and technical workers, common to research, design, technological, design organizations.
OQF qualification level (industry qualification framework)	6 Level on SQF
Area of professional activity	-all branches of the economy; - Committee of the Republic of Kazakhstan on Land Management; -state administration and land relations departments; - military-industrial complex; -civil and industrial construction; -enterprises for the production of geodetic and land management works; -private enterprises that have a license for the production of geodetic and land management works.
Object of professional activity	-the surface of the Earth; state geodetic networks and special purpose networks; -construction sites of buildings and structures; -civil, residential, transport, hydraulic engineering buildings and structures; -mineral deposits; land plots; -natural and natural-anthropogenic systems.
Types of professional activity	Organizational and managerial activities; Production and technological activities;

	Settlement and design activities; Research activities; Educational activities.
2.5.Graduate Model	A graduate of the educational program “Geodesy and Cartography” is a highly qualified specialist with general cultural and professional competencies in the field of geodesy, cartography and geospatial data, etc., which constitute the field of training that meets the requirements of employers. Acquired competencies expressed in the achieved learning outcomes 1. Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technologies taking into account current trends in the development of society. 2. To process the received information about the object of research by methods of natural science disciplines 3. Use the basics of cartography and geodesy in solving various tasks on the ground 4. Demonstrate the ability to build plans and maps of the area by traditional and modern methods 5. Demonstrate skills and abilities in the field of geodetic data processing, analysis of measurement results, development and application of geoinformation systems, as well as methods and tools for optimizing and improving geodetic production processes. 6. Process and analyze cartographic information obtained during Earth monitoring to ensure quality, observation of a digital terrain model 7. Perform geodetic works related to the creation of a survey justification of cadastral surveys and the assessment of relief-forming processes, analyze and process geodetic data and evaluate the characteristics of the relief 8. Solve geodetic tasks aimed at ensuring maximum efficiency and the required quality of engineering and geodetic works in the design, construction and operation of buildings and structures 9. Make geodetic measurements related to the solution of typical construction tasks 10. Demonstrate a comprehensive set of professional skills necessary for successful work in the geodetic industry, such as the development of academic writing skills, the ability to work with regulatory and technical documentation, understanding of economic and managerial aspects of geodetic production

3.Modules and content of the educational program

Module 1. Fundamentals of social and humanitarian knowledge

Brief description of the module content

This module reveals such aspects as: socio-cultural, economic-legal, environmental knowledge, communication skills, the use of information technology taking into account modern trends in the development of society.

Module disciplines

Foreign language

Kazakh(Russian) language (1)

Bases of economics, law and ecological knowledge

Physical Culture

Foreign language

History of Kazakhstan

Kazakh(Russian) language (2)

The module of socio-political knowledge (sociology, political science, cultural studies, psychology)

Physical Culture

Physical Culture

World of Abai

Information and communication technology

Physical Culture

Philosophy

Module 2. Science disciplines

Brief description of the module content

The module "Natural Science Disciplines" provides students with in-depth knowledge in the theory of mathematical processing of geodetic measurements. In the course of their studies, they learn the methods of measurement equalization and acquire the necessary mathematical skills to effectively process geodetic network data. This module also develops students` ability to analyze and interpret data using specialized software, which allows them to successfully apply modern mathematical methods and analytical approaches in professional activities in the field of geodesy.

Module disciplines

Mathematics

The theory of mathematical processing of geodetic measurements

The theory of mathematical processing of geodetic measurements

Adjustment measurements

Module 3. Basics of cartographic and geodesic measurements

Brief description of the module content

The module "Basics of cartographic and geodetic measurements" provides students with the comprehensive knowledge and skills required to work in the surveying and mapping profession. In this module, students study in depth the basic methods and tools of higher geodesy, cartography and aerial photography. They master the creation of digital models and maps of terrain, acquire practical skills in working with geodetic tools and equipment, as well as gain experience in topographic drawing and the performance of training and field geodetic work. This module is aimed at training specialists who are able to ensure high accuracy and quality of the cartographic materials created, as well as effectively perform geodetic measurements in various conditions and environments.

Module disciplines

Introduction to the Profession of Surveyor-Cartographer

Cartography

Topographical drawing

Educational - field geodetic practice

Geodetic Instrumentation

Higher Geodesy

Digital models and terrain maps

Module 4. Automation and new technologies in geodesic production

Brief description of the module content

The module "Automation and new technologies in geodetic production" provides students with in-depth knowledge and practical skills in advanced methods and technologies used in modern geodesy and cartography. During the course, students learn the use of laser scanners, global navigation satellite systems and the latest surveying instruments. They also master the use of computer-aided design software packages such as AutoCAD and BIM technologies to effectively plan, design and manage construction and surveying projects. Students learn to apply digital and smart technologies to improve the accuracy and efficiency of surveying work, which will prepare them for a successful career in today`s technologically demanding environment.

Module disciplines

Computer drawing in design

Autocad in pojecting

Computer graphics in construction

Laser scanners in geodesy

Software packages for computer-aided design

Modern technologies in geodesic production

Electronic instruments and methods of geodetic measurements

New technologies of cartographic production

Modern geodetic instruments and technologies

Technology of creating geodetic reference networks by modern methods

BIM-technologies in the design, construction and operation of buildings and structures

Smart technologies in construction

Application of global navigation satellite systems in geodesy

Digital technologies in the organization, management and planning of buildings

Module 5. Land monitoring, mapping and digitization

Brief description of the module content

The module " Land monitoring, mapping and digitization" provides students with comprehensive knowledge and skills in the areas of Geographic Information Systems (GIS), photogrammetry and remote sensing. As part of the module, students will learn how to produce, edit and publish maps and perform cartographic modeling using modern software tools. In addition, they will learn photogrammetric automation and aerospace imagery processing technologies, which will enable them to effectively engage in environmental monitoring and land management. Students will be trained in methods of creating and developing the state geodetic network, as well as ensuring information security in cartography, which guarantees high accuracy and reliability of geodetic and cartographic data.

Module disciplines

Geoinformatics in a cadastre

Organization and planning of topographic surveys

Mapping modeling

Map projection and computer design

Industrial practice I

Drafting, editing and publishing maps

Soil bonitization and land valuation

Geodetic support of land works

Environmental Monitoring

GIS in Geodesy and Cartography

Aerosurvey

Geology and Geomorphology

Engineering geology

Topographic Mapping

Automation of photogrammetric works

Technology of photogrammetric processing of aerospace images

Photogrammetry and remote sensing

Methods of creation and development of the state geodetic network

Software in cartography

Module 6. Engineering and geodesic works of buildings and constructions

Brief description of the module content

The module "Engineering and Geodetic Support of Construction of Buildings and Structures" provides students with comprehensive knowledge and skills in applied geodesy and geodetic monitoring of engineering structures. Students will learn how to perform topographic-geodetic works in engineering surveys and provide accurate geodetic support of the construction process. They will acquire knowledge in the field of construction production technology, design and fundamentals of structural safety of buildings and structures, which will allow them to effectively participate in construction and ensure high quality and safety of engineering facilities.

Module disciplines

Applied Geodesy

The complex of topographic and geodesic works during engineering surveys in construction

Fundamentals of Structural Safety of Buildings and Structures

Geodetic support for the construction of engineering structures

Fundamentals of industrial construction

Building Technology Design

Industrial practice II

Technology of construction production

Geodetic monitoring of engineering buildings and structures

Module 7. Professional skills and management of geodetic production

Brief description of the module content

The module " Professional skills and management of surveying production" teaches students to manage and organize surveying projects, covering economic aspects and management in this field. As part of the module, students will study regulatory and technical documentation, enabling them to comply with standards and requirements when carrying out surveying work. They will also learn academic writing techniques, improving their scientific communication and research presentation skills. This knowledge and skills will help students to plan and implement surveying projects effectively, ensuring that they are of high quality and meet professional standards.

Module disciplines

Information security and information protection

Methods of Academic Writing

Normative and technical documentation in geodesy

Economics and management of geodetic production

Pre-diploma practice

Production practice III

Final examination

Brief description of the module content

Writing and defending a graduation project or preparing and passing a comprehensive exam

Module disciplines

Thesis project

Comprehensive exam

4.Summary table on the scope of the educational program

«6B07301 - Geodesy and Cartography»

Name of discipline	Cycle/ Component	Term	Number of credits	Total hours	Lec	SPL	LC	IWST	IWS	Knowledge control form
Module 1. Fundamentals of social and humanitarian knowledge										
Foreign language	GER/CC	1	5	150		45		35	70	Examination
Kazakh(Russian) language (1)	GER/CC	1	5	150		45		35	70	Examination
Bases of economics, law and ecological knowledge	GER/US	1	5	150	15	30		35	70	Examination
Physical Culture	GER/CC	1	2	60		60				Differentiated attestation
Foreign language	GER/CC	2	5	150		45		35	70	Examination
History of Kazakhstan	GER/CC	2	5	150	30	15		35	70	Qualification examination
Kazakh(Russian) language (2)	GER/CC	2	5	150		45		35	70	Examination
The module of socio-political knowledge (sociology, political science, cultural studies, psychology)	GER/CC	2	8	240	30	45		55	110	Examination
Physical Culture	GER/CC	2	2	60		60				Differentiated attestation
Physical Culture	GER/CC	3	2	60		60				Differentiated attestation
World of Abai	BS/US	3	3	90	15	15		20	40	Examination
Information and communication technology	GER/CC	4	5	150	15	15	15	35	70	Examination
Physical Culture	GER/CC	4	2	60		60				Differentiated attestation
Philosophy	GER/CC	5	5	150	15	30		35	70	Examination
Module 2. Science disciplines										
Mathematics	BS/US	1	5	150	15	30		35	70	Examination
The theory of mathematical processing of geodetic measurements	BS/CCh	5	5	150	15	30		35	70	Examination
The theory of mathematical processing of geodetic measurements	BS/CCh	5	5	150	15	30		35	70	Examination
Adjustment measurements	BS/CCh	5	5	150	15	30		35	70	Examination
Module 3. Basics of cartographic and geodesic measurements										
Introduction to the Profession of Surveyor-Cartographer	BS/US	1	6	180	30	30		40	80	Examination
Cartography	BS/US	2	5	150	15		30	35	70	Examination and term work/Project
Topographical drawing	BS/US	2	5	150		45		35	70	Examination
Educational - field geodetic practice	BS/US	2	6	180						Total mark on practice
Geodetic Instrumentation	BS/US	3	7	195	15	15	30	45	90	Examination

Higher Geodesy	AS/US	3	8	240	30	45		55	110	Examination and term work/Project
Digital models and terrain maps	BS/CCh	6	5	150	15	30		35	70	Examination
Module 4. Automation and new technologies in geodesic production										
Computer drawing in design	BS/CCh	3	5	150	15	30		35	70	Examination
Autocad in pojecting	BS/CCh	3	5	150	15	30		35	70	Examination
Computer graphics in construction	BS/CCh	3	5	150	15	30		35	70	Examination
Laser scanners in geodesy	BS/CCh	4	5	150	15	30		35	70	Examination
Software packages for computer-aided design	BS/CCh	4	5	150	15	30		35	70	Examination
Modern technologies in geodesic production	BS/CCh	4	5	150	15	30		35	70	Examination
Electronic instruments and methods of geodetic measurements	BS/CCh	5	5	150	15	30		35	70	Examination
New technologies of cartographic production	AS/CCh	5	7	195	15	30	15	45	90	Examination
Modern geodetic instruments and technologies	AS/CCh	5	7	210	15	30	30	45	90	Examination
Technology of creating geodetic reference networks by modern methods	AS/CCh	5	7	195	15	30	15	45	90	Examination
BIM-technologies in the design, construction and operation of buildings and structures	BS/CCh	6	5	150	15	30		35	70	Examination
Smart technologies in construction	BS/CCh	6	5	150	15	30		35	70	Examination
Application of global navigation satellite systems in geodesy	BS/US	6	5	150	15	30		35	70	Examination
Digital technologies in the organization, management and planning of buildings	BS/CCh	6	5	150	15	30		35	70	Examination
Module 5. Land monitoring, mapping and digitization										
Geoinformatics in a cadastre	BS/CCh	3	5	150	15	30		35	70	Examination
Organization and planning of topographic surveys	BS/CCh	3	5	150	15	30		35	70	Examination
Mapping modeling	BS/CCh	4	5	150	15	30		35	70	Examination
Map projection and computer design	BS/CCh	4	5	150	15	30		35	70	Examination
Industrial practice I	BS/US	4	7	210						Total mark on practice
Drafting, editing and publishing maps	BS/CCh	4	5	150	15	30		35	70	Examination
Soil bonitization and land valuation	AS/CCh	4	5	150	15	30		35	70	Examination
Geodetic support of land works	AS/CCh	4	5	150	15	30		35	70	Examination
Environmental Monitoring	AS/CCh	4	5	150	15	30		35	70	Examination
GIS in Geodesy and Cartography	BS/US	5	6	180	15	15	30	40	80	Examination and term work/Project
Aerosurvey	BS/CCh	6	5	150	15	30		35	70	Examination
Geology and Geomorphology	BS/CCh	6	3	90	15	15		20	40	Examination
Engineering geology	BS/CCh	6	3	90	15	15		20	40	Examination

Topographic Mapping	BS/CCh	6	3	90	15		15	20	40	Examination
Automation of photogrammetric works	AS/CCh	6	7	210	30		45	45	90	Examination
Technology of photogrammetric processing of aerospace images	AS/CCh	6	7	210	30		45	45	90	Examination
Photogrammetry and remote sensing	AS/CCh	6	7	210	30		45	45	90	Examination
Methods of creation and development of the state geodetic network	AS/CCh	7	7	210	30	45		45	90	Examination
Software in cartography	AS/CCh	7	7	210	30	45		45	90	Examination
Module 6. Engineering and geodesic works of buildings and constructions										
Applied Geodesy	AS/US	4	10	300	30	30	30	70	140	Examination and term work/Project
The complex of topographic and geodesic works during engineering surveys in construction	BS/CCh	5	5	150	15	30		35	70	Examination
Fundamentals of Structural Safety of Buildings and Structures	BS/CCh	5	5	150	15	30		35	70	Examination
Geodetic support for the construction of engineering structures	BS/CCh	6	5	150	15	30		35	70	Examination
Fundamentals of industrial construction	BS/CCh	6	5	150	15	30		35	70	Examination
Building Technology Design	BS/CCh	6	5	150	15	30		35	70	Examination
Industrial practice II	BS/US	6	7	210						Total mark on practice
Technology of construction production	BS/CCh	6	5	150	15	30		35	70	Examination
Geodetic monitoring of engineering buildings and structures	AS/CCh	7	7	210	30	45		45	90	Examination
Module 7. Professional skills and management of geodetic production										
Information security and information protection	BS/CCh	3	5	150	15	30		35	70	Examination
Methods of Academic Writing	BS/US	7	5	150	15	30		35	70	Examination
Normative and technical documentation in geodesy	BS/US	7	5	150	15	30		35	70	Examination
Economics and management of geodetic production	BS/US	7	5	150	15	30		35	70	Examination
Pre-diploma practice	AS/CCh	7	7	210						Total mark on practice
Production practice III	AS/CCh	7	7	210						Total mark on practice
Final examination										
Thesis project		8	8	240						
Comprehensive exam		8	8	240						

NON -PROFIT LIMITED COMPANY «SHAKARIM UNIVERSITY OF SEMEY»

EDUCATIONAL PROGRAM DEVELOPMENT PLAN

6B07301 «Geodesy and cartography»

2024-2028

Semey 2024

Table of Contents

1. Passport of the Development plan for the 6B07301 – “Geodesy and cartography” bachelor’s degree educational program (EP)

1	Basis for development	The State Program "Digital Kazakhstan", adopted on December 12, 2017, covers all spheres of activity from healthcare to industry, including the field of geodesy. Digital technologies have become a solution to the problem of faster and more reliable creation, transfer and storage of information as opposed to analog. With digitalization, more and more geo-information maps focused on industry data are emerging in Kazakhstan.
2	Implementation timeframe	2024-2028
3	Expected results of realization	Preparation of bachelors with general cultural and professional competencies in the field of geodesy, cartography and geospatial data, etc., constituting the direction of training, meeting the requirements of employers.

2. Analytical rationale of the EP

2.1 Information about EP

The educational program is developed in accordance with the National Qualifications Framework and professional Standards, in accordance with the Dublin Descriptors and the European Qualifications Framework.

The study period of the Bachelor's degree program is 3.5 years.

The educational program 6B07301 “Geodesy and Cartography” was developed taking into account professional standards:

1. Geodetic work in construction, approved by order of the NCE “Atameken” dated September 1, 2023 No. 137;
2. Geodesy and cartography, approved by order of the Minister of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan dated January 29, 2024 No. 44/NK.

The main criterion for the implementation of the educational process is the completion of at least 240 credits, with the award of the Bachelor of Engineering and Technology under the educational programme «6B07301 Geodesy and cartography» degree.

The uniqueness of "6B07301 Geodesy and Cartography" educational program in the direction of training "6B073 Architecture and Construction", implemented by NJSC "Shakarim University of Semey", is developed taking into account the needs of the regional labor market.

The educational program 6B07301 "Geodesy and Cartography" has undergone specialized accreditation by ARQA for a period of 5 years.

The content of the educational program is implemented through the curriculum, developed in a modular format, which provides two cycles of disciplines: the cycle of basic disciplines and the cycle of profile disciplines, as well as additional types of training.

2.2 Information about students

Academic year / Form of education	2024-2025 academic year	2025-2026 academic year	2026-2027 academic year	2027-2028 academic year
Grant	30	30	30	30
Contract	25	25	25	25
Total	55	55	55	55

2.3 Internal and external conditions for the development of the EP

To implement the educational program 6B07301 "Geodesy and cartography" the department has appropriate material and technical equipment. The department has the main instruments for mastering the subjects, both optical and electronic theodolites, levels, total stations, as well as the necessary software.

To date, the auditorium fund of the department is sufficient for the successful implementation of the OP plan. The department is equipped with 4 computer classes with local network connection and unlimited Internet, 7 specialized laboratories, 14 classrooms. Information resources are represented by the library (including electronic editions), access for all students and faculty to the Internet, access to the local network of the university. There are open WI-FI zones on the territory of the university.

Today dual education is a promising direction in the training of specialists, combining university education with mandatory periods of industrial training. In the educational program 6B07301 "Geodesy and Cartography" dual education has been introduced, which allows conducting classes at production facilities/enterprises with the involvement of specialists.

The educational program 6B07301 "Geodesy and Cartography" successfully carries out work on the program of internal and external academic mobility.

In 2015, a cooperation agreement was signed between the Siberian State University of Geosystems and Technologies (Russia). In 2016, an agreement was signed with Novosibirsk State University of Architecture and Civil Engineering (Russia).

In the academic year 2024 in April the university was visited by a foreign professor, leading researcher, coordinator of the laboratory of remote sensing and analysis (Interdisciplinary Research Center for Aviation and Space Exploration) of King Fahd

University of Petroleum and Minerals Professor ROMAN SHULTS. Within the framework of the visit Roman Shults gave lectures for students of 1-4 years EP 6B07301 "Geodesy and Cartography" on the discipline "Close-range Photogrammetry (Engineering Photogrammetry)".

Within the framework of the visit Prof. Roman Shults consulted the faculty of the department on writing articles in highly rated international databases, also it is planned to work on the preparation of a joint project on monitoring of forest fires using unmanned aerial vehicles, which is an urgent problem for the region of Abay.

In the period from March 25 to April 9, 2024 the foreign scientific adviser - professor of the Warsaw University of Technology of Poland PhD Agnieszka Dabska within the visit read the seminar "Modern approaches in education and science: experience and practice of the Warsaw university of techonology" for teachers of EP 6B07301 "Geodesy and Cartography" and 6B07302 "Civil Engineering".

During the development of the EP, employers took part in its discussion: N.T. Kemerbayev - Director of GEOID LLP, N.T. Toktasyn - head of the group of topographers of Semstroyproekt LLP, who represented the interests of production specialists.

According to EP 6B07301 "Geodesy and cartography", contracts have been concluded for the passage of industrial practices and for the organization of dual training with the following organizations: "GEOID" LLP, Branch of the RSOE "Kazgeodeziya" "Shygysgeodeziya" of the Committee of Geodesy and Cartography of the MDDIAI RK, "Architecture F" LLP, "GeoSemStroyProekt" LLP, "Zhana Zhol" LLP, "Semdorproekt" LLP, "Gordorstroy" LLP, "Vostok-Stroy Company" LLP, "Asyl Zhol Group" LLP, "Damu Stroy LTD" LLP, "Arlan Stroy montazh KZ" LLP, "Semstroyproekt" LLP , Branch of the RSE at the National Center of Geodesy and Spatial Information of the Committee of Geodesy and Cartography of the Ministry of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan.

2.4 Information about teaching staff implementing the educational program

The total number of the teaching staff of the department as of September 1, 2023 was 23 people, including 5 people with academic degrees and titles. All teachers have extensive teaching experience, academic titles and degrees, as well as work experience in production.

Teachers with experience in production: Sadvakasova G.O., Zhumadilov I.T., Toktasyn N.J., Moldakhanova A.B., Muhamediyarova T.D., Shakirova N.U., Shalbaev A.M., Kaliev A.A.: Sadvakasova G. O. - plant engineer, Zhumadilov I.T. - engineer of "KGS" LLP, Toktasyn N.Zh. - head of the group of topographers of “Semstroyproekt” LLP, Moldakhanova A.B. - Head of the Semey Department for Registration and Land Cadastre of the branch of the NJSC "State Corporation Government for Citizens", Mukhamediyarova T.D. – cartographer engineer of the branch of the RSOE "Kazgeodeziya" "Soltustikgeodeziya", Shakirova N.U. - engineer of KGS LLP, Shalbaev A.M. – assistant surveyor of Altay Trans LLP, Kaliev A.A. – head of the laboratory of Semey Kurylys Materialdar LLP.

The teaching staff of the department is constantly improving their knowledge in this field and are undergoing advanced training, including short-term refresher courses, attending various seminars, internships at leading universities in Kazakhstan, far and near abroad, as well as in relevant organizations of the industry.

2.5 Characteristics of the achievements of the EP

The main indicator of the effectiveness of the educational program is the proportion of employed graduates. The dynamics of the share of employed in recent years has been, respectively, by year: 2018 – 90%, 2019 – 100%, 2020 -82%, 2021-92%, 2022-82.4%, 2023-93%.

An important indicator of the relevance and relevance of educational programs, their compliance with modern trends in education is the academic mobility of students and teaching staff.

In the 2018-2019 academic year, students of the specialty 5B071100/6B07301 "Geodesy and cartography" Abd Malik K., Baltabekova N., Muratkhan M. studied at D.Serikbayev EKTU under the academic mobility program.

In the 2020-2021 academic year, students of the specialty 5B071100/6B07301 "Geodesy and cartography" Aubakirova T.A., Dairenova A.S. studied at the D.Serikbayev EKTU under the academic mobility program.

In the 2021-2022 academic year, senior lecturer K.B. Baybosinova lectured at D.Serikbayev East Kazakhstan Technical University under the academic mobility program of teaching staff.

In the 2022-2023 academic year, a student of EP 6B07301 "Geodesy and Cartography" GC-007 Tolkynuly Sumbile studied at the Kazakh Agrotechnical Research University named after S.Seifullin under the academic mobility program.

Involvement of professors of leading foreign universities in teaching and research activities. To improve the level of education, it is planned to invite foreign scientists to give lectures to students of this EP in 2024-2028.

3. The main objectives of the EP development plan

The purpose of the EP and its development is its improvement in accordance with the mission and strategy of the university, aimed at training highly qualified, competitive personnel, improving the quality of knowledge, forming a multi-level system of research activities in accordance with the current needs of modern education and science, transformation into an innovative world-class university.

The main purpose of EP 6B07301 "Geodesy and Cartography" is to prepare bachelors with general cultural and professional competencies in the field of geodesy, cartography and geospatial data, etc., which make up the training area that meets the requirements of employers.

To implement the educational program 6B07301 "Geodesy and cartography", the following tasks are defined:

- to ensure the level of education of students that meets the modern requirements of the specifics of the EP
- to develop independent thinking, the ability to self-development and self-education among students and teaching staff;
- provide conditions that take into account the individual and personal characteristics of the student;
- to form a positive environment among students for fruitful learning activities.
- to organize the study, implementation and improvement of technologies and methods for diagnosing the quality of education;
- to introduce information technologies into the educational process.
- to improve the organization of the educational process:
- to improve the interaction of academic disciplines;
- develop dual training;
- to introduce technologies that form key competencies into the educational process.

4. Risk analysis of EP

№	Name of risks	Corrective measures
1	Reduction of the contingent of students in the EP	Formation of a contingent of students through career guidance and information and advertising work (improving the effectiveness of speaking in the media), the creation of multilingual learning groups; the formation of a positive image of the EP
2	Insufficient level of knowledge of the language for the introduction of multilingualism	Taking language courses
3	Decrease in the level of employment	Work on dual training
4	Insufficient development of external and internal academic mobility of students and teaching staff	Conclusion of contracts with universities
5	The risk of reducing the settling down of the Teaching staff by EP	Financial support of initiative teachers; motivation and stimulation to scientific and pedagogical activity (material encouragement for the manifestation of creative qualities); professional development of the staff of teaching staff through doctoral studies
6	Insufficient provision of educational and methodological literature on professional disciplines in the state language	Plan the annual release of scientific and educational literature in the state language by scientists and teaching staff
7	Material and technical base	Implementation of annual purchases of modern equipment and verification of equipment; timely repair of educational laboratories
8	Weak involvement of teaching staff and students in research activities	Work in scientific society, participation in international and national scientific conferences and competitions, in competitions for grant funding

5. Action plan for the development of EP

№	Criteria	Expected results	unit of measurement	2024-2025	2025-2026	2026-2027	2027-2028
Direction 1. Educational and methodological support							
1.1	Educational updating program based on professional standards with considering the recommendations of employers	Carrying out an examination of "6B07301 Geodesy and cartography" Educational program in order to improve practice-oriented and development of professional competencies of graduates	fact	+	+	+	+
1.2	Monitoring and updating catalogs of elective disciplines according of key and professional competencies, demands of labor market.	Improving the quality of content educational programs through inclusion of elective courses aimed at developing key and professional competencies of graduates in accordance with labor market demands.	fact	+	+	+	+
1.3	Introduction of modern teaching technologies into the educational process, promoting the development of cognitive activity and communicative ability of students	Introduction of modern teaching technologies into the educational process, promoting the development of cognitive activity and communicative ability of students	fact	+	+	+	+

1.3.1	Introduction of mass open online courses (MOOCs) into the educational process according to the educational program 6B07301 «Geodesy and Cartography»	Introduction of disciplines into the educational process Improving the quality of teaching academic disciplines, taking into account the novelty and diversity of forms of work that contribute to the development of cognitive activity.	unit	-	-	-	-
1.4	Involvement of social partners and employers in the development, examination of the implementation of educational programs	Improving the quality of implemented educational programs taking into account market demands and recommendations of employers	unit	**1**	**1**	**1**	**1**
1.5	Development and implementation of elective courses in English	Introduction of disciplines in English into the educational process	unit	-	-	-	-
1.6	Conducting seminars and round tables on the application of innovative technologies in the educational process	Introduction of innovative technologies in the educational process	unit	-	**1**	**1**	**1**
1.7	Publication of educational, methodical and scientific literature on the implemented EP	Improvement of educational and methodological support in the disciplines of the implemented educational programs	unit	-	**1**	-	**1**
1.8	Conclusion of contracts with foreign and domestic partner universities in order to develop academic exchange of students of all levels and teaching staff	Creation of a database of foreign and domestic partner universities for the development of academic exchange of students of all levels and teaching staff	unit	-	-	-	-
1.9	Inviting students from partner universities to study for a semester, short-term internships, practice, etc.	Development of international recognition of educational programs, implementation of academic mobility programs for students	people	-	-	-	-

1.10	Participation of teaching staff and students in international academic exchange programs	Development of international cooperation with foreign universities implementing educational programs in the direction 6B07301 «Geodesy and cartography»	people	**-**	**-**	**-**	**-**
1.11	Development of outgoing academic mobility of teaching staff and students in the direction 6B07301 «Geodesy and cartography»	Improvement of the educational program based on the use of the experience of implementing such programs in leading foreign universities	people	**-**	**-**	**1**	**1**
Direction 2. Teaching staff							
2.1	Professional development and training of scientific and pedagogical personnel for the implementation of educational programs once every 5 years	The share of teaching staff who have passed advanced training at the national and international level is at least 20%	people	**-**	**20**	**20**	**20**
2.2	Advanced training, retraining, internships of teaching staff at the international level	Completion of at least 2 teachers of the advanced training program, retraining, internships of teaching staff at the international level	people	**-**	**-**	**-**	**-**
2.3	Promotion of publications of the works of teaching staff in international publications indexed by the Web of Science and Scopus databases	Increase in the share of teaching staff who have published the results of scientific research in publications indexed by the Web of Science and Scopus databases – at least 30% of the total number of teaching staff	%	**-**	**30**	**30**	**30**
2.4	Involvement of practical specialists in teaching and scientific activities	Participation in the implementation of educational programs of practitioners (at least 20% of specialists)	%	**-**	**20**	**20**	**20**
Direction 3. Internationalization of educational programs							

3.1	Conclusion of agreements on international cooperation with foreign universities	Implementation of joint projects, preparation of scientific publications with foreign partners, creation of bases for scientific internships of students	unit	-	-	-	-
3.2	Attracting foreign students to study under the educational program 6B07301 «Geodesy and cartography»	Increasing the number of foreign students	people	-	-	-	-
3.3	Organization of joint scientific and practical events with international partners	Improving the efficiency of scientific and methodological activities of teaching staff, exchange of experience with foreign partners	unit	-	-	-	-
3.4	Invitation of foreign specialists to give lectures and consultations on master's projects and dissertations	Improvement of the content component of educational programs based on the introduction of the experience of foreign specialists in the implementation of educational programs	unit	-	-	-	-
3.5	Expansion of cooperation with Leading foreign scientific and educational organizations in order to attract the most qualified foreign specialists to the implementation of educational programs	Formation of key and professional competencies in accordance with the practice of leading universities	people	-	-	-	-
Direction 4. Logistics and digitalization							
4.1	Step-by-step equipment of classrooms with technical training tools (projectors, panels, interactive and multimedia whiteboards, multifunction devices, webcam, projector screen)	Equipping classrooms assigned to the department with technical training tools (projectors, panels, interactive and multimedia whiteboards, multifunctional devices, webcam, projector screen)	fact	+	+	+	+

4.2	Automation of the educational process (testing, session management, student contingent movement, dean's office, department, teaching staff workload, schedule, library, syllabuses)	Information management based on the automation of the educational process (testing, session management, student contingent movement, dean's office, department, teaching staff workload, schedule, library, syllabuses)	fact	+	+	+	+
4.3	Replenishment of the full-text database of research results of teaching staff and students, teaching staff (articles, monographs, etc.)	Increase in the number of results of scientific works of scientists, research of teaching staff and students, teaching staff (articles, monographs, etc.)	unit	**2**	**2**	**2**	**2**
4.4	Expansion of the fund of scientific and educational literature, including on electronic media for implemented educational programs	Ensuring the implementation of educational programs based on modern educational and information resources, including on electronic media	%	**10**	**10**	**10**	**10**
4.5	Monitoring the content and improvement of the faculty's website	Formation of the faculty's website on various aspects of the implementation of educational programs?	%	**100**	**100**	**100**	**100**

Head of Department _____ **Zhumadilov I.**

REVIEWED

at the meeting of the Commission on Academic Quality
Graduate School Artificial Intelligence and Construction
Minutes of the meeting № 1 «06» 06. 2024
Chairman CAQ _____ Adylkanova A.Zh.

AGREED

Dean _____ Kozhahmetova D.O.
«06» 06. 2024