MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN
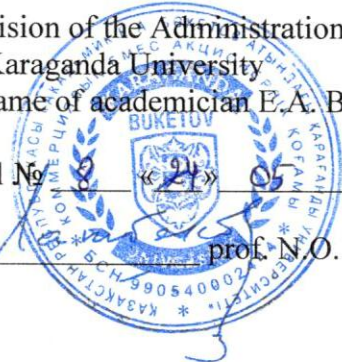
KARAGANDY UNIVERSITY OF THE NAME OF ACADEMICIAN E.A. BUKETOV

«APPROVED BY»

The decision of the Administration of
NLC "Karaganda University
of the name of academician E.A. Buketov"

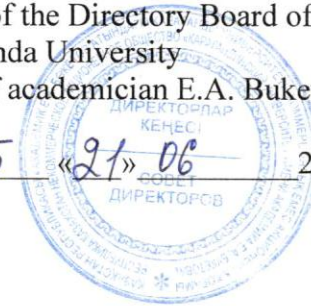Protocol № 8 « 24 » 05 2024 y.

_____ prof. N.O. Dulatbekov

«APPROVED BY»

The decision of the Directory Board of
NLC "Karaganda University
of the name of academician E.A. Buketov"

Protocol № 5 « 21 » 06 2024 y.

EDUCATIONAL PROGRAM

7M06101 Information Systems and Technology

Level: Master's Degree

Karaganda,
2024

APPROVAL SHEET

EDUCATIONAL PROGRAM 7M06101 INFORMATION SYSTEMS AND TECHNOLOGY

"AGREED"

Director of LLP "Center of information systems WTO"

_____ O. A. Laptanovich

" 15 " 04 2024 y.

"AGREED"

Director of LLP "Terricon Valley"

_____ S.F. Niyazov

" 15 " 04 2024 y.

The educational program "7M06101 - Information systems and technologies" was developed on the basis of:

– The Law of the Republic of Kazakhstan "On Education" dated July 27, 2007 No. 319-III (with amendments and additions dated 04/15/2024 No. 72-VIII);

– Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 152 dated 04/20/2011 "On approval of the Rules for the organization of the educational process in credit technology" (with amendments and additions dated 04/29/2024 No. 203)

- The National Qualifications Framework dated 03/16/2016. The Republican Trilateral Commission on Social Partnership and Regulation of Social and Labor Relations;

– Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 569 dated 10/13/2018 "On approval of the Classifier of areas of training with higher and postgraduate education" " (with amendments and additions dated 07/21/2023 No. 327);

– State mandatory standards of higher and postgraduate education (Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No. 2) (with amendments and additions dated 02/20/2023);

– Professional standard "Teacher" (Order of the Minister of Education of the Republic of Kazakhstan dated December 15, 2022 No. 500) (with amendments and additions from 02/23/2024 No. 64-VIII);

– Professional standard for teachers (teaching staff) of organizations of higher and (or) postgraduate education, approved by Order of the Minister of Science and Higher Education of the Republic of Kazakhstan No. 591 dated November 20, 2023. (as amended on 06.12.2023 No. 616);

– The Law of the Republic of Kazakhstan "On the status of a teacher" dated December 27, 2019 No. 293-VI ZRK (with amendments and additions dated 04/27/2024);

– Professional standard of the Information and Communication Technologies direction No. 171 dated July 17, 2017, as amended on December 05, 2022. Order No. 222 of the Acting Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken".

Content

Passport of the educational program

1. Code and name of the educational program: "7M06101 - Information systems and technologies"
2. Code and classification of the field of education, areas of training: 7M06 Information and Communication Technologies
3. Group of educational programs – M094 - Information technology
4. Volume of credits: 120 ECTS
5. Form of training: full - time
6. Language of training – Russian
7. Degree awarded– Master of Technical Sciences in the educational program "Information systems and technologies"
8. Type of EP (current, new, innovative) – innovative
9. ISCED level - 7
10. National Qualifications Framework level -– 7
11. Industry Qualifications Framework level - 7
12. Distinctive features of the EP: no
13. Number of the appendix to the license for the direction of personnel training: Appendix No. 16 to the state license No. KZ83LAA00018495 dated 07/28/2020.
14. The name of the accreditation body and the validity period of the EP accreditation: - KazSEE, registration number: No.23\15KA0008, 06.03.2023-05.03.2028
15. The goal EP:

The purpose of the educational program "Information Systems and Technologies" is to prepare a Master of Technical Sciences, possessing fundamental and applied knowledge in the fields of information and digital technologies, research skills for the implementation of scientific and pedagogical, professional activities in the conditions of digitalization of the Republic of Kazakhstan and the implementation of the State Program of the Republic of Kazakhstan "Digital Kazakhstan"

16. Qualification characteristics of the graduate
a) **List of posts**:
- Software Designer
- Software Maintenance Specialist
- Database Administration Specialist
- Software developers and testing specialists, WEB and multimedia applications
- Software Architects
- System Analyst
- System Administrator
- Network Administrator
- Teacher. College teacher

- Teacher. University teacher
- Teacher. Manager in Education

b) **The sphere and objects of professional activity of the graduate**:

The sphere of professional activity of graduates under the educational program "7M06101 - Information systems and technologies" are: information centers, organizations of industry, science, education, culture, healthcare, agriculture, public administration.

The objects of professional activity of masters under the educational program "7M06101 - Information systems and technologies" are: design and research institutes, management bodies, departments, financial organizations, business structures, enterprises and organizations of various forms of ownership using methods of mathematics, applied mathematics and computer science, computer technologies in professional activities, the pedagogical process of colleges, universities.

c) **Types of professional activity**

The types of professional activity of graduates are: research; scientific and technological; scientific and production; organizational and managerial; educational (diagnostic - study of the student's personality, the results of training, education and development; organizational and technological - organization of the learning and education process based on pedagogical technologies; managerial and pedagogical - interaction "subject-subject", management in education; project - modeling of education in higher school; research - creative search in solving problems of education, the study of pedagogical experience, reflection).

d) **Functions of the graduate's professional activity**

The main functions of the activity are:

- research activities in areas using IT-technology methods, information systems and ICT;

- development of requirements and specifications of individual components of objects of professional activity based on the analysis of user requests, domain models and capabilities of technical means;

- organization of the process of developing software products with a given quality in a given time;

- implementation of pedagogical activity with wide application of multimedia and other IT technologies: organizational, diagnostic and analytical, socio-pedagogical, advisory, organizational and managerial.

17. Formulation of learning outcomes based on competencies

Type of competencies	Codes	Learning outcomes
Behavioural skills and personal competencies (Soft skills)	LO1	Owns the skills to analyze methodological problems that arise in solving research and practical problems, including in interdisciplinary areas; applies modern theoretical and practical research methods in order to create software intelligent systems, effective data analysis.
	LO2	Demonstrates current knowledge of modern history and philosophy of science, applied natural sciences, contributing to the implementation of the main directions of modernization of public consciousness.
Professional competencies (Hard skills, Digital skills)	LO3	Applies in practice modern methods of analysis of innovative solutions to scientific and applied problems, planning and organization of processes of the life cycle of IP and ICT enterprise management, methods and models of commercialization of innovative technologies in the field of IT, owns methods of organization and effective management of IT projects.
	LO4	Owns mathematical, computer methods of analysis, modeling and visualization of data for solving scientific and applied problems in the IT field, designing and developing software, taking into account the requirements of information security.
	LO5	Owns the ways and methods of planning the activities of the organization of education in accordance with the requirements of curricula, regulatory documents, taking into account the individual and special educational needs of students, the methodology of conducting training sessions.
	LO6	Owns modern technologies and means of programming, testing, protection and documentation for the implementation of all stages of the software life cycle.
	LO7	Proficient in English and translation techniques at the level of understanding the functional features of oral and written professionally oriented texts, including those of a scientific and technical nature.

18. Determination of modules of disciplines in accordance with the results of training

Learning outcomes code	Name of the module	Name of disciplines	Volume (ECTS)
LO1	Philosophical and historical aspects of social and humanitarian knowledge	History and philosophy of science	4
LO3		Higher school pedagogy	4
LO3, LO5		Psychology of management	4
LO2, LO3		Pedagogical practice	4
LO4	Professional languages	Foreign language (professional)	4
LO4 LO2, LO4		Professional foreign terminology in the IT sphere Culture and ethics of academic writing	5
LO2, LO5	IT innovations	Commercialization results of scientific and technical activities / Science-intensive innovative entrepreneurship	5
LO2, LO5		IT Project Management / Innovation in the IT sphere	5
LO6, LO7	Professional	Software development technologies	4
LO6, LO7		Design and development of corporate information systems	5
LO2, LO3, LO5, LO6		Computer technologies in science and education	4
LO2, LO3 LO3, LO6	Information Technology	Methods of teaching IT disciplines in higher education / Organization and planning of scientific research	5
LO2, LO6 LO7		Applied problems of numerical methods/ Theory of algorithms	4
LO 4, LO7		Python in scientific research (in English)/ Building distributed systems in Java (in English)	4
LO4, LO6 LO6		Cryptology (in English)/ Cryptology information security technology	5
LO4, LO7 LO7		Web Application Development (in English)/ Software development for mobile devices	4
LO2, LO6 LO2, LO6, LO7		Visualization in scientific research/ Methods of analysis and visualization of big data	4
LO1, LO2. LO6, LO7		Research practice	14
LO2, LO4, LO5, LO6, LO7	Research work	Undergraduate's scientific research work including internship and master's thesis performance (research work of a master's student)	24
LO2, LO5, LO6, LO7	Research work	Preparation and defense of master	8

19. Matrix of achievability of learning outcomes

N	Name of disciplines	Brief description of the discipline (30-50 words)	Number of credits	Formed learning outcomes (codes)						
				LO1	LO2	LO3	LO4	LO5	LO6	LO7
Cycle of basic disciplines **University component**										
D1	History and philosophy of science	It is studied with the aim of forming knowledge about the significance of scientific knowledge in its tendency to development and sociocultural profile. Questions about the philosophy, methodology of science, science as a cognitive activity and tradition are considered.	4	+						
D2	Higher school pedagogy	Studied to form ideas about the modern paradigm of higher education and the theory of scientific activity in higher education. The issues of pedagogy, education of professionals-specialists, professional skills of teaching in educational organizations, pedagogical control and evaluation of knowledge in higher education are considered.	4			+				
D3	Psychology of management	It is studied with the aim of forming knowledge about the psychological laws of managerial activity, skills in analysis of socio-psychological principles, the characteristics of the psychology of management, the personal characteristics of the leader.	4			+		+		
D4	Foreign language (professional)	The course is taken for developing intercultural and communicative competence in the process of foreign language education at the level of basic sufficiency of Common European competence. The course is designed to study vocabulary and foreign language features; formation of the ability for intercultural communication, skills of argumentation in a foreign language and understanding of linguistic and cultural characteristics of their target language country.	4				+			
Cycle of basic disciplines **Component of choice**										
D5	Professional foreign terminology in the IT sphere	The purpose of studying the discipline is to obtain fundamental knowledge of professional foreign terminology in the field of information systems and technologies, knowledge of the main characteristics of the scientific and technical language and aspects of the scientific and technical translation; to	5				+			

		acquire the skill of using the foreign terminology when reading and translating in professional activities; the formation of intercultural and communicative competence in the process of foreign language communication in the IT sphere.								
	Culture and ethics of academic writing	The purpose of studying the discipline is to obtain fundamental knowledge of the language means for the scientific form of the English language, knowledge of the style and language for academic writing; the development and the improvement of skills in creating and designing official documents and their own scientific texts; the formation of competencies of written and oral speech activity in the scientific field in accordance with the norms of the international academic community.			+		+			
D6	Commercialization results of scientific and technical activities	It is studied in order to form skills for the commercial application of intellectual activity results and the introduction of scientific developments and technologies into production, the preparation of scientific projects for funding, as well as for interaction in the knowledge-intensive high-tech sector.	5		+			+		
	Science-intensive innovative entrepreneurship	The purpose of the subject is the formation of professional knowledge and practical skills of independent research, the use of quantitative and qualitative methods for conducting applied research; teaching the models for assessing the market value of business enterprises requiring science; sources of financing of investment projects and the main methods for evaluating the effectiveness of investments; conducting feasibility studies of design solutions.			+			+		
D7	IT Project Management	The course is studied in order to form project planning and management competencies in the IT industry for software development; to form the knowledge about approaches to IT project management, stages of the project life cycle; to form the practical skills for planning project activities, for carrying out the decomposition of project tasks, for estimating the costs of project tasks; formation of skills for managing processes/content project, schedule management, resources, cost, communications of the IT project.	5		+			+		
	Innovation in the IT sphere	The course is aimed at forming theoretical ideas about the trends of innovative development in the IT sphere, technologies in the sphere of IT infrastructure management of organizations of various profiles and scales, the formation of practical skills in the design, development and modernization of the company's IT infrastructure. Formation of practical skills in planning and			+			+		

		deployment of enterprise infrastructure, strategic planning and organization of the life cycle processes of IP and ICT enterprise management.								
Cycle of profile disciplines University component										
D8	Software development technologies	The course is studied in order to form the principles, models and methods used in the engineering cycle of the development of complex software products, the classical foundations of software engineering; project management, risk and configuration; methods for determining requirements in software engineering, designing software systems; creating a user interface; basic approaches to software product testing.	4						+	+
D9	Design and development of corporate information systems	The purpose of the course is the formation of theoretical knowledge about the general principles of the operation of corporate information systems (CIS), their architecture, opportunities for managing production and other processes of the enterprise, as well as the development of practical skills in the operation of systems of this class.	5						+	+
D10	Computer technologies in science and education	The purpose of the course is to create scientific prerequisites for the formation of an information culture among undergraduates in the context of the integration of natural science and humanitarian education; formation of knowledge about the theoretical and practical aspects of the use of digital technologies in scientific and educational activities; the formation of practical skills for the effective use of software products for processing information, conducting scientific experiments, processing and presenting research results.	4	+	+		+	+		
Cycle of profile disciplines Component of choice										
D11	Methods of teaching IT disciplines in higher education	It is studied in order to prepare a methodically competent teacher of computer science and digital literacy, to gain new knowledge related to computer science education. The principles of selection of the content and methods of teaching computer science at school are considered. The course is designed to develop the skills of using specific methodological recommendations for teaching IT disciplines in higher education.	5	+	+					
	Organization and planning of scientific	The purpose of the discipline is to familiarize with the basic concepts in the field of scientific research, the organization of scientific work, the planning of scientific research, preparation for the implementation of term papers and theses,			+		+			

	research	the formation of skills to apply methods of scientific research, processing of results, registration and dissemination of research results.								
D12	Applied problems of numerical methods	The aim of the course is to master and apply numerical methods for solving the equation of motion, proofs of convergence, stability and uniqueness of solutions; numerical analyses and calculations of these equations; the use of numerical results to compile process modeling programs.	4		+				+	
	Theory of algorithms	The aim of the course is to form systematic knowledge about the basic concepts of the theory of algorithms, basic definitions, properties and theorems; methods of formal representation of algorithms (Turing machines, Markov algorithms, recursive functions), the foundations of the theory of infinite sets, questions of finding effective procedures for enumerating objects of various nature; optimization problems on graphs, sorting algorithms and estimation of their complexity.								+
D13	Python in scientific research (in English)	The purpose of the course is to study the Python programming language, the library of standard modules and the principles of developing software systems; to form the knowledge about the standard modules of the language, the practical skills in the use of built-in objects, knowledge about structures and Python libraries for analyzing, processing and visualizing data (NumPy, Pandas, Matplotlib, Tkinter, PyQT); creating applications for solving applied problems.	4				+			+
	Building distributed systems in Java (in English)	The objectives of mastering the discipline are to gain knowledge about the modern object-oriented programming language Java; mastering the basic programming techniques, methods for creating console and visual platform programs, methods for developing and debugging Java code in the IntelliJ IDEA (or Eclipse IDE) development environment; obtaining practical skills in developing application programs in the Java language.					+			+
D14	Cryptology (in English)	The aim of the course is to study the cryptographic algorithms used in symmetric and asymmetric cryptosystems; formation of knowledge about the construction of a cryptosystem, mathematical modeling of cryptology; formation of skills for the implementation of basic number-theoretic algorithms in cryptographic applications; formation of skills in the use of mathematical methods of information protection and modern methods of analysis of cryptographic algorithms to ensure security.	5				+		+	

	<mark>Cryptology information security technology</mark>	The course is aimed at the formation of knowledge about the basic principles, methods and technologies for ensuring the protection of information in the process of its processing, transmission and storage using computer tools in information systems; formation of skills in the use of means and methods of information protection for the construction of secure information systems.							+	
D15	Web Application Development (in English)	The course is aimed at the formation of knowledge about modern trends and tools for the development of Web applications, about approaches to the design, development, debugging, optimization and deployment of Web applications with dynamic content (backend, frontend); the formation of practical skills for analyzing and formalizing requirements for a Web resource, designing the structure and design, frontend Web development-applications, implement the integration of mobile applications with Web applications.	4			+				+
	Software development for mobile devices	The course is aimed at the formation of knowledge about the main ways of creating interactive applications, about the life cycle of mobile application development; formation of practical skills in developing programs for mobile devices for Android using modern integrated tools; skills in creating user interfaces and controls in Android applications.								+
D16	Visualization in scientific research	The purpose of the course is to study the role of visualization tools in scientific research, the relation of the visualization course with related disciplines of computer graphics, computational geometry, pattern recognition, animation, mathematical and information modeling, visual programming; visualization methods and related basic algorithms of computer graphics and computational geometry for the presentation of scientific data, modern visualization tools and technologies.	4	+				+		
	Methods of analysis and visualization of big data	The purpose of the course is to form basic knowledge in the field of visualization of large amounts of data (Big Data), as a single scientific direction addressed to the problems of visual representation, teaching visualization methods used in different subject areas; formation of theoretical approaches to visualization and analysis of big data, and practical skills in using modern tools and technologies for visualizing Big Data.		+				+	+	

20. Coordination of the planned learning outcomes with the methods of teaching and evaluation within the module

Learning outcomes	Planned learning outcomes for the module	Teaching methods	Assessment methods
LO1	Owns the skills to analyze methodological problems that arise in solving research and practical problems, including in interdisciplinary areas; applies modern theoretical and practical research methods in order to create software intelligent systems, effective data analysis.	Interactive lecture, discussion	Test, colloquium, control tasks
LO2	Demonstrates current knowledge of modern history and philosophy of science, applied natural sciences, contributing to the implementation of the main directions of modernization of public consciousness.	Interactive lecture, discussion, panel discussion	Test, colloquium, control tasks
LO3	Applies in practice modern methods of analysis of innovative solutions to scientific and applied problems, planning and organization of processes of the life cycle of IP and ICT enterprise management, methods and models of commercialization of innovative technologies in the field of IT, owns methods of organization and effective management of IT projects.	Interactive lecture, discussion, panel discussion	Test, colloquium, control tasks, methodical portfolio
LO4	Owns mathematical, computer methods of analysis, modeling and visualization of data for solving scientific and applied problems in the IT field, designing and developing software, taking into account the requirements of information security.	Interactive lecture, round table, group work	Test, colloquium, portfolio, essay
LO5	Owns the ways and methods of planning the activities of the organization of education in accordance with the requirements of curricula, regulatory documents, taking into account the individual and special educational needs of students, the methodology of conducting training sessions.	Interactive lecture, discussion, group work	Test, colloquium, control tasks
LO6	Owns modern technologies and means of programming, testing, protection and documentation for the implementation of all stages of the software life cycle.	Interactive lecture, method of demonstration examples practical method of teaching; group work	Test, colloquium, control tasks
LO7	Proficient in English and translation techniques at the level of understanding the functional features of oral and written professionally oriented texts, including those of a scientific and technical nature.	Interactive lecture, method of demonstration examples practical method of teaching; group work	Test, colloquium, control tasks, software product

21. Criteria for assessing the achievability of learning outcomes

Codes of learning outcomes	Criteria
LO1	Knows: the subject of modern philosophy and its role in the history of human culture; the main stages in the development of world philosophical thought, schools and teachings, outstanding philosophers of the past and present. Can: establish cause-and-effect relationships in the history and philosophy of science, creatively apply historical knowledge in practice, use the categorical apparatus of thinking and philosophical methods of cognition for intellectual development. Owns: skills of theoretical and applied analysis of social processes
LO2	Knows: methodology for solving applied research and practical problems. Can: identify features, analyze the methodological problems that arise in solving applied problems; create software intelligent systems. Owns: the skills of analyzing methodological problems that arise in solving research and practical problems, including in interdisciplinary areas
LO3	Knows: the main provisions of normative and conceptual documents in the field of education, features of the educational process; requirements for the teaching profession. Can: apply methods and methods of planning the activities of an educational organization in accordance with the requirements of curricula, regulatory documents, taking into account the individual and special educational needs of students; apply various forms and methods for conducting training sessions; use innovative approaches in the educational process. Owns: the skills of designing and managing a holistic pedagogical process of educational organizations, methods of psychology in professional activities.
LO4	Knows: functional features of oral and written professionally oriented texts, including those of a scientific and technical nature; requirements and principles of academic writing; specialized terms of informatics and IT in English. Can: compose texts based on academic writing, apply foreign terminology in professional communication; compose annotations of scientific articles and state the main content of texts according to the profile into the native language / from the native language. Owns: the technique of translating a professionally oriented text, including a scientific and technical one; methods of objective interpretation and critical evaluation from the standpoint of intercultural dialogue.
LO5	Knows: the concept of innovation and the innovation process, the basics of the commercialization of innovative technologies in the field of IT and education, project management methodology, the structure and typical content of an IT project. Can: analyze and optimize the work plan and the cost of the project in the field of IT and education; draw up project documentation; apply information systems to solve practical problems of project management. Owns: methods for evaluating the effectiveness of innovative projects in the IT field and education, methods for analyzing project risks and determining measures to respond to them
LO6	Knows: technologies of analysis, modeling and visualization of data for solving applied problems, principles and requirements of

	information security.
	Can: apply specialized software packages for data analysis, modeling and visualization.
	Owns: methods of solving scientific and applied problems, planning and organizing the life cycle processes of IS and ICT enterprise management; mathematical and computer methods of analysis and visual presentation of data, taking into account the requirements of information security.
LO7	Knows: basic technologies for developing, testing and prototyping software, modern programming languages.
	Can: design and develop cross-platform applications, information systems for science, technology and education.
	Owns: methods and means of software development using modern programming languages.

22. The graduate model of the educational program

Graduate Attributes:
- High professionalism in the field of IT technologies
- Emotional intelligence
- Adaptability to global challenges
- Leadership
- Entrepreneurial thinking
- Global citizenship
- Understanding the principles and culture of academic integrity

Types of competencies	Description of competencies
Behavioural skills and personal competencies (Soft skills)	Improves and develops his intellectual and general cultural level, strives for the development and growth of personal qualities, creative abilities to achieve the chosen goals, revaluation of accumulated experience. The ability, based on deep knowledge of history and philosophy, relevant areas of natural sciences, to show a scientific worldview and a civic position in their professional activities
Professional competencies (Hard skills, Digital skills)	Willingness to apply technologies of organization, planning and management of the educational process of higher education, to analyze psychological conditions and especially management activities in order to improve the efficiency and quality of work in the education management system, to consolidate the acquired knowledge and skills in the process of pedagogical practice Willingness to solve real communicative tasks in certain situations of communication and professional activity through the studied language, to master professional terminology, to develop professionally significant skills and experience of foreign language communication in all types of real activity (reading, speaking, listening, writing) in the conditions of scientific and professional communication in the field of computer science The ability to apply methods of implementing scientific programs, projects and to commercialize the results of scientific and scientific-technical activities for conducting innovative research in the IT field Ability to apply modern technologies of software development, design and development of software products, information systems to solve problems of scientific and technological activities

	Ability to solve scientific and applied problems using mathematical and computer methods, development of applied software products and applications in compliance with information security requirements

Compilers:

Members of the working group:

Head of Department AMaI, PhD, Associate professor   A.B. Keldibekova

Professor of the Department AMaI   D.A. Kazimova

Associate professor of the Department AMaI   Ye.A. Spirina

Assistant professor of the Department AMaI   N. A. Gorbunova

Senior Lecturer of the Department AMaI   D.G. Aliyeva

Director of "Terricon Valley"   S.F. Niyazov

Master's student   A. Zholdasova

Notes:

The educational program was reviewed by the Faculty Council _____ 19.04.2024 ___ Protocol № 7

The educational program was considered at a meeting of the Academic Council from 29.04.2024 ___ Protocol № 5

The educational program was reviewed and approved at a meeting of the University Board 24.04.2024 Protocol № 8

Member of the Board, Vice-Rector for Academic Affairs   **M.M. Umurkulova**

Director of the Department for Academic Work   **T.M Khassenova**

Dean of the Faculty of Mathematics and Information tehnology   **A.O. Tanin**

EDUCATIONAL PROGRAM DEVELOPMENT PLAN

7M06101 Information Systems and Technology

The purpose of the Plan is to contribute to improving the quality of the conditions for the implementation of the educational program, taking into account the current requirements of the labor market and the achievements of modern science.

Target indicators

№	Indicators	Unit of measurement	2024-2025	2025-2026	2026-2027	2027-2028
1	**Human resources development**					
1.1	Increase in the number of teachers with academic degrees	Number of people	6	+1	+1	
1.2	Advanced training in the teaching profile	Number of people	2	+2	+2	+2
1.3	Involvement of practitioners in teaching	Number of people	-	-	-	+1
1.4	Other	Number of people				
2	**Promotion of the EP in the ratings**					
2.1	IQAA	Position	-	-	-	-
2.2	IAAR	Position	10	8	6	4
2.3	Atameken	Position	-	-	-	-
3.	**Development of educational and scientific-methodical literature, electronic resources**					
3.1	Textbooks	Number	-	-	-	-
3.2	Training manuals	Number	11	-	-	+1
3.3	Methodological recommendations/instructions	Number	-	-	+1	-
3.4	Electronic textbook	Number	-	+1	-	+1
3.5	Video/audio lectures	Number	-	-	-	-
3.6	Other	Number				
4.	**Development of educational and laboratory facilities**	Number				
4.1	Purchase of software products	Number	-	1	-	1

4.2	Purchase of equipment	Number	1	-	+1	-
4.3	Other	Number				
5.	**Updating the content of the EP**					
5.1	Updating the learning outcomes and the list of disciplines taking into account the requirements of the labor market, scientific achievements, professional standards	Year	+	-	-	+
5.2	Introduction to the EP of academic disciplines in foreign languages*	Year	+	+	+	+
5.3	Introduction of new teaching methods	Year			+	+
5.4	Opening of joint/two-degree program on the basis of the EP	Year				
5.5	Other	Year				

Head of the Department of Applied Mathematics and Computer Science   A.B. Keldibekova