«ІЛИЯС ЖАНСҮГІРОВ АТЫНДАҒЫ ЖЕТІСУ УНИВЕРСИТЕТІ» КЕ АҚ
НАО «ЖЕТЫСУСКИЙ УНИВЕРСИТЕТ ИМЕНИ ИЛЬЯСА ЖАНСУГУРОВА»
NP JSC «ZHETYSU UNIVERSITY OF THE NAME OF ILYAS ZHANSUGUROV»

БЕКІТІЛДІ/ УТВЕРЖДЕНА/ APPROVED
Басқарма отырысында/на заседании Правления/
at the meeting of Board /
Хаттама/ Протокол/ Protocol № 9 «10» 04 2024
Басқарма төрағасы – Ректор/ Председатель
Правления - Ректор/ Chairman of the Board-Rector
з.ғ.д., профессор Е. Бурибаев/
д.ю.н., профессор Е. Бурибаев /
d.l.s., Professor Y. Buribayev

БІЛІМ БЕРУ БАҒДАРЛАМАСЫ
ОБРАЗОВАТЕЛЬНАЯ ПРОГРАММА
EDUCATIONAL PROGRAM

6В06103 - Ақпараттық жүйелердің архитектурасы
6В06103 - Архитектура информационных систем
6В06103 - Architecture of information systems

БАКАЛАВРИАТ /
BACHELOR'S DEGREE

Талдықорған/ Талдыкорган/ Taldykorgan, 2024

6В06103-Ақпараттық жүйелердің архитектурасы жобалау білім беру бағдарламасы келесідей нормативтік құжаттарға сәйкес құрастырылды:

1. Қазақстан Республикасының 27.07.2007 ж. № 319-III бұйрығымен бекітілген «Білім туралы» Заңы;
2. ҚР Білім және ғылым министрінің 20.04.2011 ж. №152 бұйрығымен бекітілген Оқытудың кредиттік технологиясы бойынша оқу үдерісін ұйымдастыру қағидасы;
3. Қазақстан Республикасы білім және ғылым министрінің 20.07.2022 ж. № 2 бұйрығымен бекітілген Жоғары білім берудің мемлекеттік жалпыға міндетті стандарты;

Әзірлеушілер:

Білім беру бағдарламаларын әзірлеу бойынша Академиялық комитет төрағасы		Тукенова Наталья Иембергеновна, п.ғ.к., ақпараттық-коммуникациялық технологиялар бойынша білім беру бағдарламасының жетекшісі 8 705 671 7788, t.natalia_66@mail.ru
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Академиялық персонал		Серіков Бағдат Берікұлы, техникалық ғылымдар жоғары мектебінің оқытушы-ассисенті 8 707 233 4212, serikov.bagdat@mail.ru
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Білімгер-кеңесшілер (студент/магистрант/докторант)		Балтабаева Аружан, техникалық ғылымдар жоғары мектебі «Ақпараттық жүйелердің архитектурасы» білім беру бағдарламасының 3 курс студенті 8 775 496 7027aruzhan.baltabaeva00@mail.ru

Білім беру бағдарламасы талқыланды және бекітуге ұсынылды:

Университеттің Академиялық Кеңесі
Хаттама № 7 «26» 03 2024 ж.
Университеттің Академиялық Кеңесі төрағасы _____ Б. Таубаев

Техникалық ғылымдар жоғары мектебінің Кеңесі
Хаттама № 8 «25» 03 2024 ж.
ТҒЖМ Деканы _____ Е. Андасбаев

Техникалық ғылымдар жоғары мектебінің Академиялық комитеті
Хаттама № 7 «20» 03 2024 ж.

Техникалық ғылымдар жоғары мектебінің Академиялық комитеті төрағасы
_____ Г.Сеитова

1. PASSPORT OF THE EDUCATIONAL PROGRAM

1.1 Context

Registration number: 6B06100154

Code and classification of the domain of education: 6B06 Information and communication technology

Code and classification of the direction of preparation: 6B061 Information and communication technology

Group of educational programs: B057 Information technology

Name of educational program: 6B06102- "Information Systems"

Type of EP: current / modern / innovative

Program type: First cycle: baccalaureate level 6 NQF / ORC / ISCED

Degree awarded: Bachelor in Information and Communication Technologies in the educational program "6B06102-Information Systems"

Total credits: 240 academic credits

The typical duration of training: 4 years

Language of study: Kazakh, Russian, English

License to engage in educational activities: The Educational program is implemented on the basis of the Appendix to the License №KZ36LAA00018662 (018) dated August 24, 2020 in the direction of training 6B061- Information and communication technologies, issued by the Committee for control in the field of education and science of the Ministry of education and science of the Republic of Kazakhstan.

Accreditation:

1) ***Institutional accreditation:*** An Independent Agency for quality assurance in education, certificate number IA-A No. 0101 dated 22.04.2019, period of validity of accreditation 22.04.2019-19.04.2024;

2) ***Specialized accreditation:*** The International accreditation Agency ACQUIN, expiration date of accreditation and 27 June 2023 – 30 December 2024.

EP rating:

NAOCO – 6/11 (39%) (2020)

«Atameken» –57/58, (2023)

Professional standards for the development of OP:

Professional standards developed by the National chamber of entrepreneurs of the Republic of Kazakhstan " Atameken» :

1. Professional standard «Software testing».
2. Professional standard "System analysis in information and communication technologies".

Professional standard "System and network administration".

1.2 Place of NJSC "Zhetysu University named after Ilyas Zhansugurov" in the system of higher and postgraduate education of the Republic of Kazakhstan

Zhetysu University named after Ilyas Zhansugurov is a large regional multidisciplinary university of the Zhetysu region, which provides three-stage training (bachelor's, master's and doctoral PhD) in a wide range of specialties.

Mission: Training competitive personnel that satisfies the industrial and innovative development needs of both Zhetisu region and Republic of Kazakhstan.

Strategic goal:

1. Providing high-quality training of competitive personnel;

2. Modernization of the content of higher and postgraduate education in the context of global trends.

Positions of the university in national and international rankings:

- 4th place in the national ranking of multidisciplinary universities of the Republic of Kazakhstan (NAOKO) - 2022;

- TOP-241-250 best universities in developing Europe and Central Asia in the regional QS World University Rankings: Emerging Europe and Central Asia 2021;

- 6th place among 95 universities of the Republic of Kazakhstan in the ARES rating.

1.3 Profile of the educational program

Rationale: Information technologies is a driving force of the modern digital economics. Due to this fact the IT specialists are widely accepted on the labor market. Organizations and establishments of various forms of ownership are based their activities on IT departments which automate all kinds of activity and support its presence in the Internet sphere.

Labor market research in accordance with employers' requests: Information systems are used by organizations for different purposes. They increase productivity by helping to do work better, faster and cheaper, functional efficiency, helping to make the best decisions. Information systems improve the quality of services provided to customers and clients, help to create and improve products. They make it possible to consolidate customers and alienate competitors, change the basis of competition by changing components such as price, cost and quality. Information systems at the moment are indispensable for running small businesses, managing larger organizations (corporations, holdings), and of course for managing the state. All this confirms that this educational program is relevant. Advanced technological solutions are used in various fields of industry and the need for IT specialists is constantly growing. The educational program 6B06102- "Information Systems" provides competitive career prospects.

The purpose of the educational program: the training of qualified specialists who know high-performance methods of information processing and who know how to apply their knowledge in the field of information systems with practical skills and leadership qualities that meet modern requirements for the quality of specialists with higher education.

Distinctive features of the program

Area of professional activity	- creation and administration of information systems that automate the tasks of organizational management of commercial companies and budgetary institutions; - analysis of requirements for information systems and business applications; - a set of methods and tools for developing information systems; - implementation of design specifications and architecture of business application; - regulations for modification, optimization and development of information systems.
Objects of professional activity	design and research institututions, automated production of industrial enterprises, telecom companies, government bodies, law enforcement agencies, information technology departments, financial organizations, business structures, educational organizations, educational institutions, industrial production
Branch of the EP	Future-IT School of Robotics IT Hub LLP «Kainar-Media» LLP «Design Institute named Zh.R. Dzhanekenov »
Base of practice	JSC "KazPost" JSC "Kainar" LLP «TV channel Zhetysu» LLP «Design Institute named Zh.R. Dzhanekenov » LLP «ASTEL»
Academic mobility	Partner universities:University of Lodz, Lodz (Poland); Yaroslavl State Pedagogical University named after K. UshinskyYaroslavl (Russia); Omsk State Pedagogical University Omsk

	(Russia); Palacky University, r. Olomouc (Check Republic)
Scholarship programs	State educational order, grant of local executive bodies

1.4 Profile of the graduate

Graduate attributes according to Dublin Descriptors:

1) demonstrate knowledge and understanding in the field of study based on advanced knowledge in the field of study;

2) apply knowledge and understanding at a professional level, formulate arguments and solve problems in the field of study;

3) collect and interpret information in order to form opinions with due regard to social, ethical and scientific considerations;

4) apply theoretical and practical knowledge for solving practical and professional tasks in the field under study;

5) learning skills necessary for independent further study in the field under study;

6) know scientific research and academic writing methods and apply them in the field under study;

7) apply knowledge and understanding of facts, phenomena, theories and complex dependencies between them in the field under study;

8) understand the meaning of principles and culture of academic honesty.

Graduates competences due to EP:

KC 1 - Have a sufficient outlook in the field of general education disciplines and be able to take them into account when making decisions in professional activities.

KC 2 - Know, understand the basic provisions of the social sciences and is able to apply them in their professional activities.

KC3 - Ability to communicate on general and professional topics and has writing skills in a multilingual environment.

KC4 - To be able to develop and debug efficient algorithms and programs using modern programming technologies.

KC5 - Know government regulations, orders, orders, standards, regulations in the design, implementation and maintenance of information systems.

KC6 - The ability to demonstrate basic knowledge in the field of natural sciences and the willingness to use the basic laws in their professional activities, to apply the methods of mathematical analysis and modeling, theoretical and experimental research.

KC7 - To be able to design and implement mathematical, linguistic, informational, software and technical support of information systems based on modern methods, tools and design technologies, including using computer-aided design systems;

KC8 - The ability to exploit and maintain information systems and services and to carry out testing of information system components according to specified scenarios.

KC9 - Use operating systems, network technologies, software development tools and software interfaces, the use of languages and methods of formal specifications, database management systems.

KC10 - To be able to analyze own and foreign experience in the development and implementation of information systems;

CC11 - The ability to plan and implement measures to ensure the information security of the organization.

KC12 - The ability to set and solve applied problems using modern Internet technologies.

KC13 - To use the methods of managing the processes of developing requirements, assessing the risks of acquisition, design, construction, testing, evolution and maintenance of information systems.

KC14 - To be able to apply the basic processes, methods and tools for the development of information systems and software.

KC15 - Ability to work with information: to find, evaluate and use information from various sources, necessary for the effective performance of professional tasks, professional and personal development.

KC16 - To know the latest means of information technology and apply them in their professional activities.

KC17 - Have the skills of choosing the architecture and integration of the hardware of information systems.

Upon completion of the study of the compulsory disciplines of the GED cycle, the student will be able to:

1) assesses the surrounding reality on the basis of worldview positions formed by knowledge of the fundamentals of philosophy, which provide scientific understanding and study of the natural and social world by methods of scientific and philosophical cognition;

2) interprets the content and specific features of the mythological, religious and scientific worldview;

3) argues his own assessment of everything that is happening in the social and industrial spheres;

4) shows a civic position based on a deep understanding and scientific analysis of the main stages, patterns and peculiarities of the historical development of Kazakhstan;

5) uses methods and techniques of historical description to analyze the causes and consequences of events in the history of Kazakhstan;

6) assesses situations in various spheres of interpersonal, social and professional communication, taking into account basic knowledge of sociology, political science, cultural studies and psychology;

7) synthesizes knowledge of these sciences as a modern product of integrative processes;

8) uses scientific methods and techniques of research of a specific science, as well as the entire socio-political cluster;

9) develops his own moral and civic position;

10) operates with social, business, cultural, legal and ethical norms of the Kazakh society;

11) demonstrates personal and professional competitiveness;

12) applies in practice knowledge in the field of social sciences and humanities, which has worldwide recognition;

13) selects methodology and analysis;

14) summarizes the results of the study;

15) synthesize new knowledge and present it in the form of humanitarian socially significant products;

16) enters into communication in oral and written forms in Kazakh, Russian and foreign languages to solve the problems of interpersonal, intercultural and industrial (professional) communication;

17) carries out the use of language and speech means based on the system of grammatical knowledge; analyze information in accordance with the communication situation;

18) assesses the actions and actions of the communication participants.

19) uses various types of information and communication technologies in personal activities: Internet resources, cloud and mobile services for the search, storage, processing, protection and dissemination of information;

20) builds a personal educational trajectory throughout life for self-development and career growth, focus on a healthy lifestyle to ensure full-fledged social and professional activities through methods and means of physical culture;

21) knows and understands the basic laws of the history of Kazakhstan, the basics of philosophical, socio-political, economic and legal knowledge, communication in oral and written forms in Kazakh, Russian and foreign languages;

22) applies the acquired knowledge for effective socialization and adaptation in changing socio-cultural conditions;

23) has the skills of quantitative and qualitative analysis of social phenomena, processes and problems.

Learning outcomes:

LO1 - Shows an active civil position in interpersonal and intercultural communication in a multilingual environment based on fundamental knowledge and skills in the field of social, political, cultural, psychological sciences in the context of their role in the modernization and digitalization of Kazakhstani society.

LO2 - To have the ability to evaluate and apply innovative approaches to understanding socially significant phenomena and processes in the legal, business, industrial, ecological environment.

LR3 - To know modern models, methods and technologies of database management and design of information systems.

LR4 - To be able to build mathematical and physical models, set mathematical and physical problems, conduct high-quality mathematical and physical research, develop practical recommendations based on the analysis carried out.

LR 5 - Know the basic foundations for the development of specifications for software systems, typical methods for designing algorithms and the basic techniques for their design; owns programming tools and environment, modern programming technologies.

LR6 - Possess the skills of planning, design, implementation and operation of telecommunication networks and systems, their technical, informational and software support.

LR7 - To use computer technologies in the field of design, development, diagnostics of cybernetic, intelligent robotic systems and complexes for industrial and research purposes.

LR8 - To use the skills of professional knowledge in the field of computer science, information technology, information security and data protection.

LR9 - To apply various types of information and communication technologies in professional activity: Internet resources, cloud and mobile services for the search, storage, processing, protection and dissemination of information.

LR10 - To speak a foreign language at the level of social and professional communication, applies special vocabulary and professional terminology of the language.

LR11 - Analyze our own and foreign experience in the development and implementation of information systems, interacting with experts in other subject areas in the design and development of information systems.

Employment opportunity:

The graduate has the opportunity for employment in such organizations and institutions as: in the banking sector; in telecommunications and communications; in the energy industry; in the public sector; in educational institutions; in private companies.

2. THE CONTENTS OF THE EDUCATIONAL PROGRAM

2.1 Modules description

№ Module	Code and name of the module	№ and name of the discipline	Number of credits	Cycle of disciplines	Generated module learning outcomes
1.	SH -1 «Social humanitarian»	History of Kazakhstan	31	GED	To assess situations in various areas of interpersonal, social and professional communication, taking into account the basic knowledge of sociology, political science, cultural studies and psychology; to build a personal educational trajectory throughout life for self-development and career growth, to focus on a healthy lifestyle to ensure full-fledged social and professional activities through methods and means of physical culture.
		Social and Political knowledge module (Sociology, Cultural studies, Political science, Psychology)		GED	
		Philosophy		GED	
		1) Economics and entrepreneurship 2) Ecology and life safety basics 3) Basics of law and anti-corruption culture 4) Methods of scientific research 5) Ilyastanu 6) Fundamentals of financial literacy		GED	
		Physical training		GED	
2.	IC-2 «Informational and communicative»	Foreign language	25	GED	Use various types of information and communication technologies in personal activities: Internet resources, cloud and mobile services for searching, storing, processing, protecting and distributing information; enter into oral and written communication in Kazakh, Russian and foreign languages to solve problems of interpersonal, intercultural and industrial (professional) communication.
		Kazakh (Russian) language		GED	
		Information and communication technology		GED	
3.	AP-3 "Algorithmization and programming"	Algorithm, data structures and programming	27	BD	Development of algorithmic thinking necessary for professional activity in modern society; development of skills to compose and record an algorithm for a concrete
		1) Java programming 2) Kotlin programming		BD	

		Advanced programming in Python		MD	performer; formation of knowledge about algorithmic constructions, logical meanings and operations; familiarity with one of the programming languages and basic algorithmic structures — linear, conditional and cyclic;
		1) Technological programming in C/C++ 2) C#. High-level programming		BD	
		1) Programming in 1C 2) Introduction to data analysis		BD	
		Educational practice		BD	
4.	SEMEP-4 "Skills of effective management of the educational process"	Professional term in the field of information technologies (in English)	10	BD	Use methods for evaluating the effectiveness of research activities; search for information for all stages of the preparation of research work; develop a methodology for ongoing research; use current standards in professional activities; correctly select methods of scientific research; own methods of information retrieval for the preparation of research papers; Use the methods of planning and conducting the experiment; Use and develop: e-courses; professional terms in the field of information technology
		1) Methodology writing scientific publications/ 2) Development of electronic courses		BD	
5.	APSK-5 Hardware and software tools and complexes	The basis of information systems	51	BD	Use the basic laws of natural sciences in professional activities, apply the methods of mathematical analysis and computer modeling, theoretical and experimental research; Analyze the working situation, carry out current and final control, evaluate and correct their own activities, be responsible for the results of their work;
		1) Modeling of information processes and systems 2) Mathematical and computer modeling		BD	
		1) Architecture of computer systems 2) PC hardware		MD	
		Basics of artificial intelligence		BD	
		1) Programming in the ARDUINO environment 2) Intelligent Robotic Systems		BD	
		Innovative technologies of protection of digital information		BD	
		1) Computer networks 2) Computer complexes, systems and networks		MD	
		1) Neural networks in information technology		MD	

		2) Intellectual Data Mining Technologies			
		1) Introduction to WindowsAPI 2) Operating systems, environments and shells		BD	
		1) Digital processing of video and audio information 2) Hardware and software video editing		MD	
6.	DaMBD-6 «Development and management of basic data»	Projection of information systems	20	BD	Know modern database design methods, modern software products necessary for building databases of complex organizational systems, modern database management systems, theoretical foundations and basic principles for creating databases of information systems; Be able to use modern database design software, use database design automation tools, design, administer and use databases in the environment of selected target DBMS; Own the methodology and methodology for conducting a study of the information model of an enterprise, the skills of independent work on managing modern DBMS;
		1) Databases in information systems 2) Network database management systems		MD	
		1) Information system architecture development tools 2) Database Application Design Basics		MD	
		Industrial Practice		MD	
7.	IT-7 "Internet technology"	WEB- technologies	14	MD	Use Internet resources in professional activities. formation of networking skills with Web-resources and Web-services; formation of ideas about the structure and principles of functioning and development of modern Web-resources; familiarization with the main methods of modern Web-technologies in professional activities, as well as with decision support tools and the possibilities of their application in the tasks of managing enterprise information resources.
		1) JavaScript programming 2) Programming in PHP		MD	
		Educational practice		BD	
8.	ITVIS-8 "Innovative technologies in	1) Digital animation technology 2) Modeling in 3D Max	44	BD	Use methods and means of computer graphics and geometric modeling; use modern

	information systems"	1) Vector and raster graphics 2) Ingeering and computer graphics		BD	software in the field of computer graphics development; basic techniques for creating and editing images in vector editors; skills in editing photorealistic images in raster editors; Process audio and visual content using sound, graphic and video editors; Create and play videos, presentations, slide shows, media files and other final products from the original audio, visual and multimedia components using a personal computer and multimedia equipment. Characterize usage representation and class diagrams in UML; Interpret program algorithm in UML; construct classes in a programming language; Design and develop software module for mobile platforms
		1) Development of web and multimedia applications 2) Development of interactive multimedia applications		MD	
		1) Creating mobile applications in Java 2) Mobile application development		MD	
		Industrial Practice		MD	
		Undergraduate or Industrial practice		MD	
		Writing and defending a thesis (project) or passing a comprehensive exam		FC	
9.	PMBCT-9 "Physico-mathematical base of computing technologies"	Computational mathematics in digital systems	18	BD	Apply calculation methods to solve typical problems of the professional field with bringing the solution to a practically acceptable numerical result; navigate the mathematical apparatus of the professional field, build a mathematical model of the object (phenomenon) under study; correctly formulate a computational problem mathematically, analyze its properties, reasonably choose the optimal numerical solution method, analyze the properties of the algorithm; implement numerical algorithms for solving computational problems, bring solutions to a numerical result, analyze the resulting solutions.
10.		1) Scheme technique 2) Physical and logical foundations of digital technology		BD	
11.		1) General physics 2) Computational physics		BD	
12.		1) Theory of electrical circuits 2) Applied Physics		BD	

2.2 Information about disciplines

№	Name of the discipline	Brief description of the discipline (30-50 words)	Number of credits	Formed learning outcomes (codes)
Cycle of general education disciplines ***compulsory component***				
1.	History of Kazakhstan	The purpose of the discipline is to provide objective knowledge about the main stages of the development of the history of Kazakhstan from ancient times to the present. Forms knowledge and understanding of the main stages of the development of the history of Kazakhstan; the ability to correlate the phenomena and events of the historical past with the general paradigm of the world-historical development of human society through critical analysis; skills of analytical and axiological analysis in the study of historical processes and phenomena of modern Kazakhstan; the ability to objectively and comprehensively comprehend the immanent features of the modern Kazakh model of development; to systematize and give a critical assessment of historical phenomena and processes of the history of Kazakhstan.	5	LO1
2.	Philosophy	The goal is to form an understanding of philosophy as a special form of cognition of the world and to give a holistic view of its main chapters, problems and methods in the framework of their future professional activities. Studies the specifics of philosophical understanding of reality. Explains the role and significance of key worldview concepts as values of social and personal existence of a person in the modern world; analyzes socio-cultural and personal situations to justify and make ethical decisions. Forms the ability to classify the methods of scientific and philosophical knowledge of the world; formulate and competently argue their own moral position in relation to the current problems of modern global society.	5	LO 1
3.	Information and communication technology	The goal is to develop the ability to critically evaluate and analyze processes, methods of searching, storing and processing information, ways of collecting and transmitting information through digital technologies. Forms the ability to critically understand the role and significance of modern information and communication technologies in the era of digital globalization and the formation of a new "digital" thinking, knowledge and skills of using modern information and communication technologies in various activities.	5	LO 1

4.	Social and Political knowledge module (sociology, cultural studies, political science, psychology)	The purpose of the discipline is to form the socio-humanitarian worldview of students in the context of solving the problems of modernization of public consciousness, strengthening the values of tolerance, intercultural dialogue. Formation of students' ideas about the basic principles of functioning of modern society and its social and political institutions, understanding of the main stages of development of culture of Kazakhstan. To develop students' skills of independent analysis of modern realities and trends in the development of society, assessment and forecasts. Instilling the skills of using the knowledge gained in the process of mastering the disciplines of the socio-political module in professional activity; the formation of critical thinking skills and the ability to apply it in practice.	8	LO 1
5.	Foreign language	The goal of this discipline is the formation of intercultural and communicative competence of students in the process of foreign-language education at a sufficient level (A2, European competence) and the level of basic sufficiency (B1, European competence). Depending on the level of training, the student at the time of completion of the course reaches the level of B2 European competence with the presence of the language level of the student at the start above the level of B1 European competence.	10	LO 1
6.	Kazakh (Russian) language	The purpose of the discipline is to ensure high - quality mastery of the Kazakh language from the point of view of national culture as a means of social, intercultural, professional communication by forming communicative competence in all types of speech activity in accordance with the qualification level A2, B1, B2, C1 for students studying the Kazakh language as a foreign language at the basic level A1. Establishes communication in oral and written forms in the Kazakh language to solve the tasks of understanding the lexical and grammatical system, information in the text, social and household, cultural, socio-political, professional, personal communication	10	LO 1
7.	Physical training	Studies the features of physical culture and sports. Reveals the main forms of physical culture in the educational and extracurricular time. It is aimed at the formation of a healthy lifestyle, personality of the student, his physical perfection and self-regulation	8	LO 1
Cycle of general education disciplines ***Optional component***				

8.	Economics and entrepreneurship	The purpose is to familiarize students with the economic problems of modern society, the formation of economic thinking and gaining knowledge in the field of theoretical foundations and practical skills in the field of entrepreneurship. It is focused on the formation of students' comprehensive understanding of the laws of the functioning of the economy, obtaining business education aimed at acquiring applied competencies in various fields of entrepreneurial activity, reveals the features of creating and successfully running their own business.	5	LO 2
	Ecology and life safety basics	Purpose – to form knowledge on the basics of ecology and life safety, allowing to analyze environmental processes, assess the socio-ecological consequences of anthropogenic activities, methods and technologies of protection in emergency situations. Develops skills to assess the impact of environmental factors on human health; predict environmental processes for planning and implementing measures to improve life safety; make decisions in adverse environmental and emergency situations, taking into account the possible consequences of accidents, catastrophes, natural disasters.	5	LO 2
	Basics of law and anti-corruption culture	The aim is to familiarize students with the main branches and institutions of law, the basics of an anti-corruption culture, as well as the laws of the emergence, development and functioning of the state and law. The course forms the skills of an anti-corruption culture and a high level of theoretical knowledge about the main functions of law in the state and society, its impact on the development of law-based state, civil society.	5	LO 2
	Methods of scientific research	The goal is to form knowledge about the principles, technologies, practical methods and techniques of conducting scientific research based on modern achievements of scientists. Forms the basic foundations of scientific culture and ethics, flexible perception of scientific texts, skills of effective application of acquired knowledge in planning and organizing research work, the ability to analyze and summarize research results.	5	LO 2
	Ilyastanu	The purpose of the discipline is to develop a deep-thinking personality with high aesthetic taste, appreciating literature, art, traditions, culture and language of the Kazakh people through a deep and comprehensive study of the works of Ilyas Zhansugurov. Forms an understanding of the importance of the works of Ilyas Zhansugurov in the development of the Kazakh literary language; skills of intellectual and creative thinking, the ability to cherish the values of national and spiritual heritage.	5	LO 2

	Fundamentals of Financial Literacy	The course "Fundamentals of Financial Literacy" is aimed at gaining knowledge and skills in the field of personal finance management. Also, as part of the course, students will learn how to use in practice all kinds of tools in the field of finance, save and increase savings, plan a budget competently, learn how to analyze financial information and navigate financial products to choose an adequate investment strategy.	5	LO 2
Cycle of basic disciplines University Component				
1.	Algorithm, data structures and programming	The discipline studies the basic concepts of algorithms, the basic structures of algorithms, the concept of a structural approach to the development of algorithms, as well as the basic concepts of programming, the use of subprograms in the development of programs, algorithmic languages, the purpose of an algorithmic language and its requirements, the concept of procedurally oriented languages.	5	LO 5
2.	Computational mathematics in digital systems	The course studies the basic concepts of higher mathematics and their applications within this discipline. Contributes to the development of mathematical intuition, education of mathematical culture, the ability to use the learned techniques and methods to solve specific problems.	5	LO 4
3.	Professional term in the field of information technologies (in English)	He studies English with the necessary and sufficient level of communicative competence, which will allow him to use a foreign language in various areas of the official business sphere, professional activity, in scientific and practical work, in communication with foreign partners, for self-education and other purposes.	5	LO3
4.	Information systems design	He studies information technologies for the analysis of complex systems and based on international standards for the design of information systems, teach students the principles of building functional and information models of systems, analyzing the results obtained, using tools to support the design of information systems.	5	LO 11 LO3
5.	Innovative technologies of protecting digital information	Studying ways of organizing information protection in computer networks; means of protecting data from the destructive effects of computer viruses; basic software methods for protecting information when working with computer systems and organizational measures and techniques for anti-virus protection.	5	LO8
6.	Basics of artificial intelligence	The discipline is aimed at studying the basic concepts, methods and algorithms that underlie the creation and application of artificial intelligence. As part of this course, students will learn the theoretical foundations of machine learning, neural networks, natural language processing algorithms, and computer vision. They will also	5	LO7

		get acquainted with the ethical, social and legal aspects of the application of artificial intelligence in various areas of life.		
7.	Basics of information systems	Studies the basic models of information processes, the organization of information processes at the physical and channel levels, studies modern methods and models building information systems of various types. Forms students' special knowledge in the field of building models and methods for developing information systems of various classes and purposes.	5	LO11
Cycle of basic disciplines ***Optional component***				
1.	Java Programming	Studying the basic concepts, types and characteristics of modern Java technology software; basic concepts of the Java platform; various methods of classification and design principles of modern operating systems; NetBeans development environment; features of the Java object-oriented language; basic user interface objects; basic techniques for working with packages.	5	LO5
2.	Programming in Kotlin	The course is dedicated to learning the Kotlin programming language, an advanced language for designing various kinds of applications. The basic principles of imperative (a program as a sequence of commands, composing expressions, assigning to variables) and structural (what parts a program consists of, in what sequence and how they are executed) programming are given, as in the study of other languages.	5	LO5
3.	General physics	This discipline is the fundamental science of nature. Students will study the natural scientific method of cognition, its possibilities and limits of applicability. Students learn to conduct experiments in the process of learning about nature.	4	LO 4
4.	Computational Physics	When studying this discipline, students will study the modeling of physical phenomena and processes, the role of experiment and theory in the process of understanding nature, physical quantities, measurement errors of physical quantities, physical laws, the limits of applicability of physical laws, the concept of the physical picture of the world.	4	LO 4
5.	Methodology of writing scientific publications	The main content of the course reflects the competency-based orientation of preparing students for active participation in modern intellectual technologies, which involves the possession of the skills and abilities of research activities, from the preparation of writing a scientific article to writing a scientific work and up to its public defense, as well as in connection	5	LO 3

		with the search for sources of funding for various research projects.		
6.	Development of electronic courses	The discipline is aimed at studying the methods of preparation and use of electronic courses in the educational process; technologies for the collective creation and sharing of electronic documents and audio-video materials for their use in the educational process and scientific research.	5	LO 3
7.	Theory of electrical circuits	The purpose of studying the course "Theory of electrical circuits" is the theoretical and practical training of specialists for activities related to the analysis, design, development and use of electronic equipment to ensure the information security of telecommunication systems.	4	LO 4
8.	Applied Physics	The purpose of the course "Applied Physics" is the formation of the personality of a future specialist, mastering the scientific method of cognition; mastering the basics of modern general and experimental physics, the scientific method of cognition; the development of students' skills of independent learning activities, the development of their cognitive needs.	4	LO 4
9.	C/C++ Programming Technologies	When studying the discipline, students will acquire the skills to develop complex programs using modern tools for describing and supporting projects at an abstract level, master modern technologies for creating programs in a procedural-oriented language using object-oriented programming methodology.	5	LO5
10.	C#. Programming in a high level language	When studying the discipline, students will acquire the skills to develop complex programs using modern tools of the high-level C# language, master modern technologies for creating programs in the C# programming language, and will be able to test and verify programs.	5	LO5
11.	Modeling of information processes and systems	The discipline considers the main classes of models and modeling methods, the principles of building models of information processes, methods of formalization, algorithmization and implementation of models using modern computer tools; methods for conducting computational experiments using simulation techniques.	5	LO6
12.	Mathematical and computer modeling	The discipline gives students an idea about modeling as a method of scientific knowledge, about using a computer as a research tool. Considers the basic concepts and properties of models; general principles of computer modeling; model building technology.	5	LO4
13.	Circuit design	Studying the principles of construction,	5	LO6

		functionality, methods of development and use of modern microelectronic products; acquisition of skills in the design of integrated circuits for special purposes; studying the basics of using various types of microcircuits in industrial electronics devices.		
14.	Physical and logical foundations of digital technology	The principles of operation of information and computing systems are considered, starting with the basic logical functions and elements, logic circuits, and the principles of their minimization. Further, information is provided on the functional orientation logic circuits - decoders and multiplexers - and the principles of their cascade connection. Separately, memory circuits are considered from the circuit of the simplest trigger to the register, register memory, to circuits of a semiconductor memory device based on LSI and VLSI. In addition, counting circuits are considered: counters and adders.	5	LO6
15.	Digital Animation Technologies	Introduces the student to the basic digital technologies needed to implement projects in various areas of design. Forms the initial skills of using application programs in the field of raster, vector and 3D graphics; animations; video and audio editing; web design, presentation graphics, etc.	5	LO 11
16.	Modeling in 3D Max	Considers the basics of modern three-dimensional graphics and animation, their development of the principles of work and the basics of modeling. An important task of mastering the discipline is to obtain solid knowledge and acquire skills in the use of new technologies for collecting and processing spatial data, creating three-dimensional objects.	5	LO11
17.	Vector and bitmap graphics	Provides theoretical study and practical development of the basics of computer graphics, the study of computer technologies for processing graphic information, since The professional activity of a modern specialist in the field of information technology is associated with the widespread use in practice of various methods of computer processing of graphic information.	5	LO11
18.	Engineering and computer graphics	The discipline includes three sections: descriptive geometry, engineering graphics and computer graphics. In descriptive geometry questions about the subject and method of descriptive geometry are considered. Engineering graphics considers issues of design documentation, drawings. In the section on computer graphics, work in the graphics program AutoCAD is studied.	5	LO11
19.	Introduction to Windows API	The discipline studies architecture, configuration and administration in the WindowsAPI	5	LO6

		environment, as well as practical skills in creating (configuring) a computing environment for implementing business processes in corporate networks (intranets) of enterprises.		
20.	Operating systems, environments and shells	t will acquaint students with theoretical knowledge about the principles of construction and architecture of modern operating systems and environments (including distributed ones) that ensure the organization of computing processes in corporate information systems for economic, managerial, industrial, scientific and other purposes.	5	LO6
21.	Programming in the ARDUINO environment	The discipline is aimed at gaining knowledge and skills in the field of microcontroller programming. System analysis of the applied area, formalization of solving applied problems and processes of information systems; development of projects for automation and informatization of applied processes and creation of information systems in applied areas; performing work on the creation, modification, implementation and maintenance of information systems and managing these works.	5	LO7
22.	Intelligent Robotic Systems	The discipline is devoted to the basics of the theory and methodology for creating intelligent systems and robotic complexes. The course outlines the foundations of the theory of intelligent systems: knowledge representation, methods of finding solutions. Methodology and examples of creation of expert systems are given. The fundamentals of the theory of image recognition and image recognition systems, communication with computers in natural language and speech communication systems are considered.	5	LO7
23.	Programming in 1C	In this course, in clear and simple language, you will receive the necessary information for a novice 1C programmer. The course introduces the installation process of "1C:Enterprise 8.0", the basics of administration, gives a general idea of working with the main objects of "1C:Enterprise 8.0" and the built-in language of the system	5	LO5
24.	Introduction to data analysis	This course focuses on all stages of solving Data Analysis problems. The course covers the basics of mathematical algorithms for data analysis so that students can choose the right tools; introduces students to methods for analyzing one-dimensional, two-dimensional and multi-dimensional data.	5	LO4
Cycle of profile disciplines ***University Component***				
1.	WEB technologies	Teaches networking skills with Web resources and Web services; forms ideas about the structure and	6	LO9

		principles of functioning and development of modern Web-resources; introduces the main methods of modern Web-technologies in professional activities, as well as decision support tools and the possibilities of their application in the tasks of managing enterprise information resources.		
2.	Advanced Python Programming	The course allows you to master the basics of programming in the Python language, from the basics and simple programs to building projects that use various programming styles - functional, modular, object-oriented. The functions and functional style of programming and the creation of complex projects in the form of a set of interacting modules, the creation of your own library of useful services, the possibility of creating projects in an object-oriented style, the rules of high-quality programming, the correctness and stability of created projects, the issues of correct exception handling, iterators, generators are considered. , decorators.	5	LO5
Cycle of profile disciplines ***Optinal component***				
1.	Computer Systems Architecture	Introduces the basic concepts and basic principles of building architectures of computing systems; types of computing systems and their architectural features; organization and principles of operation of the main logical blocks of computer systems; information processing processes at all levels of computer architectures.	6	LO6
2.	PC hardware	This course provides a detailed introduction to the IT industry and an in-depth study of personal computers, hardware and operating systems. Students learn the operation of various hardware and software components and the best practices for routine maintenance, protection and safety. In practical laboratory classes, students learn to assemble and configure computers, install operating systems and software, and troubleshoot hardware and software.	6	LO6
3.	Computer networks	Acquaints with the technologies for integrating local networks into the global Internet and data transmission in the global network; functionality of communication equipment and technologies for their implementation; means of traffic analysis in networks and methods of its minimization; the basics of designing local networks and their integration into global networks.	5	LO6
4.	Computing complexes, systems and networks	He studies systematized information about the structure and principles of operation of computer systems for various purposes, about methods for studying computer systems, about the basics of their design. Systematizes knowledge and skills in	5	LO6

		computing and programming through the study of various parallel computing architectures.		
5.	Development of web and multimedia applications	The course includes the study of technologies and tools necessary to create audio and video materials, 2D and 3D graphics, animation, interactive applications and games. Upon completion of the program, students will be able to develop and implement a multimedia project from idea to implementation, and also have the opportunity to find work as multimedia specialists in various companies developing websites, mobile applications, games and other multimedia products.	5	LO5
6.	Development of interactive multimedia applications	During the development of the course "Development of interactive multimedia applications", students receive general information about the basic elements of multimedia; a set of requirements for the characteristics of hardware and multimedia tools; stages of multimedia project development; tools for authoring multimedia systems; protocols and specifications used in Web applications; languages and tools for developing dynamic Web applications	5	LO5
7.	Databases in information systems	The discipline will introduce students to the basics of database design methodology: conceptual, logical and physical design using the example of hierarchical, network and relational databases. Students will learn the basics of description languages, database manipulation languages, and query languages. Will have an understanding of the architecture, basic design approaches and applications of database systems.	5	LO3
8.	Network database management systems	The discipline is devoted to the study of theoretical foundations, practical methods and tools for building databases, as well as issues related to the life cycle, support and maintenance of databases. The means and methods of storing data at the physical level are studied. DBMS are studied in detail.	5	LO 9 LO3
9.	Information system architecture development tools	The discipline considers the principles of building information open systems, architecture, models and resources of information systems, the main constituent elements of information systems that are of fundamental importance for the system as a whole, as well as tools for developing the architecture of information systems	4	LO11
10.	Database Application Design Basics	The course introduces students to various approaches used to implement access to data sources, analyzes existing data access methods, including ODBC, OLE DB and ADO, and considers mechanisms for publishing remote data sources on the Internet. The course provides an overview of the classes used to work with databases provided by the Delphi, JBuilder and	4	LO8 LO3

		Microsoft VisualStudio .NET programming systems.		
11.	JavaScript programming	This course covers the basics of JavaScript programming as well as some of the tools and data models you need to use JavaScript in practice.	6	LO9
12.	Programming in PHP	Studying technologies for designing the structure of a website as an information system; technologies for creating a website by means of programming on the client and server sides; technologies for hosting, supporting and maintaining a website on a server.	6	LO9 LO5
13.	Creating mobile applications in Java	Programming trains logic, creative thinking, the skill of solving practical problems and the habit of working for results. The Java programming language is ideal for getting started with programming. Java is in the top 4 in demand all over the world, and knowing this programming language, you can create almost everything: from applications for desktop operating systems Windows, Linux, Mac OS to mobile applications for Android. On the course, students will master the rules for creating graphical application interfaces for modern smartphones, create a really working application that uses the built-in functions of the phone.	6	LO5
14.	Mobile Application Development	The discipline introduces students to the basic principles of application development for the Android and IOS operating systems and the technology for creating mobile applications.	6	LO5
15.	Neural networks in information technology	The course introduces students to the basic concepts of neural networks. We consider convolutional and recurrent networks, and analyze the problems of classification, segmentation, detection, image and text generation. The knowledge gained will be enough to solve a wide range of problems.	5	PO6 PO7
16.	Intellectual Data Mining Technologies	The course is devoted to studying the basics of data mining and machine learning. Students will be able to get an idea of the organization of the data analysis process, learn the main content of the stages of pre- and post-processing of data, and related standards. The course allows you to get acquainted with modern technologies for data mining and examples of their application to solve business problems, as well as with the basics of machine learning as one of the main modern concepts of extracting new knowledge and patterns from large amounts of data and their subsequent application in computer science. - artificial intelligence systems.	5	PO6 PO7
17.	Digital processing	Considers the theoretical and practical foundations	5	LO7

	of video and audio information	of digital processing of audio and video data based on multi-stage signal sampling, as well as teaching the basic applications of digital signal processing in multimedia systems.		
18.	Hardware and software video editing	Aimed at studying the basics of coding audio-speech messages, images; methodology for designing and using digital encoders in multimedia systems; modern software for capturing audiovisual data; interface and elements of the software product Adobe PremierPro	5	LO7

2.3 Structure of the educational program

The structure of the educational program was developed in accordance with the State Mandatory Standard of Higher and Postgraduate Education (Order No. 2 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022)

2.4 Additional educational programs (Minor)

The student, when determining the individual trajectory of training within the framework of the elective component, selects disciplines according to the main educational program (Major) and (or) according to the additional educational program (Minor).

The list of Minor programs, their brief description, the composition of disciplines and the resulting learning outcomes are contained in the Catalog of additional educational programs (Minor).

2.5 Innovative technologies and teaching methods used in the educational process

In order to form the key competencies of the graduate and the results of training in the OP 6B06102 - Information Systems, the teaching staff uses the following innovative technologies and teaching methods:

- ICT (information and communication technologies: Padlet, Kahut testing),
- Case study, design, portfolio, SWOT analysis, associogram,
- Critical thinking technologies (Venn diagram, JIGSAW, brain attack, association, ZOOM),
- Work in small groups (team).
- Design technology.
- Analysis of specific situations (case study).
- Role-playing and business games.
- Modular training.
- Contextual learning.
- Development of critical thinking.
- Problem-based learning.
- Individual training.
- Advanced independent work.
- Interdisciplinary training.
- Experience-based learning.

In the case of restrictive measures, the introduction of a state of emergency, the occurrence of social, natural and man-made emergencies, the organization of the educational process can be implemented using distance learning technologies online or in a mixed format. Online training sessions provide for the process of educational interaction in real time: video conferences (GoogleMeet, Skype, Discord, MOODLE, ZOOM, Google Classroom, Microsoft Teams, Hangouts, Cisco WebEx Meetings, etc.).

2.6 Features of the implementation of the educational program for students with special educational needs

If there are persons with special educational needs in the students contingent in the educational program, this educational program is adapted to the special educational needs of such students.

A special procedure for the development of the discipline "Physical culture" is established for persons with special educational needs taking into account the state of their health. The choice of places of practical training for persons with disabilities is carried out taking into account the state of health of students and accessibility requirements. Conducting current, intermediate and final certification at the University takes into account the individual psychophysical characteristics of persons with disabilities. Students with special educational needs are provided with printed and (or) electronic educational resources in forms adapted to limit their health.

Individual support is provided or the social adaptation of students with special educational needs, which is continuous and comprehensive. Support of students with special educational needs is determined by the goals, content and methods of the educational process, aimed at preventing emerging problems of educational adaptation, preventing the timely formation of the necessary competencies.

Support includes:

- organizational and pedagogical support, which is aimed at monitoring the study of students with special educational needs in accordance with the schedule of the educational process in an inclusive learning environment;
- psychological and pedagogical support, which is carried out for students with special educational needs, having problems in learning, communication and social adaptation, is aimed at the study, development and correction of the student's personality and the adequacy of the formation of competencies, using psychodiagnostic procedures, psychological prevention and correction of personal distortions;
- preventive and health support, which provides for the solution of tasks aimed at improving the adaptive capacity of students with special educational needs;
- social support, solving a wide range of tasks of a social nature, on which depends the successful study of students with special educational needs. It includes assistance in solving household problems, living in a hostel, transport issues, social payments, allocation of material assistance, organization of leisure, summer recreation, their involvement in student self-government, organization of volunteer movement, etc.

3. Provision of the educational program

3.1 human resources

The educational program is staffed with pedagogical and teaching staff in accordance with the Order of the Minister of Education and Science of the Republic of Kazakhstan dated January 5, 2024 No. 4 "On approval of qualification requirements for educational activities and a list of documents confirming compliance with them."

3.2 Material and technical base

The University has 3 academic buildings, an educational and laboratory complex, a library, a military department, 3 dormitories, an educational and recreational training ground "Kulager" on Lake Balkhash, a sports and educational training ground "Karlygash", a stadium for 1000 seats.

The material and technical base of the educational institution is completed in accordance with the Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated January 5, 2024 No. 4 "On approval of qualification requirements for educational activities and a list of documents confirming compliance with them."

3.3 Information and library support

Completed in accordance with the order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated January 5, 2024 No. 4. Registered with the Ministry of Justice of the Republic of Kazakhstan on January 8, 2024 No. 33892 "On approval of qualification requirements for educational activities of organizations providing higher and (or) postgraduate education, and a list of documents confirming compliance with them."

3.4 Social resources

For those who want to improve their qualifications or get additional education, the university has a Center for Advanced Training and additional Education. On the basis of the center, university students can take free language training in English and prepare for the exam to confirm the international level of English language proficiency – IELTS.

To develop the entrepreneurial competencies of students and young scientists, the University has a department of science and commercialization of scientific projects, a Startup Academy. The Startup Academy provides all the necessary infrastructure for the youth of the Zhetysu region to develop innovative and entrepreneurial activities and increase the number of small and medium-sized businesses. The Academy conducts training trainings and seminars, is engaged in purposeful search, selection and development of startup projects, as well as consulting support on the development of startups and measures of state support for entrepreneurship, organization of mentoring, providing expert support, conducting grant competitions.

In their free time, students can study for free in gyms and in sections for several sports. Active work in this direction is carried out by the University Sports Club, which is engaged in the formation and promotion of the values of a healthy lifestyle, uniting students into teams to demonstrate their needs and abilities in a freely chosen sport, organizing and conducting physical culture, sports and wellness events, organizing youth participation in sports competitions of various levels.

The sports base of the university is a multifunctional stadium with a standard football field, with sectors for long jumps, grenade throwing and treadmills, boxing, gymnastics, wrestling halls and a gym equipped with modern sports equipment.

The University has created favorable conditions for the formation of competencies of social interaction, active life position, civic consciousness, self-organization and self-government, system-activity character.

The Department of Educational and Social Work and the Youth Center are engaged in the development of creative activity of students in the socio-cultural environment of the University. In order to reveal the diverse creative abilities of students, the university operates: the Department of the Assembly of the Peoples of Kazakhstan; dance and vocal and instrumental ensembles, student theater, debaters club, volunteer clubs, KVN teams, literary, intellectual clubs, labor association "Zhasyl El", association of public police assistants "Zhas Kyran", military-patriotic club "Erlik" and others.

4. PLAN
FOR THE FURTHER DEVELOPMENT
OF THE EDUCATIONAL PROGRAM

№	Event content	Realization term	Responsible person
Educational and methodical direction			
1	Development of lecture material, preparation of educational material for practical and laboratory studies, development of guidelines for SRO	2024-2028	PTS
2	The development of work programs of practices and guidelines for the implementation of theses	2024-2028	PTS
3	Development of EMCD	2024-2028	PTS
4	Organization and holding of methodical seminars, trainings, master classes	2024-2028	PTS
5	Development of test tasks and questions	2024-2028	PTS
Research direction			
1	Publication of textbooks, teaching aids, monographs	2024-2028	PTS
2	Development and implementation of innovative technologies in the educational process	2024-2028	PTS
3	Participation of faculty members in regional, republican and international conferences	2024-2028	PTS
4	Publication of articles in scientific journals database KKSON, RISC	2024-2028	PTS
5	Publication of articles in scientific journal databases Scopus, Thomson Reuters	2024-2028	PTS
6	Fulfillment of scientific projects of the GF MES	2024-2028	PTS
7	Creation of electronic textbooks, patents, copyright certificates, acts of implementation based on the results of research	2024-2028	PTS
8	Participation of students in competitions, competitions, research grant programs, start-ups	2024-2028	PTS
Educational direction			
1	Participation of students in various activities of the university, faculty, department	2024-2028	PTS
2	Visiting various sports clubs by students	2024-2028	PTS
Advanced training			
1	Participation of faculty in scientific seminars for the purpose of advanced training	2024-2028	PTS
2	internship in scientific centers, universities of the Republic of Kazakhstan, far and near abroad	2024-2028	PTS
3	Training courses and language training	2024-2028	PTS
Career guidance			
1	Participation in the organization of university’s open days	2024-2028	PTS
2	Publication of information on the university’s site and in the newspaper on the activities of the faculty	2024-2028	PTS