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.j.s. Professor Y. Buribayev

БІЛІМ БЕРУ БАҒДАРЛАМАСЫ
ОБРАЗОВАТЕЛЬНАЯ ПРОГРАММА
EDUCATIONAL PROGRAM

6B06103 - Ақпараттық жүйелердің архитектурасы
6B06103 - Архитектура информационных систем
6B06103 - 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	*Menof*	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	*Сер*	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: 6B06100247

Code and classification of the domain of education: *6B06-Information and communication technologies*

Code and classification of the direction of preparation: *6B061-Information and communication technologies*

Group of educational programs: *B057-Information technologies*

Name of educational program: 6B06103 – «Architecture of information systems »

Type of EP: New EP

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

Degree awarded: bachelor's degree in information and communication technologies in the educational program 6B06103 "Architecture of information systems»

Total credits: 240 academic credits

The typical duration of training: 4 years

Language of study: *Russian, Kazakh*

License to engage in educational activities: The Educational program is implemented on the basis of the Appendix to the License №KZ36LAA00018662 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.

AKCreditation:

EP rating:-

Professional standards for the development of OP:
1. Management of the architecture of computer systems.
2. Software Architects.

Corresponds to the Atlas of Profession and Competencies:
1. Architect of IT-ecosystems

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 Zhetisu 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:
3. 7th place in the national ranking of multidisciplinary universities of the Republic of Kazakhstan (NAOKO) - 2021;
4. TOP-241-250 best universities in developing Europe and Central Asia in the regional QS World University Rankings: Emerging Europe and Central Asia 2021;
5. 6th place among 95 universities of the Republic of Kazakhstan in the ARES rating;

1.3 Profile of the educational program

Rationale: The educational program 6B06103 - "Architecture of information systems" offers a new approach to the formation of key competencies necessary for the graduate of the specialty in the direction of training in the field of information and communication technologies.

The educational program is aimed at training for the implementation of design, production and technological, organizational, managerial, operational, expert and analytical activities.

The educational program is aimed at creating conditions and opportunities for the national higher education system to join the Bologna process, which will harmonize it with the European and international educational space.

The educational program allows for international recognition of national educational programs, the creation of conditions for academic mobility of students and the teaching staff of educational organizations, as well as improving the quality of education.

Labor market research in aKCordance with employers' requests: The specifics of the socio-economic development of the region, the industrial Information technology program are the driving force of the modern digital economy. Because of this, specialists in the field of information technology are widely in demand in the labor market. Enterprises and organizations of various forms of ownership rely on IT departments in their activities, which automate all types of activities of the organization and enterprise and ensure its presence in the Internet space.

The purpose of the educational program:

Training of qualified personnel in the field of information system architecture who possess modern methods of designing the structure of information systems in order to optimize their use for solving applied problems.

-formation of fundamental knowledge, skills and competencies required in professional activities

- formation of a culture of analytical thinking
- technical training

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 «ASTE»
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, г. Olomouc (Check Republic)
Scholarship programs	State educational order, grant of local executive bodies

1.4 Profile of the graduate

Graduate Attributes aKCording to Dublin Descriptors:

Graduate attributes aKCording 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:
KC1 - Have a sufficient outlook in the field of general education disciplines and be able to take them into aKCount when making decisions in professional activities.
KC2 - 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 – Ability to demonstrate knowledge in the field of algorithmization and programming.
KC5 - To be able to develop and debug efficient algorithms and programs using modern programming technologies.
KC6 - Master the development of software systems for a particular subject area.
KC7 - The ability to demonstrate basic knowledge in the field of natural sciences and the willingness to use the basic laws in professional activities, to apply the methods of mathematical analysis and modeling, theoretical and experimental research.
KC8 - Ability to communicate in oral and written form in Kazakh, Russian and English languages for solving problems of professional activity.
KC9 - To be able to design a network infrastructure and exploit network infrastructure objects.
KC10 - The ability to operate and maintain information systems and services and test information system components aKCording to specified scenarios.

KC11 - Know the direction of development of computers with traditional (non-traditional) architecture, trends in the development of functions and architectures of problem-oriented software systems and complexes.

KC12 - The ability to use operating systems, network technologies, software development tools and software interfaces, the use of languages and methods of formal specifications, database management systems.

KC13 - Possess theoretical and practical knowledge of representation, processing and transmission of information in information systems.

KC14 - The ability to plan and implement measures to ensure the information security of the organization.

KC15 - Know the basic principles of the theory of databases, the principles and methods of database design in information systems.

KC16 - The ability to set and solve applied problems using modern Internet technologies.

KC17 - 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.

KC18 – Know the methods of managing the development of requirements, risk assessment of acquisition, design, construction, testing, evolution and maintenance of information systems.

KC19 – Know the classic concepts and models of information management and information marketing in project management.

KC20 – The ability to apply the basic processes, methods and tools for the development of information systems and software.

KC21 – Ability to design and develop software interfaces.

KC22 - Ability to formulate requirements, risk assessment acquisition, design, design, testing process, evolution and maintenance of information systems.

KC23 - To possess data processing tools and their analysis in order to substantiate the adopted design decisions, to carry out the formulation and execution of experiments to verify the correctness of software, information systems and their effectiveness.

KC24 - To possess the latest means of information technology and apply them in their professional activities.

KC25 - Ability to develop software for robotic systems.

KC26 - To be able to apply the basic processes, methods and tools of applied data analysis to improve the quality of information systems.

KC27 - The ability to manage processes, which allows the use of a system of integrated applications for managing business processes and automating many functions related to technologies, services and resources of information systems.

KC28 - The ability to simulate discrete systems using graphs and mathematical equations, with the ultimate software implementation of the system.

KC29 - The ability to understand the principles, the possibility of rational behavior, and the other hand, the ability to develop methods that lead to the design of reasonable decisions.

KC30 - The ability to interdisciplinary exploration the use of models for conceptualizing and designing information systems.

KC31 - The ability to create an interface program that will meet the key criteria of modern applications.

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 aKCount 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 aKCordance 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 - To show an active civic 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 Kazakh society;

LO2 - Have the ability to evaluate and apply innovative approaches to understanding socially significant social phenomena and processes in the legal, entrepreneurial, industrial, environmental environment;

LO3 - To speak Kazakh, Russian, foreign languages, using a variety of means of oral and written communication to solve professional problems;

LO4 - Builds mathematical and physical models, sets mathematical and physical tasks, conducts qualitative mathematical and physical research, based on the analysis, develops practical recommendations for technical tasks of information systems;

LO5 - To master the aspects of human-machine interaction and methods of development, evaluation and implementation of interactive computer systems and digital electronic devices intended for human use, as well as to study various aspects of this use;

LO6 - Apply the basics of the development of specifications of software complexes, standard methods of design of algorithms and basic techniques of their design; own programming tools and environment, modern programming technologies;

LO7 - Apply knowledge in the field of information systems architecture to create and design cybernetic, intelligent robotic, information systems, networks and complexes for industrial and research purposes;

LO8 - Apply professional knowledge in the field of computer science, information technology, information security and data protection for the organization and creation of conditions for the optimal use of computer technology, software in solving applied problems;

LO9 - To use 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;

LO10 - To investigate the infrastructure of the enterprise and defines information data flows, data exchange processes, through modeling; describes the functional characteristics and capabilities of the IP; principles of operation and application of best practices of ICT technologies and maintenance of information systems;

LO11 - Analyze their own and foreign experience in the development and implementation of information systems, interacts with experts in other subject areas in the design and development of information systems;

LO12 - Design information models, uses modern DBMS for building, managing and applying databases; documents the processes of creating information systems at all stages of the life cycle, identifies information needs of users, forms requirements for the information system, participates in the reengineering of applied and information processes;

Employment opportunity:

The graduate has the opportunity to find 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 Description of modules

Module number	Module code and name	№ and name of discipline	Number of credits	Cycle of disciplines	Assigned to department
Cycle of general educational disciplines					
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.
		Philosophy		GED	
		Social and Political кnowledge мodule (sociology, cultural studies, political science, psychology)		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»	Information and communication technology	15	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.
		Foreign language		GED	
		Kazakh (Russian) language		GED	
3	SEMEP 3 «Skills of effective management of the educational process»	1) Methodology of writing scientific publications 2) Development of electronic courses	10	BD	Mastering the methodology and methods of scientific research, To use methods of evaluating the effectiveness of research activities; to search for information for all stages of the preparation of research work; to develop a
		Professional terms in the field of information systems		BD	

					methodology for research; to use existing standards in professional activities; to competently select methods of scientific research; to possess methods of information retrieval for the preparation of research works; To use methods of planning and conducting experiments; To use and develop: e-courses; professional terms in the field of information technology
4	AP 4 «Algorithmization and programming»	Algorithms, data structures and programming	22	BD	Knows and understands the features of building software complexes, standard methods of algorithm development and the basics of basic approaches to their design; owns modern programming technologies, environment and programming tools. To analyze the methods of translation; To master modern information technologies and software tools when solving the tasks of professional activity. Use modern information technologies; knowledge of programming, debugging and testing of prototypes of software and hardware complexes of tasks. Demonstrates application programming skills, including modeling, designing, writing software; code, testing, debugging and further administration of a software product; use theoretical skills in practice.
		1) Java programming 2) Kotlin programming		BD	
		Advanced Python Programming		MD	
		1) Programming languages and translation methods 2) High-level programming methods		BD	
		1) C/C ++ programming technologies 2) C#. Programming in high level language		BD	
		Educational practice		BD	
5	PhM-5 «Physical and mathematical base of computing technologies»	1) General Physics 2) Computational Physics	14	BD	Understanding key concepts in all major areas of physics and mathematics. Knowledge of methods, strategies, techniques and approaches to learning and the ability to compile a curriculum. Skills of critical thinking and scientific approach to the development, execution,
		1) Circuit design 2) Physical and logical foundations of digital technology		BD	
		Computational mathematics in digital systems		BD	

					recording and analysis of the results of experiments or practical work.
6	MI-6 «Machine Interface»	Computer Systems Architecture	20	BD	multi – link interface: each PC block is connected with passing blocks of its own local networks; multi-link interface is used in other cases in the quality of the peripheral interface (for communication with external PC facilities), additional system, and in the quality of the system-in some simple computers;
		1) Computer networks 2) Computing complexes, systems and networks		BD	
		Basics of artificial intelligence		BD	
		Programming in the Arduino environment		MD	
7	BDIaD-7 (Basics of digitalization of information and database)	Basics of information systems	22	MD	a new stage of automation and informatization of activities, which is based not only on the management of information and communication technologies, but also includes the accumulation and analysis of big data with their help to predict the situation, optimize business processes, attract new contractors, etc. In other words, the process of digitalization changes the business model, consumer behavior, as well as the role of man in production processes based on the use of digital technologies.
		Theoretical bases of databases		BD	
		Information Systems Design		BD	
		1) Digital animation technology 2) Modeling in 3D Max		BD	
		1) Programming in 1C 2) Introduction to Data Analysis		MD	
		1) Information Security and Data Protection 2) Innovative methods of protecting digital information		BD	
		1) Computer algebra systems 2) Computer-aided design systems		BD	
		Internet of things		MD	
		Industrial Practice		BD	
8	IT-8 «Internet technologies»	Internet technology	22	BD	Uses various types of information and communication technologies in professional activities: Internet resources, cloud and mobile services for the search, storage, processing, protection and dissemination of
		Mobile Application Development		MD	
		Web applications in Java		BD	
		Educational practice		BD	

		Design and development of mobile solutions		MD	information. Characterizes the representation of usage and class diagrams in the UML language, Interprets the algorithm of the program in the UML language; constructs classes in the programming language; Designs and develops a software module for mobile platforms;
9	MIMT 9 « Architecture and design »	1) Modeling information processes and systems 2) Mathematical and computer modeling	27	BD	Promotes the use of the basic laws of natural science disciplines in professional activities, apply methods of mathematical analysis and computer modeling, theoretical and experimental research; To use methods and means of computer graphics and geometric modeling; to use modern software in the field of computer graphics development;
		Internet of Things		MD	
		1) Vector and raster graphics 2) Engineering and computer graphics		BD	
		1) Development and administration of ERP-system 2) IT project management		MD	
		1) Digital processing of video and audio information 2) Hardware and software video editing		MD	
10	MaAIS 10 « Management and Administration of IS »	1) Computer-aided design of information systems based on CASE technology 2) UX/UI Design	15	MD	Methods for analyzing the Application Area, information needs, forming requirements for IT; technologies for collecting, collecting, processing, transferring and distributing information. conduct an analysis of the subject area, identify information needs and develop requirements for it; develop a conceptual model of the application area.
		Industrial Practice		MD	
11	FC 11 «Final certification»	Undergraduate practice	17	MD	Mastering the theoretical and practical knowledge gained during the course, possess professional competencies, including modeling and designing information systems in all areas of life activities, the ability to develop software for intelligent systems
		Writing and defending a thesis (project) or passing a comprehensive exam		MD	

2.2 Information about disciplines

№	Name of discipline	Short description of the discipline (30-50 words)	Number of credits	Formed competencies (codes)
Cycle of general educational disciplines *Compulsory component*			
1	History of Kazakhstan	"History of Kazakhstan" studies the history of the development of human society on the territory of Kazakhstan from ancient times to the present day, taking into account the latest data from historical science related to the reassessment of events and facts. When studying the course, attention is paid to the specifics of the socio-cultural, political, economic and geopolitical situation of Kazakhstan. The subject of the "History of Kazakhstan" is the study of the emergence and development of the Kazakh ethnic group, state-legal systems, economy, culture, public and social relations in Kazakhstan at various stages of history.	5	LO1
2	Philosophy	Deals with the main stages of development of world and Kazakh philosophical thought and worldview trends. It studies the General theoretical problems of being and consciousness, describes the experience of world philosophical thought in the study of universal problems of worldview. It is aimed at developing holistic views of the world and understanding the reality of the modern era. Reveals the basic philosophical concepts, categories and methods of philosophical knowledge	5	LO1
3	Information and communication technology (in English)	Studies modern methods and means of professional communication, carried out by means of information technologies for search, collection, storage, processing and dissemination of information. Develops skills in working with databases, table processors, e-technologies, Smart and cloud technologies	5	LO1
4	Social and Political кnowledge мodule (sociology, cultural studies, political science, psychology)	It contains socio-political and psychological knowledge, reflecting the laws, mechanisms and facts necessary for the knowledge of the depth of objective and subjective processes of development of society and man. Interaction between scientific disciplines - sociology, cultural studies, political science, psychology, is based on the principles of information complementarity, integration and	8	LO1

		methodological integrity of research approaches		
5	Foreign language	Aimed at the development of levels A2, B1, B2 (pan-European scale of foreign language proficiency) in accordance with the adapted national level model of teaching languages of the trinity, contains modern trends in learning and practical knowledge of foreign languages in everyday communication and professional activities	10	LO1
6	Kazakh (Russian) language	It contains the classification of types of texts. It studies the vocabulary, morphology and syntax of the Kazakh (Russian) language. It is aimed at mastering lexical topics related to various spheres of life and activity of society, in accordance with the level of language proficiency. Reveals the culture of speech and communication	10	LO1
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	LO1
Cycle of general educational disciplines *University component / Optionalcomponent*				
1	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	LO2
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	5	LO2

		of accidents, catastrophes, natural disasters.		
3	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	LO2
4	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	LO2
5	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	LO2
6	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	LO2
Cycle of Basic Disciplines *University component*			
1	Algorithms data structures and programming	Discipline studies the basic concepts of the algorithm, the basic structures of the algorithms, the concept of a structural approach to the development of algorithms, the basic concepts of programming, the use of	5	LO6

		subroutines when developing programs, algorithmic languages, the assignment of an algorithmic language and the requirements for it, the concept of procedural oriented languages.		
2	Professional terms in the field of information systems	Studies English as a necessary and sufficient level of communicative competence, which will allow to use a foreign language in various fields of official business, professional activity, in scientific and practical work, in communication with foreign partners, for self-education and other purposes.	5	LO3
3	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	LO4
5	Web applications in Java	Studies the basic concepts, types and characteristics of modern Java technology software; basic concepts of the Java platform; various classification methods and design principles of modern operating systems; NetBeans software development environment; basics of programming at the backend and frontend level; Java object-oriented language capabilities; basic user interface objects; basic techniques for working with packages.	6	LO6 LO9
6	Basics of artificial intelligence	The discipline is designed to improve the level of information and communication competence (ICC) of students through in-depth study of the theoretical foundations of artificial intelligence systems, the development of new modern technologies for building intelligent systems and the application of knowledge and skills in practice.	5	LO7 LO5
7	Internet technology	Aimed at studying modern web technologies and tools for creating, supporting and managing web resources, acquiring the skills and abilities to use modern tools in practical activities and in identifying ways and tools to effectively solve the necessary tasks.	5	LO10
8	Information Systems Design	The discipline gives students an idea of modeling as a method of scientific knowledge, on the use of a computer as a tool for research activities. Examines the basic concepts and properties of models; general principles of computer modeling; technology of building models.	5	LO6
9	Educational practice	The purpose of the practice is to develop	2	LO2

		students 'professional skills and abilities; to acquire initial practical experience for their subsequent development of General and professional competencies in their chosen specialty; to develop students' skills to perform work on the operation and modification of individual modules of information systems.		

<table>
<tr><td colspan="5" align="center">Cycle of Basic Disciplines
Optional component</td></tr>
<tr><td>1</td><td>Programming languages and translation methods</td><td>The discipline is aimed at familiarizing students with different levels of programming languages and methods of program translation. Examines the basics and concepts of application development using elements of object-oriented, visual, modular, and event-based programming. Fundamentals of application development using modern programming technologies in The C++Builder environment, abstraction Mechanisms in C++ . Implementing I / o using threads.</td><td>5</td><td>LO6</td></tr>
<tr><td>2</td><td>High-level programming methods</td><td>The discipline examines the modern paradigm of programming.
Basic concepts, tools, and features of typical representatives o+f modern programming languages. Basics of programming at the backend and frontend level and modern basics of computer process programming technology in C#. Basics of object-oriented programming related to the basic technologies of the .NET platform.</td><td>5</td><td>LO6</td></tr>
<tr><td>3</td><td>General Physics</td><td>Studies matter and energy, as well as the fundamental interactions of nature that control the movement of matter.
It is aimed at forming students' modern understanding of the physical picture of the world, the skills of research, obtaining and processing experimental results, as well as the skills of modeling physical processes in solving specific problems.</td><td>5</td><td>LO4</td></tr>
<tr><td>4</td><td>Computational Physics</td><td>Describes the tasks of modeling physical processes and phenomena, a number of basic computational methods used in solving physical problems and in processing experimental data, ways of their optimal implementation on a computer, estimation of the error of the result of calculations</td><td>5</td><td>LO4</td></tr>
<tr><td>5</td><td>Methodology of writing scientific publications</td><td>The main content of the course reflects the competence orientation of preparing students for active participation in modern intellectual technologies, involving the possession of</td><td>5</td><td>LO3</td></tr>
</table>

		skills and abilities of research activities, ranging from the preparation of writing a scientific article to writing a scientific paper and up to its public defense, as well as in connection with the search for sources of funding for various research projects.		
6	Development of electronic courses	The discipline is aimed at studying methods of preparation and use of electronic courses in the educational process; technologies of collective creation and joint use of electronic documents and audio-video materials for their application in the educational process and scientific research.	5	LO3
7	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	PO11
8	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	PO11
9	Modeling information processes and systems	He studies information technologies for analyzing complex systems and designing information systems based on international standards, teaching students the principles of constructing functional and information models of systems, analyzing the results obtained, and using information design support tools.	5	LO6
10	Mathematical and computer modeling	The discipline examines the main classes of models and modeling methods, principles of building models of information processes, methods of formalization, algorithmization and implementation of models using modern computer tools; methods of conducting computational experiments using simulation techniques.	5	LO9
11	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	5	LO5

		methodology.		
12	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
13	Information Security and Data Protection	The purpose of this discipline is to review current problems in the field of information security in information systems, as well as to review the directions of development of the information security program; the formation of students ' knowledge in the field of information security and the practical application of methods and means of information protection.	5	LO8
14	Innovative methods of protecting digital information	Studies ways to organize information protection in computer networks; data protection tools against the destructive effects of computer viruses; basic software methods for protecting information when working with computer systems and organizational measures and techniques of antivirus protection.	5	LO8 LO9
15	Computer algebra systems	Familiarization of students with the basic concepts of higher algebra and analytical geometry, the main mathematical methods that computer science students need to know in the course of study when studying special courses found both in scientific work and in the independent study of applied areas of mathematics.	4	PO4
16	CAD systems	The discipline studies automated systems that are designed to implement a particular information technology of design implementation. Students will get acquainted with technical systems that allow, thus, to automate and ensure the independent functioning of the processes that make up the development of projects.	6	LO10 LO12
17	Vector and raster graphics	Provides for the theoretical study and practical development of the basics of computer graphics, the study of computer technologies for the processing of graphic information, since professional activities of a modern specialist in the field of information technology is associated with the widespread practical application 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	5	LO11

		and computer graphics. Descriptive geometry addresses issues about the subject and method of descriptive geometry. Engineering graphics considers issues related to design documentation, drawing design. In the section computer graphics, work in the graphics program AutoCAD is studied		
19	Computer networks	The discipline studies the principles of functioning of the main levels of OSI, methods of transmitting, storing, searching, processing, and presenting information. Introduces the technologies of integration of local networks into the global Internet and data transmission in the global network; the functionality of communication equipment and technologies for their implementation; tools for analyzing traffic in networks and methods for minimizing it; the basics of designing local networks and their integration into global networks.	5	LO3 LO8
20	Computer systems and networks	Studies systematic information about the structure and principles of computer systems for various purposes, methods of research of computer systems, the basics of their design. Systematizes knowledge and skills in computing and programming through the study of various parallel computing architectures.	5	LO3 LO8
Cycle of main disciplines **University component**				
1	Architecture of computer systems	In the course of studying the discipline, students will receive systematic knowledge about the architecture of computer systems, the organization and basic principles of computer devices, storage devices, processors and computer systems, the principles of building computer systems architectures; types of computer systems and their architectural features; the organization and principles of the main logical blocks of computer systems; information processing processes at all levels of computer architectures.	5	LO5 LO10
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	6	LO5

		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.		
3	Programming in the Arduino environment	The purpose of this discipline is to acquire knowledge and skills in the field of microcontroller programming. System analysis of the applied area, formalization of solutions of 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; implementation of works on creation, modification, implementation and maintenance of information systems and management of these works.	5	LO6 LO7
4	Mobile Application Development	The discipline introduces students to the basic principles of application development for Android and iOS operating systems and the technology of creating mobile applications using Java and C# through Android and iOS.	5	LO10
5	Internet of things	Purpose of the discipline: training in IoT technologies. Aimed at teaching the ideas of the Internet of things for the "smart home", for sectors of the economy, the service sector, IT; analysis of the development trends of the Internet of Things and factors and hardware contributing to the development of the Internet of Things.	5	LO2 LO10
Cycle of main disciplines **Optional component**				
1	Theoretical bases of databases	This course covers the basics of database design methodology: conceptual, logical, and physical design based on hierarchical, network, and relational databases. The basics of description languages, database manipulation, and query creation languages are discussed.	5	LO12
2	Circuit Design	The course is dedicated to the study of analog and digital electronic devices, the principles of their construction and operation, in order to provide future specialists with the opportunity to independently analyze and develop functional nodes of communication and telecommunications systems. The study of the	6	LO4 LO5

		discipline "circuit Engineering" is the basis for specialists in the field of telecommunications systems.		
3	Physical and logical foundations of digital technology	Formation of knowledge in the field of construction and implementation of automatic and automated control systems for electric power systems by means of digital technology using digital integrated elements and microcontrollers. - mastering engineering methods for calculating the stability and quality of transients; - getting an idea of the types of automatic control systems (ATS), their constituent elements and types of regulators, methods for correcting the characteristics of control systems;	6	LO4 LO5
4	Development and administration of ERP-systems	This discipline considers process management software, which allows you to use a system of integrated applications for managing business processes and automating many functions related to technologies, services and resources of information systems. All aspects of operations are studied, including product planning, development, into a single database, application, and user interface.	5	LO10 LO11
5	IT project management	This discipline involves the formation of theoretical knowledge, skills and practical skills for solving problems that arise in the management of IT projects. Development of skills and practical skills for effective project management in various sectors of the economy using automated systems.	5	LO11 LO10
6	Programming in 1C	In this course, in clear and simple language, get the necessary information for a novice 1C programmer. The course introduces the installation process of 1C:Enterprises 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	PO5
7	Introduction to Data Analysis	In this course, attention is paid to 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 multidimensional data.	5	PO5
8	Digital video and	Considers theoretical and practical bases of	5	LO11

		digital audio processing and video data based on multi-stage signal sampling, as well as training in basic digital signal processing applications in systems multimedia.		
9	Hardware and software means for video editing	Aimed at learning the basics of audio coding -speech messages, images; design methodologies and applications digital encoders in multimedia systems; modern software for capturing audiovisual data; interface and elements of Adobe PremierPro software	5	LO11
10	Computer-aided design of information systems based on CASE technology	The discipline studies a set of methodologies for the analysis, design, development and maintenance of complex software systems, supported by a set of interconnected automation tools. The discipline teaches automation of the design of complex information systems. As a result, students do not create new methodologies, but increase the efficiency of using existing ones through automation.	5	PO10 PO12
11	UX/UI Design	The purpose of this discipline is to develop the skills to develop a user interface using tools that allow solving standard tasks of professional activity based on information and bibliographic culture using information and communication technologies and taking into account the basic requirements of information security.	5	PO5
12	Industrial Practice	Mastering the production skills of creating an IP architecture, developing and documenting, ensuring IP security, upgrading software; researching the experience of creating and applying information technologies to solve real problems of organizational, managerial and scientific activities in a specific organization; preparing a report and presenting the results.	13	LO7 LO8 LO9

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 on EP 6B06102 - Information Systems, the teaching staff uses the following innovative technologies and teaching methods:
- Work in small groups (team).
- Project technology.
- Analysis of specific situations (case study).
- Role-playing and business games.
Modular training.
- Contextual learning.
Development of critical thinking.
- Problem training.
- Individual training.
- Advanced independent work.
- Interdisciplinary training.
- Learning from experience.
- Information and communication technologies.

In the case of restrictive measures, the introduction of a state of emergency, the occurrence of emergency situations of a social, natural and man-made nature, the organization of the educational process can be implemented using distance educational technologies in online or 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 June 17, 2015 No. 391 "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 OP is completed according to the Order of the Minister of Education and Science of the Republic of Kazakhstan dated June 17, 2015 No. 391 "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 Education and Science of the Republic of Kazakhstan dated June 17, 2015 No. 391 "On approval of qualification requirements for educational activities 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
center	**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
center	**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
center	**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
center	**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
center	**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