1. PASSPORT OF THE EDUCATIONAL PROGRAM

1.1 Context

Registration number: 6B06100109
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: 6B06101 «Computer science»
Type of EP: modern
Program type: First cycle: baccalaureate level 6 NQF / ORC / ISCED
Degree awarded: Bachelor in Information and Communication Technologies in the educational program 6B06101 «Computer Science»
Total credits: 240 academic credits
The typical duration of training: 4 years
Language of study: Russian, Kazakh
License for educational activities: The Educational program is implemented on the basis of the Appendix to the License № 12019969 dated December 21, 2012 in the direction of training 6B061 «Computer science», 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.
The rating OP:
Specialized accreditation: Independent Agency for Quality Assurance in Education, certificate No. 0051/1, dated April 25, 2014, the term of accreditation April 25, 2014 - April 24, 2020.
Institutional accreditation: Independent Agency for Quality Assurance in Education, certificate IA-A No. 0101 dated April 22, 2019, validity period of accreditation is April 22, 2019 - April 19, 2024.
Professional standards developed by the National chamber of entrepreneurs of the Republic of Kazakhstan " Atameken» :
1. Software Testing;
2. System analysis in information and communication technologies.

1.2 Location I. Zhansugurov in ZhSU in the system of higher and postgraduate education of the Republic of Kazakhstan

Mission: is to be driving force for innovative development of society by means of providing qualitative education, training and researches at the national and international levels.
Vision: We want to be a significant factor in socio-economic and spiritual development of region, to be the driving force of innovative economic development in Almaty region.
Strategic Goal: Training of competitive staff.
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1.3 Profile of the educational program
Labor market research in accordance with the economy demands: 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.

Justification:
Educational program 6B06101 «Computer Science» today is very popular. The graduates of the programme are trained to work in organizations and enterprises connected with the usage of

computer technologies and also in IT companies specialized in producing computer technologies and software on computerized entrprises. Besides this programme will provide students with necessary requirements for academic advancement in the computer technologies.

The purpose of the educational program: training of highly qualified specialists in the field of computer science, computer and IT technologies, capable of responding quickly in changing social and economic conditions and training graduates who are competitive and highly-demanded in the labour market.

Distinctive features of the program:

Area of professional activity	- informatics; - information technology; - information networks and Internet technologies - mathematical and algorithmic models; - applied mathematics; - hardware and software for solving problems of science, education, technology, Economics and management; - computer systems and networks; high-speed computing systems
Objects of professional activity	- organizations, institutions and enterprises associated with the use of information and communication technologies - distance learning centers and organizations of various forms of ownership, using mathematical methods and computer technology to solve professional problems; - research centers; - public administration
Branch of the Department	LLP "IB Group» KSU "Center of information technologies in education of Almaty region»
Practice bases	- LLP "IB Group»; - Too "Arhstroy»; - LLP "Samgau Project»; - KSU "Regional communications service of Almaty region»; - JSC "Kazpost»; - KSU "employment Center of akimat of Karatal district»; - Chamber of entrepreneurs of Almaty region - KSU "Center of information technologies in education of Almaty region»; - - Too "Zhetysu zharnama»; - LLP "Zhetysu TV Channel»; - GU "the audit Commission in Almaty region»; - LLP "Project Institute name Janeckova J. R.»; - GGK "Zhetysu-Vodokanal»; - Republican state institution of the Department of defense of Almaty region
The possibility of academic mobility	- University of Lodz, Lodz (Poland); - University of management and science, Kuala Lumpur (Malaysia) - Riga technical University, Riga (Latvia); Czech agro-technical University (Czech Republic)

1.4 Profile of the graduate

Graduate Attributes:
- Possesses knowledge and skills in his subject domain, including elements of advanced experience and innovation;
- Thinks creatively and creatively approaches the solution of new problem situations, demonstrating initiative and originality;
- expands and deepens knowledge, skills necessary for everyday professional activity independently;
- follows rules of professional ethics, responsibly and honestly completes responsibilities;
- Demonstrates developed skills of individual and team work, ability to communicate effectively;
- Possesses ability to prioritize and manage time, performing organization, ability to plan, focus on results;
- Is a patriot of his country and a tolerant citizen of the world, meets the culture of other nations.

Learning outcomes:
LO1 – Takes an active civil position in interpersonal and intercultural communication in a multilingual environment on the basis of 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 Kazakhstan's society;

LO2 – Has the ability to evaluate and apply innovative approaches to the understanding of social phenomena and processes in the legal, entrepreneurial, industrial, environmental environment;

LR3 – Speaks Kazakh, Russian, foreign languages, using a variety of means of oral and written communication to solve professional problems;

LR4 – Uses mathematical methods for processing, analyzing and synthesizing the results of professional research. Applies modern physical principles in those areas of technology in which students specialize;

LR5 – Able to compose and program simple and complex algorithms; program using modern tools. Shows application programming skills, including modeling, designing, writing code, testing, debugging and further administration of the software product;

LR6 – Able to design, develop various databases; knowledge of modern models, methods and technologies and the ability to design information systems;

LR7 – Applies the skills of using modern system software: operating systems, operating and network shells, service programs; choice of architecture of modern computing systems, systems and networks of system administration;

LR8 – Able to use modern computer networks, software products and Internet resources to solve problems of professional activity; uses methods of information security with modern software and hardware;

LR9 – Applies the skills of working with tools in the field of intellectual integrated circuits; design and implementation of expert systems; designing robots and programming their actions;

LR10 – Applies the basic models, methods and means of information technology to solve problems in the subject area of web programming. Owns the basic methods and means of designing software for Internet sites;

LR11 – Has skills to work with modern software for designing and working with various types of information (graphics, text, sound, video), organized in the form of a unified information environment;

LR12 – Proficient in the use of information and communication technologies and data management using digital technologies in his professional activities.

Competence of the graduate of the educational program:

ҚС1 – Have a sufficient outlook in the field of general education and is able to take them into account when making decisions in professional activities;

ҚС2 – Know, understand the basic provisions of social sciences and is able to apply them in their professional activities;

ҚС3 – The ability to communicate on general and professional topics and has writing skills in a multilingual environment;

ҚС4 – Readiness for communication in oral and written form in Kazakh, Russian and English languages for solving problems of professional activity;

ҚС5 – The ability to demonstrate basic knowledge in the field of natural sciences and the willingness to use the basic laws in their professional activities, apply methods of mathematical analysis and modeling, theoretical and experimental research;

ҚС6 – To be able to develop and debug efficient algorithms and programs using modern programming technologies;

ҚС7 – Have an idea of the basic principles of the theory of databases, the principles and methods of designing databases in information systems;

ҚС8 – Be able to apply different packages when solving applied problems;

ҚС9 – The ability to organize modern computer systems, information processing at all levels of computer architectures, as well as to plan activities to ensure the information security of the organization;

ҚС10 – The ability to set and solve applied problems using modern Internet technologies, as well as develop and create mobile applications;

ҚС11 – Ability to develop software for robotic systems;

ҚС12 – Ability to use modern software in professional activities;

ҚС13 – The ability to use modern software packages for solving applied problems, to apply basic information processing algorithms for solving applied problems, to assess the complexity of algorithms, to program and test programs;

ҚС14 – Master the means of development of software systems for a specific subject area;

ҚС15 – Use operating systems, network technologies, software development tools and software interfaces, the use of languages and methods of formal specifications, database management systems.

Matrix of correlation of learning outcomes in the educational program as a whole with the formed competencies

	LR1	LR2	LR3	LR4	LR5	LR6	LR7	LR8	LR9	LR10	LR11	LR12
ҚС1	+	+										
ҚС2	+	+										
ҚС3	+											
ҚС4			+	+								
ҚС5				+			+					
ҚС6					+							
ҚС7						+						
ҚС8				+								+
ҚС9							+	+				
ҚС10										+		
ҚС11									+			
ҚС12											+	+
ҚС13					+						+	+
ҚС14					+							
ҚС15							+					

Employment opportunity:

• organizations, institutions and enterprises involved in the use of information and communication technologies;

• distance learning centers and organizations of various forms of ownership, using mathematical methods and computer technology to solve professional problems;

• research centres;

• public administration;

• banks.

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»	1) Modern history of Kazakhstan	31	GED	Departament of History of Kazakhstan
		2) Philosophy		GED	Departament of Social and Humanitarian Disciplines
		3) Social and Political кnowledge мodule (sociology, cultural studies, political science, psychology)		GED	Departament of Social and Humanitarian Disciplines/ Departament of Pedagogics and Psychology
		4) Social studies knowledge (interdisciplinary course)		GED	Department of Economics and service / Department of pedagogy and psychology/ Department of Kazakh language and literature
		5) Physical training		GED	Sports Club
2	IC-2 «Informational and communicative»	1) Information and communication technology (in English)	25	GED	Departament of Mathematics and Computer Science
		2) Foreign language		GED	University-wide Departament of Foreign

					languages
		3) Kazakh (Russian) language		GED	Departament of Kazakh language and literature/ Departament of Journalism and Philology
Cycle of basic disciplines					
3	SEMEP 3 «Skills of effective management of the educational process»	1) Methodology of writing scientific publications	15	BD	Departament of Information and communication technology
		2) Development of electronic courses		BD	Departament of Information and communication technology
		3) Professional terms in the field of information systems		BD	Departament of Information and communication technology
4	PhM 4 «Physics and mathematics»	Higher mathematics	21	BD	Departament of Mathematics and Computer Science
		1) Computer computing 2) Digital data processing		BD	Departament of Information and communication technology
		1) Modeling information processes and systems 2) Mathematical and computer modeling		BD	Departament of Information and communication technology
5	AP 5 «Algorithmization and programming»	Algorithms and Programming Languages	33	BD	Departament of Information and communication technology
		1) C / C ++ Programming 2) Application development in the Delphi environment		BD	Departament of Information and communication technology

		1) Basics of programming in assembly 2) System programming		BD	Departament of Information and communication technology
		1) Object-Oriented Programming in C ++ Builder 2) Basics of C # Programming		BD	Departament of Information and communication technology
		1) Basics of logic programming 2) Modern tools and methods of creating software		BD	Departament of Information and communication technology
		Educational practice		BD	Departament of Information and communication technology
6	DDBIS 6 «Database Design and Information Systems»	Database theory	11	BD	Departament of Information and communication technology
		1) Big Data 2) Information Systems Design		BD	Departament of Information and communication technology
7	MI 7 «Machine Interface»	Operating Systems	12	BD	Departament of Information and communication technology
		Computer architecture		BD	Departament of Information and communication technology
		1) Circuit design 2) Microprocessor technology		BD	Departament of Information and communication technology
8	CNIS 8 «Computer networks and information security»	1) Computer networks 2) Computer systems and networks	10	BD	Departament of Information and communication technology

				BD	Departament of Information and communication technology
		1) Information Security and Information Security 2) Protection of digital information		BD	Departament of Information and communication technology
Cycle of main disciplines					
9	MIMT 9 «Modern Internet and Mobile Technologies»	1) Web technologies 2) Internet programming	11	MD	Departament of Information and communication technology
		1) Android application development 2) Development of iOS applications		MD	Departament of Information and communication technology
10	AIR 10 «Artificial Intelligence and Robotics»	Artificial intelligence systems	11	MD	Departament of Information and communication technology
		1) Programming in the Arduino environment 2) Intelligent robotic systems		MD	Departament of Information and communication technology
11	NIT 11 «New information technologies»	1) Vector and raster graphics 2) Engineering and computer graphics	27	MD	Departament of Information and communication technology
		1) Digital animation technology 2) Modeling in 3D Max		MD	Departament of Information and communication technology
		1) Digital video and audio information processing 2) Hardware and software video editing		MD	Departament of Information and communication technology
		1) Software Interfaces 2) Applied calculations in spreadsheets		MD	Departament of Information and communication technology
		IT project development tools		MD	Departament of Information and communication

					technology
12	FC 12 «Final certification»	Industrial Practice	27	MD	Departament of Information and communication technology
		Undergraduate practice		MD	Departament of Information and communication technology
		Writing and defending a thesis (project) or passing a comprehensive exam		MD	Departament of Information and communication technology

2.2 Information about disciplines

№	Name of discipline	Short description of the discipline (30-50 words)	Number of credits	Formed learning outcomes (codes)
		Cycle of general educational disciplines *Compulsory component*		
1	Modern history of Kazakhstan	Deals with the main stages and features of the historical process in Kazakhstan at the present stage. Studies the main stages of independence and development of Kazakhstan's statehood in the context of the world process. Traces political and economic reforms on the path of independence. Reveals the main directions of Kazakhstan's foreign policy at the present stage	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 methodological integrity of research approaches	8	LO1
5	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

6	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
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_				
8	Social studies knowledge (interdisciplinary course)	Focused on the formation of students \u0027 complex ideas about the regularities of the functioning of the economy, obtaining a business education, reveals the features of creating and successfully running your own business. Deals with the basic laws of functioning of living organisms, ecosystems of different levels of organization, the biosphere as a whole and their stability. Contains theoretical bases of safety of activity; legal, normative-technical and organizational bases of safety of activity and methods of increase of safety of technical means and technological processes. Deals with the biography of Ilyas Zhansugurov, his place in the Kazakh literary science. Studies his contribution to the formation of artistic principles of Russian literature.	5	LO2
Cycle of basic disciplines **University component**				
9	Basics of logic programming	Examines general information about logic programming language; basic language elements and programming techniques; approval of targeted statements; arithmetic in logic programming language; examples of the use of logic programming language for solving problems of artificial intelligence.	5	LO4
10	Modern tools and methods of creating software	Discipline is a natural science discipline that includes solving mathematical, engineering and technical problems, creating the simplest workstations and IPS, developing client applications for the created database. Students will get acquainted with the system of visual programming, learn methods and tools for developing applications with a graphical interface.	5	LO5
11	Professional terms in the	Studies English as a necessary and sufficient level of communicative competence, which will allow to	5	LO3

	field of information systems	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.		
12	Higher mathematics	Studies basic algebraic and geometric concepts and research methods; methods for solving specific mathematical problems; methods of structural analysis and output. It forms the mathematical culture of the future specialist, acquires practical skills in problem solving, develops skills and abilities to independently improve their knowledge.	6	LO4
13	Algorithms and Programming Languages	Aimed at studying the ways of describing algorithms and their properties; varieties of data structures used at various levels of data presentation, determined by the design stages of the program; main algorithms for processing data structures: replenishment, deletion, modification, search, sorting (ordering)	6	LO5
14	Database theory	Studies the theoretical foundations and principles of database construction; physical presentation methods; presentation models; principles of building information systems based on databases; bases of functioning of modern DBMS; general SQL query language instructions.	5	LO6
Cycle of basic disciplines *Optional component*				
15	General Physics	Studies matter (matter) and energy, as well as the fundamental interactions of nature that govern the movement of matter. It is aimed at forming in students a modern understanding of the physical picture of the world, skills of research work, obtaining and processing experimental results, as well as skills of modeling physical processes when solving specific	5	LO4
16	Computational Physics	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, methods for their optimal implementation on a computer, and an estimate of the error of the result of the calculations	5	LO4
17	Computer computing	Describes the principles of mathematical experiments using programming languages and computer algebra systems. It is aimed at studying the mathematical package MathCad, which combines the possibilities of both a programming language and a computer algebra system.	5	LO4
18	Digital data processing	The discipline examines the main stages of information processing; basic statistical characteristics; classification in pattern recognition; planning an experiment when building a static	5	LO4

		model of an object. Aimed at studying modern mathematical packages for data processing, such as MatLab, MathCad, Statistica.		
19	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
20	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	LO12
21	Methodology of writing scientific publications	The main content of the course reflects the competence orientation of preparing students for active participation in modern intellectual technologies, involving the possession of skills and abilities of research activities, starting 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.	5	LO3
22	Development of electronic courses	The discipline is aimed at studying the methods of preparation and use in the educational process of electronic courses; technologies of collective creation and sharing of electronic documents and audio-visual materials for their application in the educational process and scientific research.	5	LO3
23	C / C ++ Programming	Studies the basic concepts of modern programming languages; principles of setting and solving problems using a computer; data types and basic constructions of the C / C ++ programming language; basic programming techniques in C / C ++ using the command interpreter.	6	LO5
24	Developing an application in the Delphi environment	Examines the technology of working in a visual Delphi programming environment; working with visual and non-visual components; graphic capabilities of the environment; work with the file structure at the operating system level; interaction with DB; complex interface elements.	5	LO5
25	Fundamentals of programming in assembly	Aimed at learning the basics of programming in Assembly: methods for addressing operands of Assembly, data transfer commands, arithmetic commands, logic commands, bit instructions, control transfer commands, types of subroutines, basic rules for designing programs in Assembly,	5	LO5

		structure of an assembler program.		
26	System Programming	Examines the main theoretical and practical aspects of system programming at the level of program development, which allows obtaining modern programs with a complex logical structure at the lowest cost. Describes the organization and capabilities of internal computer nodes; number systems; segments.	5	LO5
27	Object Oriented Programming with C ++ Builder	Directed to theoretical and practical training, providing knowledge on the basics of object-oriented programming; obtaining practical skills in developing object-oriented programs; obtaining skills of using standard techniques in compiling and debugging object-oriented programs on personal computers.	5	LO5
28	Basics of C# Programming	Considers the C # programming language, which is one of the important elements of the Microsoft .NET platform. Introduces the syntax and semantics of the C # programming language; feature of the .NET architecture; principles of application development within the framework of the object-oriented programming paradigm.	5	LO5
29	Big Data	Examines the basic principles, approaches and directions of technologies and infrastructure of Big Data; Big Data Ecosystems; Big Data Management Systems; Big Data field of application and Big Data processing system architecture; parallel algorithms and equipment for working with big data.	5	LO6
30	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
31	Creation of databases by means of programming systems	Describes the principles of database design and tools for designing database structures; object-oriented programming technologies and components for working with databases; Table and Query datasets; navigation and relational ways to access the database.	6	LO6
32	Database Management Systems	Examines the characteristics and types of database systems; fields of application of database management systems; stages of database design; physical database organization; means of maintaining integrity in databases; data management features in distributed processing systems; order of operation of databases.	6	LO6
33	Operating Systems	Considers the concept of the operating system, its functions; types of operating systems; conceptual models of building operating systems; principles of	6	LO7

		operation of various operating systems; principles of interaction of operating systems with peripheral devices and users; machine-dependent and machine-independent properties of operating systems		
34	Computer architecture	Examines the classification of computers according to various characteristics, characteristics and features of various computer classes, development trends of computer systems; structural and functional scheme of a personal computer, the purpose, types and characteristics of central and external PC devices; forms of information in the computer.	5	LO7
35	Circuit Design	Examines the fundamental laws of nature and the basic physical laws in the field of electricity; basic concepts and methods of mathematical analysis, algebra, mathematical logic, methods for calculating electrical circuits; requirements for signals in transmission and information conversion systems; properties of components and the basis of electronic devices circuitry, modern element base of microelectronic analog and digital devices.	6	LO7
36	Microprocess or technology	Studies the theoretical foundations of building microprocessors and microprocessor systems; characteristics and types of microprocessors; methods of interfacing microprocessor systems with external devices; the structure of single-chip microcontrollers and the principles of operation of microprocessor devices based on them; hardware and software implementation principles of control and monitoring devices.	6	LO7
37	Computer networks	Describes the history of development and basic solutions in the field of computer networks; basic concepts of local and global networks and the basics of data transmission; computer network hardware and software; methods of organizing and methods of combining computers in a network; multilayer OSI model; protocols: basic concepts, principles of interaction, differences and features of common protocols.	5	LO8
38	Computer Systems and Networks	Aims at studying the principles of construction, composition, purpose of computer hardware and software, features of their functioning; general principles of functioning of computer networks, their classification and application; principles of networks built on the basis of basic technologies of local networks and be able to develop networks using these technologies.	5	LO8
39	Information Security and	Describes the basics of information security and information security; principles of cryptographic	5	LO8

	Information Security	transformations; typical software and hardware and information protection systems from unauthorized access to the computer environment; regulatory support of information security.		
40	Digital Information Protection	Considers issues of information security in modern information systems, security tools like cryptography, electronic digital signature; It gives an overview of the main threats to information security, the main methods of preventing threats, the mechanisms for implementing these methods.	5	LO8
Cycle of main disciplines *University component*				
41	Artificial intelligence systems	Studies the theoretical foundations of artificial intelligence systems; new modern technologies for building intelligent systems; direction of research in the field of artificial intelligence; representation of knowledge in artificial intelligence systems; knowledge bases and expert systems; types of expert systems; pattern recognition.	5	LO9
42	IT project development tools	The discipline involves the study, listing and classification of software tools for project development; determination of the direction of application, composition, methods and tools of instrumental software; analysis of the possibilities and characteristics of the use of tools, their information support	5	LO12
Cycle of main disciplines *Optional component*				
43	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
44	Engineering and computer graphics	The discipline includes three sections: descriptive geometry, engineering graphics 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	5	LO11
45	Web technologies	Teaches networking skills of working with Web resources and Web services; forms ideas about the structure and principles of functioning and development of modern Web-resources; acquaints with the main methods of modern Web-technologies in professional activities, as well as with decision-making support tools and the	6	LO10

		possibilities of their application in the tasks of managing information resources of an enterprise.		
46	Internet programming	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.	6	LO10
47	Android application development	The discipline is aimed at studying students the basics and principles of developing applications for Android operating systems; technology to create mobile applications using the programming language through Android; complex interface elements.	5	LO10
48	IOS application development	As part of the course attention is paid design features custom interface and design mobile apps devices on the platform IOS. Students will learn create modern high performance applications as general, and narrow directions, interface which will take into account user features their needs as well Terms of Use. All will be studied required standard libraries without which no cost attachment.	5	LO10
49	Programming in the Arduino environment	This discipline is designed to study the Arduino environment, which studies the design features Custom interface. Considers the development mobile apps Arduino environment devices; application creation technologies, and complex interface elements.	6	LO9
50	Intelligent Robotic Systems	Discipline is devoted to the basics of the theory and methodology of creating intelligent systems and robotic systems. The course outlines the basics of the theory of intelligent systems: the representation of knowledge, methods for finding solutions. The methodology and examples of creating expert systems are given. The basics of the theory of image recognition and image recognition systems, communication with a computer in a natural language and speech communication systems are considered.	6	LO9
51	Digital animation technology	Introduces the student with basic digital technologies necessary for the implementation of projects in various design directions. Forms 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	LO11
52	Modeling in 3D Max	Examines the basics of modern three-dimensional graphics and animation, mastering their principles of work and the basics of modeling. An important	5	LO11

		task of mastering the discipline is obtaining solid knowledge and acquiring skills in using new technologies for collecting and processing spatial data, creating three-dimensional objects.		
53	Digital video and audio processing	Considers theoretical and practical bases of 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.	5	LO11
54	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
55	Applied calculations in spreadsheets	Considers modern spreadsheet processors, also shows the capabilities of an Excel spreadsheet processor for solving various tasks that require processing large amounts of information, without possessing special knowledge in the field of programming	5	LO12
56	Software interfaces	Aimed at studying the main types of software, application packages (MS Word, MS Excel, MS Power Point, etc.)	5	LO12

2.3 Additional educational programs (Minor)

In order to form additional competencies for related or specialized educational programs that will help graduates of ZhSU named after I. Zhansugurov to be more competitive in the labor market, as well as to meet their personal needs, students are offered to study one of the programs Minor to choose from.

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

2.4 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 educational program 6B06101 «Computer Science», the teaching staff uses the following innovative technologies and teaching methods.

Teaching methods:

- business games that allow you to simulate real situations and simulate professional activities through the game;
- "round table", forming the ability to solve problems and teaching the culture of discussion;
- "brainstorming" for the organization of collective mental activity in the search for innovative ways to solve problems;
- analysis of specific situations (case-study) in order to develop active cognitive activity of students.

Innovative technologies: student-centered learning; problematic training; block-modular training; project method; distance learning technologies.

2.5 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 implemented by the Department of Information and communication technology. Quantitative and qualitative indicators of teaching staff serving the educational program (basic and major disciplines(:

The total number of teaching staff 14 people, including:

Candidates of Sciences – 6

PhDoctors – 1

Masters – 7

The degree of Department – 50%.

Qualification characteristics of the teaching staff of the Department of accounting and Finance are reflected in the Personnel directory.

3.2 logistics

The learning environment of the educational program is represented by the following characteristics:

1) Library stock and services

An obligatory guarantee of quality educational services of higher education institution is the provision of information resources.

The most important part of the information resources is the library Fund – the oldest and most important of the foundations of civilization, a repository of valuable knowledge and spiritual wisdom, national memory, cultural and scientific heritage of many generations.

The library Fund on the educational program, the code and the name for May 1, 2021 makes 4152 copies, including in the state language - 2025 copies, 2070 in Russian and 57 in foreign languages. Insert information about library collection which your University Library provides students and faculty access to databases: Thomson Reuters, Elsevier, Scopus, Polpred.com, Kaznel, Epigraph, NCSSTE.

Access to the Republican interuniversity electronic library (RIEL), which combines electronic educational and scientific resources of Universities of Kazakhstan, is provided.

Currently, the library has bibliographic databases of its own generation – an Electronic catalogue: "Books", "Periodicals (subscription)", "Electronic publications", "Abstracts", "Brochures", "Notes", "Articles". The library has created a multi-level information Website: http://www.zhgu.edu.kz/.

Since 2009 the electronic catalog in library is conducted in more advanced library and information system "The Kazakh automated library and information system" ("KABIS": the automated workplace "Acquisition", the automated workplace "Cataloger", and "Administrator"). All remote users of the library can view the catalog from any computer included in the local computer network of the University.

The library has access to the electronic database "Library Fund of ZhSU", which works in the corporate network of the University. There are 1465 full-text books in this database, 400 of them were purchased from the publishing house "Epigraf", 1065 were scanned by the library staff. The presence of a planetary scanner is a new generation of "electronic archive" allows you to quickly and accurately scan books, catalogs, magazines, newspapers, coins, medals, coinage, art paintings, historical documents, and be added to the electronic database.

The library opened multifunctional halls of electronic resources, created Wife zone, updated software processing information.

User service is carried out in 5 reading rooms, which are equipped with 114 automated workstations.

Readers of the library have the opportunity to get literature at home from the subscription of educational, scientific and fiction, as well as to search for books in the open, free access, independently select sources of information that develops skills of professional search, broadens the horizons of students and attracts them to read books.

2) Student residence

Currently, the University has two student residence with 524 bed capacity. In students residence, created an enabling environment for a full life and study: there are residential sections, which are equipped with sanitary units, rest rooms with TVs, reading and computer rooms, showers and Laundry, household rooms, equipped with electric stoves.

The organization of social and cultural life in the dormitories engaged in student councils, elected from among the student activists. An electronic database of students living in the dormitories has been created. The allocation of seats in the dormitories to consider applications of students-orphans and are provided with free dormitories. Doctoral and master students enrolled in the target program are fully provided with a dormitory.

3) *Distance learning technologies (DLT).*

To provide students with the opportunity to develop educational programs of higher education, directly at the place of residence, in Zhetysu state University named after I. Zhansugurov since 2011 has been introduced distance learning.

Distance learning is provided by the use of a set of modern information and communication and educational technologies that allow carrying out the processes of learning, knowledge control, online proctoring, practical training and consultations on a fully indirect interaction of the student and the teacher.

Distance learning technologies are used in relation to students enrolled in educational programs with a reduced period of study on the basis of technical and professional, post-secondary and higher education.

For the organization of educational process on remote educational technologies at University the information and educational portal with the pages containing educational and methodical, testing and organizational and administrative information for students is created.

To equip trainees with the educational-methodical materials on all disciplines of the curriculum that are implemented with the use of distance learning technologies, the faculty developed the electronic educational and methodical complexes, electronic textbooks, video lectures.

To carry out the process of educational interaction in real time at the University there is a specialized multimedia audience, which allows you to conduct classes in the "on-line" mode.

4) *Possibility of free additional training*

For those who want to improve their skills or get additional education, the University opened a Center of advanced training and additional education.

On the basis of the center, students of the University can undergo free language training in English and prepare for the exam to confirm the international level of English – IELTS.

The Lagoon of English club is organized at the center for the development of skills of spoken English, vocabulary, formation of intercultural professionally-oriented communicative competence. Volunteers – native speakers take part in the work of the club.

At the center opened an office "Robotics". Everyone in his spare time can design and program robotic structures and mechanisms.

The center organizes and conducts training seminars and refresher courses with the issuance of certificates for teachers and all categories of employees in the main priority areas of science and education.

5) *Development of entrepreneurial competencies*

For the development of entrepreneurial competencies of students and young scientists at the University opened an Office of commercialization of research results, which successfully operates the competence center "Start-Up Academy ZHGU".

"Start-Up Academy ZHGU" – a platform that unites students, business coaches, entrepreneurs, investors, government representatives and other stakeholders. The Academy provides free, comprehensive support to budding entrepreneurs from consulting and information support to attract investors, facilitate the submission of applications for participation in financial programs or to receive government grants.

The Academy provides the entire necessary infrastructure for the youth of Almaty region to develop innovation and entrepreneurship and increase the number of small and medium-sized businesses. The Academy conducts training sessions and seminars, engaged in targeted search, selection and development of start-up projects, as well as consulting support on the development of startups and measures of state support of entrepreneurship, organization of mentoring, providing expert support, conducting grant competitions.

6) *Maintaining a healthy lifestyle and playing sports*

For the youth of the University created favorable conditions for sports and maintain a healthy lifestyle. In their free time, students are free to engage in sports halls and sections of several sports.

Active work in this direction is carried out by the Sports club of the University, 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 sports and recreational activities, 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, throwing grenades and treadmills, Boxing, gymnastics, wrestling and a gym equipped with modern sports equipment, tourist bases "Karlygash" and "Kulager".

7) *Socio-Cultural environment and development of creative personal qualities*

Today, the system of training at the University must meet the highest educational standards, be universal, ensure the formation of key competencies of the specialist as the basis of his professional skills and personal growth.

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, the Department of cultural work, 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 at the University operate:
- Department of the Assembly of peoples of Kazakhstan;
- dance ensembles "Shagala" (winner of international competitions) and "Kulager";
- vocal and instrumental ensemble "Live Band";
- student theatre "Zhas Tulek";
- debater's club "Ilyastyn Soz Kulagerlery";
- volunteer clubs "Alau", "Rise up", "Kush-Zhiger", "Ayala";
- club of fun and resourceful "Amigo", "Physics and mathematics" and "Creative", "Dollar";
- club "Young journalist";
- literary club "Mizam";
- intellectual club "New generation";
- student Association "Zhas Otan";
- labor Association "Zhasyl El";
- Association of public police assistants "Zhas Kyran";
- Military-Patriotic club "Erlik";
- club "Kyzykty psychologiya".

8) *Internet Access and Wi-Fi*

The University has powerful technical support – 50 multimedia boards and 1071 computers, 87 of which are in the reading rooms of the library, academic buildings, dormitories in free access

for students. All computers of the University are provided with free access to the global Internet, the speed of which is 300 MB/s. Free access to Wi-Fi at a speed of 100MB/s is Provided.

9) Digitalization of the educational process

In order to develop digitalization, informatization, automation of processes, the University uses modern hardware and software.

The University is provided and equipped with software that allows automating the main processes of the University (educational, research, social and educational).

Department of development and implementation of information systems of the University created and implemented such software as: "Selection Committee"; "Accounting and movement of students"; "Educational and methodical complex of discipline"; "Registration for discipline"; "Class schedule"; "Electronic journal of students quality control"; "State certification Commission/State examination Commission"; "Computer testing"; "Transcript"; "Diploma supplement"; "Distance learning DiLear"; "Library Fund of ZhSU"; "Personnel management Department"; "The system of accounting of working time of the employee"; "Sending data to Unified system of higher education management", etc.

The University is developing a flexible, customer-oriented platform of the new generation "Smart ZhetySU", aimed at digitalization, automation, optimization of the main processes of the University, as well as ensuring high-quality interaction between the teacher and the student through a personal account at each stage of training.

10) Publishing services

High-quality and effective educational and scientific activity of higher educational institution is impossible without reliable publishing support. Therefore, in order to prepare for the publication of teaching AIDS, scientific works and improve the quality of printing products, the University has a publishing Department.

The Publishing Department of the University is a modern publishing and printing complex with an expanded range of services and a full printing production cycle.

The complex of measures and organizational and technical works aimed at the production of scientific, educational, methodical, reference products of the University is carried out on the basis of its own material and technical resources. All conditions are created for timely performance of work.

The publishing Department is provided with modern computer and printing equipment designed for high-speed digital printing of books, brochures, booklets, brochures. Modern equipment of the publishing Department allows you to publish blanks and printing products of the highest quality in the shortest possible time.

The publishing Department also produces advertising and information, advertising and image and presentation printing products (about 500 items per year).

3. 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	2021-2025	PTC
2	The development of work programs of practices and guidelines for the implementation of theses	2021-2025	PTC
3	Development of EMCD	2021-2025	PTC
4	Organization and holding of methodical seminars, trainings, master classes	2021-2025	PTC
5	Development of test tasks and questions	2021-2025	PTC
Research direction			
1	Publication of textbooks, teaching aids, monographs	2021-2025	PTC
2	Development and implementation of innovative technologies in the educational process	2021-2025	PTC
3	Participation of faculty members in regional, republican and international conferences	2021-2025	PTC
4	Publication of articles in scientific journals database KKSON, RISC	2021-2025	PTC
5	Publication of articles in scientific journal databases Scopus, Thomson Reuters	2021-2025	PTC
6	Fulfillment of scientific projects of the GF MES	2021-2025	PTC
7	Creation of electronic textbooks, patents, copyright certificates, acts of implementation based on the results of research	2021-2025	PTC
8	Participation of students in competitions, competitions, research grant programs, start-ups	2021-2025	PTC
Educational direction			
1	Development of plans for educational work and holding curator hours	2021-2025	PTC
2	Participation of students in various activities of the university, faculty, department	2021-2025	PTC
3	Visiting various sports clubs by students	2021-2025	PTC
Advanced training			

1	Participation of faculty in scientific seminars for the purpose of advanced training	2021-2025	PTC
2	internship in scientific centers, universities of the Republic of Kazakhstan, far and near abroad	2021-2025	PTC
3	Training courses and language training	2021-2025	PTC
Career guidance			
1	Participation in the organization of university's open days	2021-2025	PTC
2	Publication of information on the university's site and in the newspaper on the activities of the faculty	2021-2025	PTC