

MINISTRY OF SCIENCES AND HIGHER EDUCATION OF THE REPUBLIC OF
KAZAKHSTAN
M.O. AUEZOV SOUTH KAZAKHSTAN UNIVERSITY

«APPROVED»

Chairman of the board -

Rector _____

Doctor of historical sciences,

Academician, Kozhamzharova D.P.

«__» _____ 2022

EDUCATIONAL PROGRAM

6B06120—«Information systems»

Registration number	6B06100023
Code and classification of the field of education	6B06 Information and Communication Technology
Code and classification of areas of training	6B061 Information and communication technology
Group of educational programs	B057 Information technology
EP type	Acting
ISCE level	6
NQF level	6
IQF level	6
Language of instruction	Kazakh, Russian, English
The complexity of the EP, not less	240 credits
Distinctive features of the EP	-
Partner university (JEP)	-
Partner university (DDEP)	-

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The EP was considered in the direction of training information and communication technologies at a meeting of the academic committee, protocol № ____ «____» _____ 2022 y.

Chairman of the Committee _____ Shertayev E.T.

Signature

The EP was considered and recommended for approval at Educational-methodical meeting of M. Auezov SKU
protocol № ____ « ____ » _____ 2022 y.

The EP was approved by the decision of the Academic Council of the University
protocol № ____ « ____ » _____ 2022 y.

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1.CONCEPT OF THE PROGRAM

University Mission	Generation of new competencies, preparation of a leader who translates research and entrepreneurial thinking and culture.
University Values	<ul style="list-style-type: none"> • Openness – open to change, innovation and cooperation. • Creativity - generates ideas, develops them and turns them into values. • Academic freedom - free to choose, develop and act. • Partnership – builds trust and support in relationships where everyone wins. • Social responsibility - ready to fulfill obligations, make decisions and be responsible for their results.
Graduate Model	<ul style="list-style-type: none"> • Deep subject knowledge, its application and constant expansion in professional activity. • Information and digital literacy and mobility in a rapidly changing environment. • Research skills, creativity and emotional intelligence. • Entrepreneurship, independence and responsibility for their activities and well-being. • Global and national citizenship, tolerance for cultures and languages.
The uniqueness of the educational program	<ul style="list-style-type: none"> • Orientation to the regional labor market and social order through the formation of professional competencies of the graduate, adjusted to the requirements of stakeholders. • Practice orientation and emphasis on the development of critical thinking and entrepreneurship, the formation of a wide range of skills that will allow you to be functionally literate and competitive in any life situation and be in demand in the labor market.
Academic Integrity and Ethics Policy	<p>The university has taken measures to maintain academic honesty and academic freedom, protection from any kind of intolerance and discrimination:</p> <ul style="list-style-type: none"> • Rules of academic integrity (protocol of the Academic Council No. 3 dated October 30, 2018); • Anti-corruption standard (Order No. 373 n/k dated December 27, 2019). • Code of Ethics (Protocol of the Academic Council No. 8 dated January 31, 2020).
Regulatory and legal framework for the development of EP	<ol style="list-style-type: none"> 1. Law of the Republic of Kazakhstan "About Education"; 2. Standard rules of activity of educational organizations implementing educational programs of higher and (or) postgraduate education, approved by Order of the Ministry of Education and Science of the Republic of Kazakhstan dated October 30, 2018 No. 595 with amendments and additions dated December 29, 2021 No. 614 3. State obligatory standards of higher and postgraduate education, approved by order of the Ministry of Education and Science of the Republic of Kazakhstan dated July 20.2022 No. 2; 4. Rules of the organization of the educational process on credit technology of training. Order of the Minister of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152; 5. Qualification directory of positions of managers, specialists and other employees, approved by order of the Minister of Labor and Social Protection of the Republic of Kazakhstan dated December 30, 2020 No. 553.

	<p>6. Guidelines for the use of ECTS.</p> <p>7. Guidelines for the development of educational programs for higher and postgraduate education, Appendix 1 to the order of the director of the Central Library and Medical Academy No. 45 o /d dated June 30, 2021</p>
Organization of the educational process	<ul style="list-style-type: none"> • Implementation of the principles of the Bologna Process • Student-centered learning • Availability • Inclusivity
Quality assurance of the Educational program	<ul style="list-style-type: none"> • Internal quality assurance system • Involving stakeholders in the development of the Educational Program and its evaluation • Systematic monitoring • Content update
Requirements for applicants	<p>Established in accordance with the Model Rules for Admission to Education in Educational Organizations Implementing Educational Programs of Higher and Postgraduate Education Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 600 of 10/31/2018</p>

2. PASSPORT OF THE EDUCATIONAL PROGRAM

Purpose of the EP	To train highly qualified, multilingual specialists with critical thinking, ready for professional work in digitation of various sectors of the economy, possessing advanced knowledge in the field of IT-technologies
Tasks of the EP	<ul style="list-style-type: none"> - the formation of socially responsible behavior in society, a high general intellectual level of development, mastery of competent and developed speech, multilingualism, a culture of thinking, understanding the importance of professional ethical standards and following these standards; - providing lifelong learning skills that will enable them to successfully adapt to changing conditions throughout their professional careers; - formation of the competitiveness of graduates in the field of information technology to ensure the possibility of their fastest possible employment in their specialty or continuing education at subsequent levels of education; constant feedback with stakeholders and ensuring their requests.
Harmonization of EP	<ul style="list-style-type: none"> • 6th level of the National Qualifications Framework of the Republic of Kazakhstan; • Dublin descriptors of the 6th level of qualification; • 1 cycle of a Framework for Qualification of the European Higher Education Area); • 6th Level of European Qualification Framework for Life long Learning).
Connection of the EP with the professional sphere	<ol style="list-style-type: none"> 1. Professional standard "Software Maintenance" (Appendix No. 29 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated December 24, 2019 No. 259). 2. Professional standard "Creation and management of information technologies" (Appendix No. 40 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated December 24, 2019 No. 259). 3. Professional standard "Database designers and administrators", approved by order No. 171 dated July 17, 2017 of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" (Appendix No. 3); 4. Professional standard "Software developers and specialists in testing, WEB and multimedia applications", approved by order No. 171 dated July 17, 2017 of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" (Appendix No. 2); 5. Professional standard "Business Analytics and IT Project Management" (Appendix No. 5 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated December 24, 2019 No. 259). <p>Professional standard "Network, system administrators and server administrators" (approved by NCE RK "Atameken" - order No. 330 dated December 5, 2018).</p>
Name of the degree awarded	After the successful completion of this EP, the graduate is awarded "Bachelor in Information and Communication Technologies in the educational program 6B06120 - "Information Systems".
List of qualifications and positions	Bachelors can hold the primary positions of a software maintenance specialist (NKZ code 2513-0-001; APCS engineer § 84 of the

	<p>Qualification Directory of Positions); a specialist in the creation and management of information resources (content manager 2529-0-003; engineer for scientific and technical information § 24 of the Job Qualification Directory); mobile application developer (NKZ code 2512-2-003; programmer engineer § 46 of the Job Qualification Directory); database administration specialist (database administrator, NKZ code 2521-1-002; system administrator § 39 of the Qualification Directory of Positions); a database management system specialist (NKZ code 2521-1-004; system administrator § 39 of the Qualification Directory of Positions); big data specialist (NKZ code 2521-1-003); database analytics (NKZ code 2521-3-001); business analytics in the field of IT (NKZ code 2511-2-001); administrator of information systems (code according to NKZ 2523-0-002; system administrator § 39 of the Qualification Directory of Positions) in research institutions, design, design and other organizations without presenting requirements for work experience in accordance with the qualification requirements of the National Classifier of the Republic of Kazakhstan (NKZ), approved by the order of the Committee for Technical Regulation and Metrology of the Ministry for Investments and Development of the Republic of Kazakhstan dated December 30, 2020 No. 553.</p>
Field of professional activity	<p>-Public and private enterprises and organizations using automated information systems in various fields of economic activity. -Research, design, development, testing, implementation and maintenance of information and communication systems</p>
Objects of professional activity	<p>Enterprises and organizations of various forms of ownership that develop, implement and operate information systems in various areas of human activity.</p>
Subjects of professional activity	<ul style="list-style-type: none"> - Software applications by areas of activity; - Information systems software; - Websites of organizations; - Databases of information systems; - Simulation games for making managerial decisions; - Mobile application programs.
Types of professional activity	<ul style="list-style-type: none"> - design and engineering; - production and technological; - organizational and managerial; - operational; - commercialization, entrepreneurial activity
Learning outcomes	<p>LO1 Communicate freely in the professional environment and society in Kazakh, Russian and English, taking into account the principles of academic writing and the culture of academic honesty. LO2 Apply natural science, mathematical, social, socio-economic and engineering knowledge in professional activities, methods of mathematical data processing, theoretical and experimental research, regulatory documents and elements of economic analysis. LO3 To develop, test, implement and maintain all types of ICT project support in accordance with standards. LO4 Describe and practically apply three-dimensional and interactive computer and illustrative graphics; web design; Smart technologies (on the example, "Smart Home"); LO5 Program in environments: C++ - for resource-intensive technologies and solving problems on devices with minimal performance; Python - in data analysis, machine learning, DevOps and WEB development; Java,</p>

PHP - in the development of interactive products for the Internet; iOS, Android, WP, Tisen - when developing mobile applications.

LO6 Describe the basic principles of information security in IS, recommend how to practically implement the technical protection of information in the design and implementation of information processes on various devices;

LO7 To install and configure the software and ensure the operation of the database; ensure the information security of the database;

LO8 Apply mathematical apparatus in solving problems using artificial intelligence; in computer modeling, including simulation models; in designing economic IS and for processing statistical data;

LO9 Manage the functioning of the organization's IT infrastructure; ensure the regular operation and security of the OS, SOS and DBMS; apply and configure the 1C: Enterprise software product to automate accounting and management accounting of the enterprise;

LO10 Analyze and process big data using Big Data and Data Mining technologies.

LO11 Lead a healthy lifestyle, apply the ability of self-learning and self-education throughout life.

LO12 To be able to work effectively individually and as a member of a team, correctly defend their point of view, correct their actions.

3. COMPETENCES OF GRADUATE EP

SOFT SKILLS. Behavioral skills and personal qualities.	
SS1. Competence in managing one's own literacy.	SS1.1. The ability to self-learn, self-develop and constantly update their knowledge within the chosen trajectory and in an interdisciplinary environment. SS1.2. Ability to express thoughts, feelings, facts and opinions in the professional field. SS1.3. Ability for mobility in the modern world and critical thinking.
SS2. Language competence	SS2.1. The ability to build communication programs in the state, Russian and foreign languages. SS2.2. The ability to interpersonal social and professional communication in terms of intercultural communication.
SS3. Mathematical and scientific competence	SS3.1. The ability and willingness to apply the educational potential, experience and personal qualities acquired during the study of mathematical, natural science, technical disciplines at the university to solve professional problems.
SS4. Digital competence, technological literacy	SS4.1. The ability to demonstrate and develop information literacy through the mastery and use of modern information and communication technologies in all areas of their lives and professional activities. SS4.2. The ability to use various types of information and communication technologies: Internet resources, cloud and mobile services for searching, storing, protecting and disseminating information.
SS5. Personal, social and academic competencies	SS5.1. Ability to physical self-improvement and focus on a healthy life to ensure full-fledged social and professional activities through the methods and means of physical culture. SS5.2. Ability to social and cultural development based on the manifestation of citizenship and morality. SS5.3 The ability to build a personal educational trajectory throughout life for self-development, career growth and professional success. SS5.4. The ability to successfully interact in a variety of socio-cultural contexts at school, at work, at home and at leisure.
SS6. Entrepreneurial competence	SS6.1. Ability to be creative and entrepreneurial in a variety of environments. SS6.2. The ability to work in a mode of uncertainty and rapidly changing task conditions, make decisions, allocate resources and manage your time. SS6.3. Ability to work with consumer needs.
SS7: Cultural Awareness and Expressiveness	SS7.1. The ability to show worldview, civil and moral positions. SS7.2. The ability to be tolerant of the traditions and culture of other peoples of the world, to have high spiritual qualities.
HARDSKILLS	
Theoretical knowledge and practical skills specific to this area	HS1 Ability to develop, modify, control software; design structure and content, writing code for application software, databases, Web pages.
	HS2 The ability to develop databases that allow solving the problem of storing and organizing information according to the individual requirements of the company; install, configure, deploy, maintain, optimize the operation of databases, monitor.
	HS3 Ability - to provide the required mode of operation of network devices that are part of the local area network; monitor the state of network elements, identify and resolve emerging problems.
	HS4 Ability to set up, configure, monitor, upgrade and troubleshoot

	software.
	HS5 The ability to assess the adequacy and effectiveness of the internal control system and the risk management system in the field of information technology, to participate in comprehensive information security audits.
	HS6 The ability to independently develop technical documentation for products in the field of IT, develop technical documents for information and methodological purposes, manage technical information.
	HS7 Ability to develop terms of reference for the project along with the specification, detailing the requirements of the customer; advising programmers and testers during product development.
	HS8 Ability to develop, support mobile applications and draw up relevant documents.
	HS9 The ability to solve all issues related to the stages of the technological process, labor safety in production, environmental protection.

3.1 Matrix for correlating EP learning outcomes as a whole with the resulting competencies of the modules

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12
SS 1	+	+										+
SS 2	+											+
SS 3		+						+				
SS 4		+				+			+			
SS 5	+										+	+
SS 6		+				+					+	+
SS 7	+											+
HS 1		+	+				+	+				
HS 2		+						+	+			
HS 3		+	+	+	+		+					
HS 4			+	+	+		+		+			
HS 5		+	+		+							
HS 6									+			
HS 7		+						+		+		
HS 8		+	+						+			
HS 9		+	+									+

4. MATRIX OF THE INFLUENCE OF DISCIPLINES ON FORMATION OF LEARNING OUTCOMES AND INFORMATION ON LABOR INTENSITY

№	Module name	Cycle	OC/UC/EC	Component name	Brief description of the discipline (30-50 words)	Number of credits	Formed LO (codes)												
							LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12	
1	Social Sciences Module	GED	OC	History of Kazakhstan	The purpose of the discipline is formation of an objective idea of the history of Kazakhstan based on a deep understanding and scientific analysis of the main stages, patterns and originality of the historical development of Kazakhstan. Ancient people and the formation of nomadic civilization. Turkic civilization and the great steppe. Kazakh Khanate. Kazakhstan in the era of modern times. Kazakhstan as part of the Soviet administrative-command system. Declaration of Independence of Kazakhstan. State system, socio-political development, foreign policy and international relations of the Republic of Kazakhstan. Methods and techniques of historical description for the analysis of the causes and consequences of events in the history of Kazakhstan.	5		v											
		GED	OC	Philosophy	The basics of the emergence of philosophy are considered, the features of the emergence of the culture of thinking are revealed, the concepts of "philosophy", "worldview", the essence and content of the concepts of "being", "consciousness" are revealed; the relationship between the concepts of "cognition" and "creativity" is considered, the essence and content of the category of philosophy of freedom are revealed, the skills of highlighting the essence of a philosophical problem, critical thinking, skills of researching philosophical aspects, problems of practice and cognition are developed.	5		v										v	v
2	Socio-political knowledge module	GED	OC	Sociology and Political Science	The theory of sociology, social structure and stratification of society are studied, the role and place of politics in society are explained, the main stages of the formation and development of political science, including youth policy, the role of politics in the system of public life is examined, the essence of the state is revealed, the relationship between the	4		v										v	v

					state and civil society is revealed. ; principles of copywriting and rewriting.															
		GED	OC	Culturology and Psychology	Describe the socio-ethical values of society as a product of integration processes in the systems of basic knowledge of the disciplines of the socio-cultural-psychological module; analyze the features of psychological institutions in the context of their role in the modernization of Kazakhstani society; to form programs for resolving conflict situations in society, including in professional society; be able to correctly express and defend one's own opinion having social significance	4		v											v	v
3		GED	US	Ecosystem and Law	Formation of integrated knowledge in the field of economics, law, anti-corruption culture, ecology and life safety, entrepreneurship, scientific research methods. Fundamentals of safe human-nature interaction, ecosystem and biosphere productivity. The entrepreneurial activity of society in conditions of limited resources, increasing the competitiveness of business and the national economy. Regulation of relations in the field of ecology and human life safety. Knowledge and compliance of Kazakhstan's law, obligations and guarantees of subjects, state regulation of public relations to ensure social progress. Application of scientific research methods.	5	v	v											v	v
		BD	EC	Actual problems and Renewal consciousness	Discuss topical issues of science and education, spiritual revival in the framework of the implementation of the main directions of the "Rukhani Zhangyru" Program. Describe the mechanisms for protecting the economic interests of Kazakhstan in the context of social modernization; prospects for the development of IT in science, education and practice within the framework of the State Program "Digital Kazakhstan-2020". Apply practical experience and knowledge to solve urgent problems of modernity, patriotism and worldview, spiritual guidelines in modern society.	3		v												
		BD	EC	Mukhtar Study	Knowledge of the biography, life and creative activity of the writer M.O. Auezov, knowledge of the poem "Abai" and the epic "The Way of Abai", to know the history of the publication of the poem and other works, the difficulties of creative life, understanding the role of the writer in the formation of the national dramaturgy of the early twentieth century, the writer's creativity. The writer's legacy. The	3		v												

					influence of the writer's creativity on the upbringing of the younger generation.																
		BD	EC	Abay Study	Mastering the course forms students' knowledge about the biography, life and creative activity of the great poet and writer Abai Kunanbayev. Knowledge of the poet's great heritage and the role of the influence of the writer's creativity on the upbringing of the younger generation, knowledge of the work and their understanding.			v													
4	Communication and physical education module	GED	OC	Kazakh (Russian) Language	To develop cognitive and communicative activities in the Russian (Kazakh) language in the areas of interpersonal, social, intercultural communication. To instill the skills of discussing ethical, cultural, socially significant norms in discussions, the ability to work in a team, interaction in a team, flexibility, creativity. Develop practical skills in interpreting text information, explaining their style, genre specifics in various areas of communication.	10		v											v		
		GED	OC	Foreign language	To form intercultural and communicative competence in the process of foreign language education at a sufficient level (A2), the level of basic sufficiency (B1), basic standardization (B2). Depending on the level of preparation of the student at the time of admission, he can reach level C1 if the language level of the student above level B1. Be fluent in written and oral communication in native and foreign languages, use information management skills	10		v												v	
		GED	OC	Physical education	Reveal the social significance of physical culture and its role in personal development and preparation for professional activities; methods of control, assessment of physical development and preparedness. Apply the acquired knowledge and skills in practical activities to improve efficiency, maintain and improve health, prepare for professional and creative activities to promote a healthy lifestyle.	8														v	
		BD	UC	Professional Kazakh (Russian) language	Formed skills of extracting necessary information from text, interpreting in professional communication, integrating with special disciplines based on professional, linguistic knowledge. Developed abilities to establish contacts at professional level; to competently build communications based on goals and situation; to build programs of speech in Russian (Kazakh) in professional communication.	3		v												v	
		BD	UC	Professional	Demonstrate the distinct features of technical English	3		v													v

				y Oriented Foreign Language	(lexico-grammatical and phonetical); develops the skills of reading arranging different types sentences and the technical literature in the field of information systems, skills of conversational English; the ability to argue for the purpose of a complete understanding of the information technology.														
		GED	OC	Information and Communication Technologies (in English)	Knowledge of computer systems, software. Development of skills in the use of information resources to search and store information, work with spreadsheets, work with databases. Application of methods and means of information protection; design and creation of websites, multimedia presentations. Skills of using e-government and e-textbooks, various cloud mobile technologies, management of SMART technologies.	5	v												v
5	Mathematical and natural science foundations	BD	UC	Physics	The laws of classical and modern physics are considered; modern scientific equipment and methods of physical research; techniques of modern physical experiment. The degree of reliability of the results of theoretical and experimental studies is assessed; an experiment is planned and its results are processed. The knowledge gained is used to solve specific problems from various fields of physics: mechanics, thermodynamics and molecular physics, electrodynamics, optics, etc.	4		v							v				
		BD	UC	Algebra and geometry	The basic fundamental concepts of linear algebra and analytic geometry are considered. Practical skills are taught in solving problems using vectors, matrices and operations on them, determinants, systems of linear algebraic equations, complex numbers, limits, a straight line on a plane, a plane and a straight line in space, canonical equations and the general theory of lines and surfaces of the second order.	4		v							v				
		BD	UC	Mathematical Analysis	Ability to explore SLAEs, carry out matrix calculations, own methods for calculating determinations, in-depth solution of geometric problems, create geometric images found in other mathematical and computer disciplines and apply the acquired skills in professional activities.	4		v							v				
		BD	EC	Theory of Probability and Mathematical Statistics	The basic fundamental concepts of mathematical analysis are considered. Practical skills of solving problems using differential calculus of functions of one real variable and functions of several variables are taught. Skills in solving indefinite integrals using basic integration methods; definite integrals and their applications in geometry, mechanics and physics; calculating the sums of numerical series.	4		v							v				

		BD	EC	Fundamentals of Econometrics	The basic laws and provisions of the theory of probability and mathematical statistics are considered. Practical skills of calculating probability are taught within the framework of the classical approach and using basic formulas, finding distribution laws and numerical characteristics of both random variables (one- and multidimensional) and functions of random variables, estimating distribution parameters and testing statistical hypotheses.			v						v				
		BD	EC	Introduction to specialty	Students form: ideas about the future specialty, the prospects for its development and the peculiarities of professional training in the specialty; knowledge in the field of the basics of designing information systems, necessary for further training and creativity; skills of using information resources and software and hardware are developed, motivation for self-study and development is formed	4		v										
		BD	EC	Fundamentals of Academic Writing	Develop skills and abilities to draw up a plan for the text of the study; write an abstract, research abstract; review the literature used in the research project; correctly quote, avoid plagiarism; use statistical data in your written work, including those presented graphically; edit what is written; compile bibliographic lists; make a presentation of your own project; conduct business correspondence			v										
6	Basics of programming	BD	UC	Algorithmization and programming	Use the basic laws and provisions of algorithms: principles of processing and analysis of algorithms, recursions, structured and basic data types, pointers, data structure, algorithms for processing data structures, processing strings, recursive algorithms, sorting, search - linear and binary, row processing, dynamic programming. Compare and apply algorithms when solving problems, perform them and test	5		v			v			v				
		BD	EC	Technologies of programming	The basic laws and provisions of programming technology are studied using the example of the C ++ programming system: operators, arrays, functions, graphics, files; programming tasks for processing data structures. Tools and methods for verifying the structure of program code, coding regulations in programming languages, regulations, tools and methods for software testing. Skills and abilities are developed to program in C ++, to verify the structure of the program code.	5		v			v							
		BD	EC	Content and language in learning	The lexical stock of thematic terminology necessary for reading and translating texts of scientific and technical material in the field of information systems; development of			v				v		v		v		

					the skill of oral presentations and presentations in English are considered. They are trained in practical knowledge of spoken and special foreign languages for active use in the professional field. Skills of improving and presentation thoughts, understanding the content of texts and basic phrases and terms in the specialty in written and oral form in a foreign language are acquired.													
		BD	UC	Educational practice	Expansion and deepening of the obtained theoretical knowledge on the development of algorithms and their programming; acquisition of initial practical skills and competencies in the field of professional activity, in solving specific problems. Use the basic laws and provisions of algorithms and programming in the C ++ environment	2	v			v		v						
7	Economic systems software	BD	UC	Object - Oriented Programming	Use the basic laws and provisions of object-oriented programming: data processing without using programming languages; modern programming languages, programming in Python, algorithms and their implementation in Python, efficient algorithms for sorting, working with regular expressions and groups and applying them to solving problems. Know organizational and technological support for coding in programming languages; IS testing (verification).	5		v			v							
		BD	EC	Economic Information Systems Software	Use the basic laws and regulations of IP software: creation of the main and context menu; classes for storing graphic objects; creation of graphic files; creating databases using utilities. Know the definition of change management and data access management; organization of IS acceptance tests (validation); organization of a repository for storing data on the creation (modification) and commissioning of ISs	5			v			v	v			v		
		BD	EC	CASE-technologies of Economic Information Systems Design	Use the basic laws and regulations of IC design: selection of IC design technology; information management system; methods and means of organizing metainformation; standard design of IS; computer-aided design of IS using CASE-technology: various approaches; content of RAD technology for prototyping applications; intersystem interfaces and drivers; standard methods of sharing access to databases and programs in complex information systems.			v	v						v	v		
		BD	EC	Programming in Java Environment	Use the basics of programming in the Java environment: Expressions and assignments. Java language operators. Arrays. Working with strings. Graphics. Object class and creation. Static methods in Java. Practice them when solving	5					v							

					problems														
		BD	EC	Programming in PHP Environment	Use the basic provisions of programming in the PHP environment: PHP capabilities; PHP application areas; ways of using; installation and configuration of software; basics of syntax; control structures; Query Processing; functions, objects and classes; arrays and strings; working with the file system; interaction between PHP and MySQL; interaction between PHP and XML.						v								
8	Theoretical foundations of information systems	BD	EC	Bases of Information Systems	Studied: fundamentals of systems theory and systems analysis; composition and general structure of information systems, basic concepts related to information, key components of information systems, class diagrams, use diagrams, interaction diagrams and other diagrams. The device and functioning of the IS and the principles of their interaction. Basic models of architecture of modern computing systems and networks. Life cycle and software development methodologies. Order CC and principles of software documentation. The composition of the hardware and software complex.	5		v	v										
		BD	EC	Bases of Information Theory	Use the basic laws and provisions of information theory: theoretical foundations of information measurement, information transfer, information discretization and quantization, information presentation in human-machine systems; methods of effective and noise-resistant coding of information, methods of analog-to-digital conversion of signals, basic color-forming systems, methods of compressing digital data; Huffman efficient coding technique; coding data in the Hamming error-correcting code.			v	v										
		BD	EC	Information Security and Data Protection	Know the threats to database security and how to prevent them. Database security tools. Means and methods for controlling access to the database. Methods and principles of information security. Database information security standards. Provide information security of the database: development of information security policy at the database level; development of normative and technical documentation for information security; control of compliance with security regulations and audit of the data security system at the database level.	5						v	v						
		BD	EC	Cryptographic methods of	To study and use the basic concepts of cryptography: General principles of differentiation of access rights to							v	v						

				Information Protection	information on the Internet, ensuring information security. Recognize the facts of violation of security regulations at the database level. Plan and implement measures to eliminate the consequences of violations of security regulations at the database level. Select criteria for evaluating the results of data audit at the database level. Develop an audit methodology and audit data security systems at the database level, evaluate its effectiveness.													
9	Technical means of information systems	BD	EC	Computer Systems Architecture	Know the principles of building aircraft architectures; organization and principle of operation of logical blocks of computer systems; information processing processes at all levels of architectures; principles of resource management. Prepare for software maintenance; software technical support; software user support. Analyze software problems and changes; carry out software transfer to a new environment, software decommissioning. Manage the development of the software maintenance service.	4		v				v	v			v		
		BD	EC	Networks technologies	Use the basic laws and provisions of network technologies: OSI model, protocol stack; client-server, peer-to-peer and hybrid networks; middleware; terminals and remote control; shared access to resources; directory services; database servers; unification of interfaces to databases; application servers; Web services; basics of security in computer networks; prospects for the development of network technologies			v				v	v			v		
		BD	EC	Operating Systems (OS), Environments and Shells	Use the basic laws and regulations of Operating Systems: composition, functions, classification, installation and configuration, kernel, shell software services, dispatcher. Network adapters. Physical structuring of the local network. OS family from Microsoft. History of Windows. Windows versions. Areas of Windows use. Structure: NT executive and protected subsystems. Multiple application environments. Object oriented approach. Network facilities. Basics of OS and DBMS system administration.	5		v				v	v			v		
		BD	EC	Network Operating Systems	Know the basic concepts used in the study of Network operating systems (computer resources, process, thread, task, SOS and others); definition, purpose and functions of SOS; main subsystems of SOS; stages of SOS evolution; methods of classification of SOS; modern trends in the development of SOS; purpose, device, functions of virtual machines			v				v	v			v		
		PD	EC	IT-	Know the basic concepts of the organization's IT	4		v				v	v			v		

				infrastructure	infrastructure: tasks and purpose, business architecture and information technology architecture, determining factors, standards and management techniques, management tools and systems. The role and functions of the IT infrastructure in the activities of the organization. IT infrastructure management standards and methods. Tools and systems for managing the IT infrastructure of the organization														
		PD	EC	Administrati on in Information Systems	Determine the initial requirements of the customer for IS and the possibility of their implementation in IS at the stage of pre-contract work; document the existing business processes of the customer's organization (reverse engineering of the business processes of the customer's organization); analyze requirements and develop models of customer's business processes; adapt the customer's business processes to the capabilities of the IS and prototype the IS; develop IP architecture, design and implement IP design.			v				v	v			v			
		PD	UC	Industrial practice I	Consolidation and demonstration of theoretical knowledge on network technologies, operating systems, IT-infrastructure of the organization and the acquisition of practical skills in the analysis and construction of architectures of computing systems, adaptation to the labor market and possible future work related to the design of information systems. Strengthening the skills of setting up operating systems. Demonstration of report design and protection skills	3		v	v			v				v			
10	Mathemat ical support of economic systems	BD	EC	Finite Structures and Information Coding	Use the basic laws and provisions of finite mathematics and coding theory: combinatorial analysis, finite groups, finite graphs, mathematical models of discrete information converters, such as finite automata, Turing machines, and the theory of algorithms. Apply them in solving applied problems	5			v			v				v			10
		BD	EC	Mathematical Logic	Use the basic laws and provisions of mathematical logic: elementary set theory; Boolean propositional logic; general theory of formal calculus; set-theoretic logic of predicates; to use the studied mat.apparat in solving typical problems; for solving problems from related fields of science and its applications; to the study of concepts and theories of modern mathematical logic to assess the degree of adequacy of the proposed apparatus for solving problems.				v			v				v			
		BD	EC	Computer	Apply the basic provisions of the application of software	5			v							v			

				Calculations	packages (APP) for calculations: the use of Mathcad for solving equations, matrix algebra problems. nonlinear equations, linear programming problems, modular programming. Practice the application of PPP in the design of IS													
		BD	EC	Bases of Computer Modeling	Use the basic laws and provisions of the theory of computer modeling: analytical and simulation apparatus of computer modeling (Monte Carlo method, modeling of random events, continuous and discrete random variables and processes), computer modeling of queuing systems and economic and organizational systems.		v						v					
		PD	EC	Cloud Computing Technologies in Business	Know the basic laws and regulations of cloud computing technology: modern infrastructure solutions, system and server blades, storage systems and networks, virtualization technologies and models, virtualization platforms, cloud computing architecture, network models of "cloud" services, Web services in the cloud - creation new project CloudService namespace. Compare and apply them when solving problems	5	v		v	v			v					
		PD	EC	Mathematical economics in the information systems	Use the basic laws and provisions of econometrics and statistical analysis: Basic concepts of statistics. Methods for statistical research of test results. Fundamentals of Statistical Analysis. Statistical tools. Typical problems of processing a small sample, linear and nonlinear approximations of stochastic dependence, time series in economics and management, principles of building a computer model for business planning. Processing of statistical data, application of methods of statistical calculations.		v						v					
11	Information support of IS	PD	UC	Database Management Systems	Examines the concepts, organization of the database, data models, functions of the database management system: modern storage technologies, data retrieval, query languages; technologies and software for database design; mathematical model of the database based on the Codd algebra; Describe basic operations in the language of relational algebra. Develop client and server parts of database distribution using modern DBMS.	5	v					v		v				
		PD	EC	Databases in information systems	Design, install and configure software; ensure the functioning of the database. Coordinate database access control: coordination of ensuring user access rights to the database; coordination of software configuration to support users' work with the database. Monitor events and manage	5			v			v	v		v			

					database backup and restore: regulation of backup activities; control of compliance with the regulations for backup and recovery of the database; data loss and corruption prevention management.													
		PD	EC	Structured Query Language SQL	Know SQL data types, fetching data (SELECT statement), ordering output fields, manipulating data, creating database tables, SELECT for specific columns. Modeling a logical data structure: defining data composition, structure and data sources; database structure design. Determination of the logical structure and physical implementation of the data; formation of data using queries from the database for the report; preparation of an analytical report.			v			v	v			v			
		PD	UC	Industrial practice II	Demonstration in practice of theoretical knowledge on information support of IP using database management systems. Acquisition of in-depth practical skills in analyzing information flows of the subject area and developing standard information objects and gaining experience in working in a team. Application of the method of analyzing the object of practice for structuring data. Demonstration of the skills of correct design and protection of the report.	6		v			v			v				
12	Basics of Internet technologies	PD	UC	Internet technologies	Examines modern principles, technologies for organizing the global computer network Internet, the basics of building the functioning of Internet application services; basic technologies of applied programming for the Internet. Develops skills in determining the network section with the maximum delay in the transmission of IP packets; formation of HTTP requests, analysis of HTTP response fields; development of hypertext documents, programming of Internet applications, possession of technologies for protecting Internet applications to ensure information security.	5				v	v	v				v		
		PD	EC	Web Technologies	Know Web technologies in networks of various levels. ISP, POP, NAP concepts. TCP / IP protocol stack. OSI Application Layer Protocols. Features HTML, DHTML, XHTML, XML. Server scripts PERL, PHP, ASP, SSI. Java technologies, Java-script, VB-script. Flash technology. Toolkit for creating Web-applications. To support the processes of modernization and promotion of the organization's Internet resources: design of IR; development and testing of IR functionality; formulation of requirements for the structure and services of IR.	4				v	v					v		

		PD	EC	Programming Web-Application	Use the basic laws and regulations of programming WEB-applications: technical specifications, standards, protocols used on the Internet. Design architecture, development tools and technologies, client scripts for Web applications. JavaScript language. CGI technology. Development of server applications using PHP scripts as an example. XML language. Web services. Building architecture, security of building Web-applications based on CMS, Web 2.0, semantic and social Web. Process web login within the DMP system and build recommendation systems.					v	v					v			
		PD	EC	Graphic and Animation Tools in Advertising	Know the classification of types of interactive computer graphics and the scope of graphic tools; fundamentals of computer graphics. Characteristics and common formats of graphic files. Work in graphic editors and processing of raster and vector images: scale, crop, change resolution and palette, compose images. Own text and graphic editors, technologies for posting and transmitting information on the Internet / intranet.	4				v	v								
		PD	EC	Smart Technology Basics	Use the basic laws and regulations of Smart-technologies on the example of "Smart House": basic methodological concepts, the concept of SMART technologies and the possibility of their application; methods and means of automation of basic engineering systems; basics of engineering systems management; software and hardware solutions for building integrated automation solutions; automation and control equipment; technical means of automation of engineering systems; technical measurements and devices.					v	v				v				
		BD	EC	Web-Design	Use the basic laws and regulations of web design: structure and content, design, composition theory, computer graphics (Adobe Photoshop, CorelDRAW), multimedia, flash animation, creation technologies, static technologies, JavaScript programming basics, advertising design. Apply them when solving problems, set a task, carry out, analyze and formulate conclusions	5				v	v					v			
		BD	EC	Tizen Mobile App Development iOS, Android, WP, Tizen	Analyze the requirements for application development (by level, by nature); develop mobile applications taking into account the tasks and the implementation of the specified functions on a specific mobile operating system; support mobile applications; evaluate the performance, debug and test applications; draw up the necessary documentation;	5		v	v		v					v			

					place applications in portals for potential buyers.														
13	Information systems development	PD	EC	Business Information Systems	Use the basic laws and provisions of the development of IP: the stage of formation of the terms of reference. Strategies for managing the environment. Systems approach. Circular model of the system life cycle. The overall system model of the company. AIS and technologies of accounting and audit technologies. AIS in banks. Development and implementation of KIS. Apply them when solving problems, set a task, perform, analyze and formulate conclusions.	5		v	v			v		v					
		PD	EC	Big Data Technologies	Use the basic laws and regulations for working with BigData technologies: processing and working with BigData; BigData and DataMiniHg. Bigdata infrastructure; distributed computing and the Hadoop ecosystem, the MapReduce approach and its software implementations; parallel computing; application of cloud technologies; machine learning; data analysis using machine learning on the Microsoft Azure platform.			v			v			v		v			
		BD	EC	Intelligent Information Systems	Use the basic laws and regulations of the development of IIS: typologies of knowledge and IIS, typical structure of IIS, technological principles of creation and design stages - production, formal logical, frame and semantic-network models of knowledge representation, device, basic circuits and algorithms for the operation of INS, processing fuzzy knowledge and fuzzy inference. Apply them when solving problems, set a task, carry out, analyze and formulate conclusions	5		v			v			v					
		BD	EC	Pattern Recognition and Image Processing	To form knowledge about the tasks and methods of pattern recognition: basic concepts of the theory of pattern recognition (Objects. Features for describing objects. Vector features. Morphological methods of image processing); classification of recognition tasks. Develop skills in applying structural recognition methods (Algorithms for constructing graphs of complex images, feature extraction from two-dimensional and three-dimensional images of scenes. Matrix of imprecision. Decision trees) images.			v			v			v		v			
		BD	EC	Special Practicum in IC Environment	Acquisition of skills to work in the IC: Enterprise environment. Maintenance of documentation and accounting registers. Setting up a chart of accounts. Methods of entering information: postings, documents. Accounting and reporting in the IC: Enterprise program. Typical documents: incoming	5		v								v			

					and outgoing cash order, payment orders, invoice, waybills, invoice. Use the "1C: Enterprise" complex to automate production tasks														
		BD	EC	Configuration in 1C Environment	Know the basics of configuring on the 1C: Enterprise platform; Develop and finalize configurations on the 1C: Enterprise platform; finalize typical 1C configurations; create subsystems, documents, various forms of reports, accumulation registers, settlement registers; develop a user-friendly interface; Analyze the results of program debugging; Set and change properties and methods of objects in the 1C: Enterprise environment;			v										v	
		PD	EC	Information Systems Design	Use the basic principles of IS design: the basics of the creation and operation of IS, classification and consumer properties, new approaches in design technology, new tools, CASE technologies, hardware implementation of DBMS functions, design of all types of software, databases, work in multi-user mode; protection of information in LAN.	5		v	v	v	v	v	v	v					v
		PD	EC	System analysis and development	Apply developments and descriptions of business processes; principles of building business processes and work algorithms; methods of statistical and mathematical data analysis; requirements for the preparation of regulatory documents; data analysis tools, conflict management techniques. To develop skills and abilities: development of demonstration materials necessary for conducting presentations; drawing up a statistical report on the client base; selection of a method for monitoring, evaluating and correcting the operation of the database			v	v	v	v	v	v	v					v
14	Module for acquiring new professional competencies /	BD	EC	Minor program	We consider an additional educational program (Minor), which determines the set of disciplines and (or) modules and other types of educational work of a certain student in order to form additional competencies in a selected area that is not core field. Getting students to individual education, increasing students motivation	12				v					v	v	v		
15	Final certification module	PD	UC	Undergraduate practice	Demonstration of the application of theoretical knowledge on the design of IS and the calculation of the economic efficiency of IS, ecology and the basics of life safety; foundations of entrepreneurial skills and anti-corruption culture. Inspection of the facility and collection of the necessary materials for the development of an information	8	v	v		v	v	v	v						

				system; develop a model and components of the IS; database; write a program code with a test case; check the functionality of the program; formulate conclusions and recommendations														
			Writing and defending a thesis or preparation and passing a comprehensive exam	Disclosure of professional potential, demonstration of the ability to organize and conduct independent research in the field of ICT; reasoned development of sound recommendations; disclosure of the level of qualifications, theoretical knowledge and practical skills; demonstration of the internal unity of work and displaying the progress and results of the development of the selected topic; application of the rules for the design and defense of the thesis; clarification of readiness for independent work on the profile.	12	v	v		v	v	v	v						

5. SUMMARY TABLE REFLECTING THE VOLUME OF CREDITS MADE IN THE SECTION OF EDUCATIONAL PROGRAM MODULES

Course of study	Semester	Number of acquired modules	Number of studied disciplines			Number of KZ credits					Total hours	Total KZ credits	Ammount	
			OC	UC	EC	Theoretical teaching	Phisical training	Educational practice	Industrial or predegree practice	Final certification			exam	diff. offset
1	1	3	6	1		28	2				900	30	6	1
	2	3	3	4	1	26	2	2			900	30	5	3
2	3	5	1	3	4	28	2				900	30	6	2
	4	4	3	2	2	24	2		4		900	30	5	2
3	5	4			6	30					900	30	6	
	6	4		1	4	24			6		900	30	4	1
4	7	3			4	20					600	20	4	
	8	3		1	3	20					600	20	4	
	9	1							8	12	600	20		
Total			13	12	24	200	8	2	18	12	7200	240	40	9

6. STRATEGIES AND METHODS OF TRAINING, MONITORING AND EVALUATION

Learning strategies	<p>Student-centered learning: the learner is the center of teaching/learning and an active participant in the learning and decision-making process.</p> <p>Practice-oriented learning: focus on the development of practical skills.</p>
Teaching methods	<p>Conducting lectures, seminars, various types of practice with the use of innovative technologies:</p> <ul style="list-style-type: none"> • problem-based learning; • case study; • work in a group and creative groups; • discussions and dialogues, intellectual games, olympiads; • rapid design software applications; • projects; • presentations; <ul style="list-style-type: none"> • rational and creative use of information sources: • multimedia training programs; • electronic textbooks; • digital resources. <p>Organization of independent work of students, individual consultations.</p>
Monitoring and evaluation of the achievability of learning outcomes	<p>Current control on each topic of the discipline, control of knowledge in classroom and extracurricular activities (according to the syllabus). Assessment Forms:</p> <ul style="list-style-type: none"> • survey in the classroom; • testing on the topics of the academic discipline; • test papers; • protection of laboratory works; • protection of individual assignments; • colloquia; • presentations of essays, software products. <p>Midterm control at least two times during one academic period within the same academic discipline.</p> <p>Intermediate certification is carried out in accordance with the working curriculum, academic calendar.</p> <p>Conduct forms:</p> <ul style="list-style-type: none"> • exam in the form of testing; • oral exam; • a written exam; • combined exam; • defense of term papers; • protection of practice reports. <p>Final state certification.</p>

7. EDUCATIONAL AND RESOURCE SUPPORT OF THE EP

<p>Information Resource Center</p>	<p>Educational Information Center</p> <p>The structure of the OIC includes 6 subscriptions, 16 reading rooms, 2 electronic resource centers (ERC). The network infrastructure of the JRC is based on 180 computers with Internet access, 110 workstations, 6 interactive whiteboards, 2 video doubles, 1 video conferencing system, 3 A-4 format scanners, 3. JRC software - AIBS "IRBIS-64" under MS Windows (basic set of 6 modules), stand-alone server for uninterrupted operation in the IRBIS system.</p> <p>The library fund is reflected in the electronic catalog available to users on the site http://lib.ukgu.kz on-line 24 hours 7 days a week.</p> <p>Thematic databases of their own generation have been created: "Almamater", "Proceedings of SKSU scientists", "Electronic archive".</p> <p>Online access from any device in 24/7 mode via an external link http://articles.ukgu.kz/ru/ppp.</p> <p>Working with catalogs in electronic form. EC consists of 9 databases: "Books", "Articles", "Periodicals", "Proceedings of the teaching staff of SKSU", "Rare Books", "Electronic Fund", "SKSU in Print", "Readers" "SKU".</p> <p>The JIC provides its users with 3 options for accessing its own electronic information resources: from the "Electronic Catalog" terminals in the catalog hall and in the JIC subdivisions; through the information network of the university for faculties and departments; remotely on the library website http://lib.ukgu.kz/.</p> <p>Open access to international and republican resources: "SpringerLink", "Polpred", "Web of Science", "EBSCO", "Epigraph", to electronic versions of scientific journals in the public domain, "Zan", "RMEB", "Adebiat", Digital library "Aknurpress", "Smart-kitar", "Kitar.kz", etc.</p> <p>For people with special needs and disabilities, the library website has been adapted to the work of visually impaired users</p>
<p>Material and technical base</p>	<p>To implement EP 6B06120 - "Information Systems", 3 computer classes with 28 computers with licensed MSWindows and MSOffice software products and anti-virus protection are assigned. Specifications: ZIK PC-2 Work, processor (CPU) - Core i3-9100 3.6 GHz, motherboard (MB) - Gigabyte H310 LGA 1151, random access memory (RAM) -DDR4 8Gb, hard disk drive (HDD) - 1 Tb, DVD drive - DVD-RW, video adapter (VC) - Intel UHD Graphics 630, power supply - Brotoko 500 W; Monitor Display -ZIK 21.5. There are 4 lecture halls equipped with INITECH interactive whiteboards. In addition, there are laboratory classrooms equipped with modern computers.</p> <p>There are computer classes UNPK on the basis of LLP "Balance Service", with access to the licensed software "1C: Enterprise. Accounting 8.3"</p>

APPROVAL SHEET
on the Educational program 6B06120–«Information systems»

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