Ф.7.02-09

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.
«23» 02 2023

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)	-

Shymkent, 2023

Developers:

FULL NAME	Position	Signature
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Turdaliev Zhandos Kaldybaevich	Director of LLP "INNOVA Corporation company"	Stamp
Utegenov Musakhan Kalaubekovich	Director of the Higher College of new technologies named after Manap Utebayev	Stamp

The EP was considered in the direction of training information and communication technologies at a meeting of the academic committee, protocol № 7 «21» 02 2023y.

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 № 4 «22» 02 2023 y.

Chairman of the EMC _____ Abisheva R. D.

The EP was approved by the decision of the Academic Council of the University protocol № 13 «23» 02 2023 y.

CONTENT

1 CONCEPT EP

Mission of the University	We are focused on generating new competencies, training a leader who translates research thinking and culture.
University Values	– 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 - creates trust and support in a relationship where everyone wins. – Social responsibility - ready to fulfill obligations, make decisions and be responsible for their results.
Graduate Model	– Deep subject knowledge, their application and continuous expansion in professional activity – Information and digital literacy and mobility – Research skills, creativity and emotional intelligence – Entrepreneurship, independence and responsibility for their activities and well-being – Global and national citizenship, tolerance to cultures and languages
Uniqueness of the EP	the program was developed in accordance with the Atlas of New Professions and Competencies, and is aimed at training competent specialists for transport and logistics and scientific and pedagogical structures who are able to organize and manage the activities of a structural enterprise, independently determine the goals of professional activity, choose and justify methods and means to achieve them.
Academic Integrity and Ethics Policy	The University has taken measures to maintain academic integrity and academic freedom, protection from any kind of intolerance and discrimination: • Rules of academic integrity (Order No. 212-нқ dated 10.10.2022); • Anti-Corruption Standard (Order No. 221-нқ dated 07.12.2021). • Code of Ethics (order No. 212-нқ dated 10.10.2022). • Anti-Corruption Policy of the NJSC "M. Auezov South Kazakhstan University." (order No. 144 пқ dated 07.14.2022).
Regulatory and legal framework for the development of EP	1. Law of the Republic of Kazakhstan "On Education" No. 319-III dated July 27, 2007; 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 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 for the organization of the educational process on credit technology of training, approved by the Order of the Ministry 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 the Order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan on December 30, 2020 No. 553. 6. Guidelines for the use of ECTS. 7. Guidelines for the development of educational programs of higher and

	postgraduate education, Appendix 1 to the order of the Director of the Central Research Institute No. 45 o/d dated June 30, 2021.
Organization of the educational process	– Implementation of the principles of the Bologna Process – Student-centered learning – Availability – Inclusivity
Quality assurance of EP	– Internal quality assurance system – Involvement of stakeholders in the development of the EP and its evaluation – Systematic monitoring – Updating the content (updating)
Requirements for applicants	They are established according to the Standard Rules of admission to training 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 dated 31.10.2018
Conditions for the implementation of educational programs (EP) for persons with disabilities and special educational needs(SSN)	For students with SEN (special educational needs) and persons with disabilities (PSI), tactile PVC tiles, specially equipped toilets, a mnemonic diagram, and shower bars have been installed in educational buildings and student dormitories. Special parking spaces have been created. Crawler lift installed. There are desks for people with limited mobility (PLM), signs indicating the direction of movement, ramps. In the educational buildings (main building, building No. 8) there are 2 rooms with six working places adapted for users with disorders of the musculoskeletal system (DMS).For visually impaired users, the SARA™ CE Machine (2 pcs.) is available for scanning and reading books. The library website is adapted for the visually impaired. There is a special NVDA audio program with a service. The JIC website http://lib.ukgu.kz/ is open 24/7. An individual differentiated approach is provided for all types of classes and in the organization of the educational process.

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	- 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	• 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	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). 6. **Professional standard "Network, system administrators and server administrators"** (approved by NCE RK "Atameken" - order No. 330 dated December 5, 2018).
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

	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.
Field of professional activity	-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
Objects of professional activity	Enterprises and organizations of various forms of ownership that develop, implement and operate information systems in various areas of human activity.
Subjects of professional activity	- 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	- design and engineering; - production and technological; - organizational and managerial; - operational; - commercialization, entrepreneurial activity
Learning outcomes	**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** Apply basic blockchain technologies and concepts, distributed ledger technologies in practice. **LO5** Program in environments such as C# for web service development, Python in the Django framework, Java, JavaScript for web application development, iOS, Android for mobile application development. **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** Perform installation and maintenance of graphical and operating systems, ensuring the functioning and information security of databases. **LO8** Develop design, create and modify web resources, integrate web resources with other computer applications, administer and update web resources. **LO9** Apply mathematical tools for decision making and optimization in management tasks of automatic and automated control. **LO10** Describe the functioning of IT infrastructure of an organization, the normal operation, and security of operating systems, network operating systems, and database management systems. **LO11** Demonstrate practical application and configuration of the software product "1C: Enterprise" for accounting and management accounting automation of an enterprise. **LO12** Collect, analyze, and process big data, applying Big Data and Data Mining technologies. **LO13** Work effectively individually and as a team member, demonstrate self-defense and self-improvement skills, and maintain a healthy lifestyle.

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** The ability to develop design; create and modify web resources; integrate web resources with other computer applications; layout web pages, fill them with content; administer and update web resources; develop, maintain applications and issue relevant technical documentation
	HS2 The ability to design and develop a graphical interface; design and explore the architecture of a graphical interface that provides high operational (ergonomic) characteristics of software products and systems; perform work on the creation (modification) and maintenance of web resources
	HS3 The ability to configure and support graphical systems; ensure reliable operation of the OS
	HS4 Ability to monitor the software product to detect errors and eliminate them; organize work on software modernization

	HS5 The ability to install and configure software; ensure the functioning of the database; monitor and manage database backups; provide database information security; analyze and configure DBMS performance; ensure the smooth operation of the DBMS; manage the development of the database
	HS6 Ability to independently collect and analyze data about site visitors; analyze data from the data warehouse
	HS7 Ability to develop technical specifications for the project together with the specification, detailing the customer's requirements; consulting programmers and testing specialists during product development
	HS8 Ability to solve all issues related to the stages of the technological process, occupational 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	LO13
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		+	+										

4 MATRIX A OF INFLUENCE DISCIPLINE ON FORMATION RESULTS TRAINING AND LABOR INFORMATION _

No.	Module name	cycle	component	Name disciplines	Brief description of the discipline	Qty credit and tov	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12	LO 13
1	Basics public Sciences	OOD	OK	History of Kazakhstan	**Purpose** of the discipline is the formation of an objective idea of the history of Kazakhstan based on a deep understanding and scientific analysis of the main stages, patterns, originality of the historical development of Kazakhstan. **Contents** : Ancient people and the formation of a 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 . Independent Kazakhstan . _ State system , social and political development , foreign policy and international relations . Methods and techniques of historical description .	5		v												
		OOD	OK	Philosophy	**Purpose:** Formation of students' holistic view of philosophy as a special form of knowledge of the world, philosophical reflection, skills of introspection and moral self-regulation. **Contents:** The emergence of a culture of thinking. The subject and method of philosophy. Fundamentals of philosophical understanding of the world. Philosophy of man and the world of values. Ethics. Philosophy of values. The subject of aesthetics as a field of philosophical knowledge. Philosophy of freedom, art, history, religion. "Mangilik El" and "Modernization of public consciousness" is a new Kazakh philosophy.	5		v												v
2	Csocio-political knowledge	OOD	OK	Sociology and political science	**Purpose:** formation of knowledge about socio-political activity, explanation of socio-political processes and phenomena. **Contents:** Consideration of the socio-ethical values of societies. Understanding the features of social, political, cultural, psychological institutions, their role in the modernization of Kazakhstani society. Making decisions to resolve conflict situations. Studies of political institutions and processes, methods of analysis and interpretation of ideas about politics, power, state, society, application of sociological and corporate analysis methods, understanding the essence and content of the political situation in the modern world.	4		v												
		OOD	OK	Culturology And psychology	**Purpose:** Formation of scientific knowledge of history, modern trends, current problems and methods for the development of culture and psychology, skills of systemic	4		v												

					analysis of psychological phenomena. **Contents** : Morphology, language, semiotics, anatomy of culture. Culture of nomads, proto-Turks, Turks. Medieval culture of Central Asia. Kazakh culture at the turn of the XVIII - XIX centuries, XX century. Cultural policy of Kazakhstan. State Program "Cultural Heritage". National consciousness, motivation. Emotions, intellect. The will of man, the psychology of self-regulation. Individual typological features.														
3	Csocio-ethnic development	OOD	VC	Ecosystem and Law	**Purpose:** Formation of integrated knowledge in the field of economics, law, anti-corruption culture, ecology and life safety, entrepreneurship, scientific research methods. **Content:** Fundamentals of safe interaction between man and nature. Entrepreneurial activity in conditions of limited resources, increasing the competitiveness of business and the national economy. Regulation of relations in the field of ecology and safety of human life. Knowledge and observance of Kazakh law, obligations and guarantees of subjects, state regulation of public relations to ensure social progress. Application of scientific research methods.	5		v											
		DB	HF	Actual Problems and Modernization of Public Consciousness	Purpose: restoration of spirituality, deformed during the tsarist and Soviet periods of reality, the formation of a creative personality based on the modernization of the public consciousness of young people. Content: spiritual modernization: origin and prerequisites. Modern national identity. Pragmatism and competitiveness. National identity and national code. Experience and prospects of evolutionary development. The triumph of knowledge and openness of consciousness. Alphabet reform: experience and priorities. The motherland is the foundation of the state. Education through national sacred places and history. Modern Kazakh culture is the cornerstone of spiritual revival. New humanitarian education and the future national intelligentsia. Abai Kunanbayev and the Kazakh society..	3		v											
		BD	EC	Mukhtar studies	Purpose: To form a historical, literary idea of M. Auezov's work in the context of literary history, patriotism and cultural and spiritual position. Development of artistic thinking, skills of independent research activity. Content: The life and creative path of M. Auezov Semipalatinsk, Tashkent, St. Petersburg periods. M. Auezov's activity in the magazines "Sholpan",			v									

					"Abai". M. Auezov's journalism. An artistic review of the short stories "Korgansyzdyn kuni", "Kyr suretteri", "Okagan azamat", "Kokserek", the play Enlik-Kebek and the stories "Kili Zaman", "Karash-Karash" okigasy", the monograph "Abai Kunanbayev", the epic novel "Abai Zholy".														
		BD	EC	Abay studies	Purpose: Preservation of the “National code” in the project “Kazakhtanu” based on the creativity of A. Kunanbayev Content: Historical overview of the history of Kazakhstan and Kazakh literature of the XIX-XX centuries. Studies of Abai's legacy of the XX-XXI century. Chronology of Abai's creativity. Abai is a great poet, ethnographer, founder of Kazakh written literature. Abai is the compiler of the code of laws “The Position of Karamola”, social significance. Abai is a thinker, religious scholar, philosopher. The role of Abai in education and science, the concept of a “Holistic person”. “Words of Edification” by Abai, an epic novel by M.Auezova “The Way of Abai”. K. Tokayev “Abai and Kazakhstan in the XXI century”, role, significance.			v											
				Service to Society	**Purpose:** Formation of socially significant skills and competencies among students based on the assimilation of academic programs, carrying out socially useful activities related to the disciplines studied at the university. **Contents:** The concept and meaning of Service learning. Key components of Service Learning, socially useful activities in the children's and youth environment, organization of volunteer movement, profile orientation of Service Learning. International practice of learning through socially useful activities . Methodology for the development of social projects. Methods of analysis of implemented social projects.		v	v										
				Foundations of Anticorruption Culture	Purpose: Formation of an anti-corruption worldview, strong moral foundations of personality, civic position, stable skills of anti-corruption behavior. Content: Overcoming legal nihilism, formation of the foundations of the legal culture of students, in the field of anti-corruption legislation. Formation of conscious perception, attitude to corruption. Moral rejection of corrupt behavior, corrupt morality, ethics. Mastering the skills necessary to counter corruption. Creating an anti-corruption standard of conduct. Anti-corruption propaganda, dissemination of ideas of legality, respect for the law. Activities aimed at understanding the nature of corruption, awareness of social losses from its manifestations, the ability to defend one's position in a reasoned manner, to look for ways		v	v										

					to overcome manifestations of corruption.														
4	Module of communications and physical culture	OOD	OK	Kazakh (Russian) language	**Purpose:** Formation of communicative competence using the Kazakh (Russian) language in the socio-cultural, professional sphere and public life, improving the ability to write academic texts. Content **:** Levels A1, A2, B1 , B2-1, B2-2 (B2, C1 Russian) are presented in the form of cognitive-linguocultural complexes of the international standard : , written speech works, listening. Demonstration of understanding of language material in texts, knowledge of terminology and development of critical thinking.	10	v												
		OOD	OK	Foreign language	**Purpose** : Formation of intercultural and communicative competence of students in the process of foreign language education at a sufficient level of A2 and a level of basic sufficiency B1. **Content:** Levels A 1 , A2, B1, B2 are presented in the form of cognitive-linguoculturological complexes of communication of the international standard: social and domestic, socio-cultural, educational and professional, modeled forms: oral and written communication, written speech works, listening. Demonstration of understanding of the language material in texts on the educational program, knowledge of terminology and development of critical thinking.	10	v												
		OOD	OK	Physical Culture	**Purpose:** Formation of social and personal competencies and the ability to purposefully use the means and methods of physical culture that ensure the preservation and strengthening of health in order to prepare for professional activities. **Contents:** Implementation of physical culture and health and training programs. A complex of general developmental and special exercises . In sports (gymnastics, sports and outdoor games, athletics , etc.). To control and self-control in the process of training, insurance and self-insurance. Competition judging . From the means of professionally applied physical training. Modern health systems.	8													v
		DB	VC	Professional Kazakh (Russian) language	Purpose: To provide professionally-oriented language training for specialists who are capable of effectively communicating in professionally significant situations and possess language norms for specific purposes. Content:Professional language and its components. Professional terminology as a key characteristic of scientific style. Scientific vocabulary and constructions in educational-professional and scientific-	3	v												

					professional domains. Algorithm for analyzing and producing scientific texts in the field of specialization. Production of scientific-professional texts. Basics of business communication and documentation within future professional activities.														
		BD	UC	Professionally oriented foreign language	Purpose: To develop foreign language communicative competence that is professionally oriented, enabling integration into the international professional environment and utilizing English as a means of intercultural and professional communication. Content: The professional-oriented approach to teaching foreign languages in non-linguistic faculties of universities ensures the development of students" abilities to communicate in specific professional, business, and scientific spheres and situations, taking into account the characteristics of professional thinking. This approach involves organizing motivational and research activities to stimulate students" engagement and orientation.	3	v												
		OOD	OK	Information and Communication Technologies	**Goal:** Formation of the ability to critically evaluate and analyze processes through digital technologies. The development of a new "digital" thinking, the acquisition of knowledge and skills in the use of modern information and communication technologies. **Contents:** Introduction and architecture of computer systems. Software. OS. Human interaction with computers. Database systems. Database management. Networks and telecommunications. Cyber protection. Internet technologies. Cloud, mobile, multimedia, smart , electronic technologies. Electronic business and management.	5		v											
5	Mathematical and natural science foundations	DB	VC	Physics	Purpose: To develop knowledge of physical laws and skills for their application in engineering and computer technology, to cultivate the ability to conduct and evaluate results of theoretical and experimental research, and to foster scientific thinking based on an interdisciplinary approach. Content: Laws of classical and modern physics (mechanics, molecular physics, thermodynamics, electromagnetism, optics, quantum and atomic physics). Application of knowledge of physical phenomena and processes to solve applied, technical, and technological problems based on an interdisciplinary approach. Scientific research methods, planning, conducting, processing, and analyzing results of theoretical and experimental research.	5		v											
		BD	UC	Algebra and geometry	Purpose: To acquire knowledge in mathematics necessary for studying related engineering disciplines and specialized	4		v						v					

					courses, and to develop mathematical methods and mathematical intuition that enable solving applied problems related to future profession. Content: Vectors, matrices and operations on them, determinants, inverse matrices, systems of linear algebraic equations and methods of their solution, lines on the plane, planes and lines in space, general theory and canonical equations of curves and second-order surfaces.														
		BD	UC	Mathematical analysis	**Purpose:** Formation of knowledge in mathematics necessary for the study of related engineering disciplines and special courses, for the development of mathematical methods and mathematical intuition, which teach to solve applied problems related to the future profession **Contents** : Set and function. Function limit. Remarkable limits. Function derivative. Antiderivative function and indefinite integral. Definite integral. Applications of a definite integral. Function of several variables. First order differential equations. Higher order differential equations. ranks	4		v						v					
		BD	EC	Theory of Probability and Mathematical Statistics	**Purpose:** Formation of theoretical knowledge on the theory of probability and the basics of mathematical statistics. **Contents:** Basic laws and provisions of the theory of probability and mathematical statistics. Practical skills are instilled in calculating probability within the framework of the classical approach and using basic formulas, finding distribution laws and numerical characteristics of both random variables (single and multidimensional) and functions of random variables, estimating distribution parameters and testing statistical hypotheses.	4		v						v					
		BD	EC	Fundamentals of econometrics	**Purpose:** Formation of knowledge on the basics of econometrics for the analysis of economic processes **Contents:** Basic laws and provisions of econometrics: conceptual and terminological base of probability theory; description of random variability in economic processes. Practical skills of calculation of probabilistic distribution and numerical characteristics of random variables are inculcated; use econometric methods to analyze the state and to assess the patterns of development of economic and social systems in terms of the relationship between the factors that describe them.			v						v					
		BD	EC	Introduction to the specialty	**Purpose:** Formation of ideas about the future specialty, the prospects for its development and the features of professional training in the specialty. **Content** : Main aspects of professional training of future	4		v											

					specialists in the system of higher professional education . Fundamentals of design and maintenance of information systems by areas of application; review of artificial intelligence technologies. The skills of using information resources and software and hardware are developed, the motivation for self-learning and development is formed.														
		BD	EC	Fundamentals of Academic Writing	**Purpose:** Developing skills for independent research work for students to create a text in a chosen scientific genre. **Content:** Develop skills and abilities to plan the text of the study; write an annotation, research abstract ; leave a review of the literature used in a scientific project; quote correctly, avoid plagiarism; use statistical data in their written work, including those presented graphically; edit what is written make bibliographic lists; make a presentation of your own project; conduct business correspondence		v												
6	About the basics of programming	BD	UC	Algorithmization and programming	**Purpose:** mastering the skills of developing algorithms, methods and technology for solving practical and scientific problems in the Python language (1st level) **Contents:** PC software. The concept of an algorithm. Basic Structures of Algorithms . Methods for describing algorithms. Linear structure algorithms. Branching structure algorithms. Cyclic structure algorithms. Operations of the Python language. Linear Structure Programs . Branching Structure Programs . Lists. Strings. Tuples . Working with a function. Recursion . two-dimensional arrays. Sets. Dictionaries. Modules. Working with files. Graphic arts	5		v			v								
		BD	EC	Programming technology	Purpose: Acquisition by students of fundamental theoretical and practical knowledge in the process of studying the basics of programming technology in the C # language (1st level) Contents: Programming technology. Introduction to the C# programming system. Expressions and assignments. C# language operators. Conditional operator. Loop operators. Precondition operator. Postcondition operator. An operator with a parameter. foreach statement. One-dimensional arrays. two-dimensional arrays. Procedures are methods of a class. Functions are class methods. Strings. Graphic arts. Classes. Files.	5		v			v								
		BD	EC	Integrated subject and language teaching	**Purpose:** Formation of skills in the use of professional terminology **Content:** Professional terminology used in software, databases and knowledge bases, information security and information protection, IS development, optimization models and methods,		v												

					computer networks, graphics and animation tools, WEB-design, computer computing. Application of terminology in practical classes in a group and individually														
		BD	UC	Object Oriented Programming	**Purpose:** Formation of in-depth knowledge and skills in programming in the Python environment (2nd level) **Contents:** Classes and objects. Inheritance, polymorphism, encapsulation, abstraction of functions and variables. Multiple inheritance and visible variable scope. Connecting to a SQLite database. Creating database queries within the program. Creating and making changes to the database through the program console. Displaying the database through the application. Design patterns; working with databases, application development	5		v			v								
		BD	EC	Java Programming	**Purpose:** Acquisition of skills in Java programming technology (1st level) **Contents: An Introduction to the** Java Programming System . The composition of the programming system, elements of the language. Java Language Operations . Linear structure programs. The conditional if statement . swit variant operator with h . Branching structure programs. for statements ; while ; while . Arrays. Strings. String class. Graphic arts. Class and object creation. Static Methods in Java. Packages and interfaces.	4		v			v								
		BD	EC	Structured Query Language SQL	**Purpose:** Formation of knowledge and skills in the use of visual query building tools **Contents:** SQL data types, data selection (SELECT statement), ordering output fields, data manipulation, creating database tables, SELECT for specific columns. Modeling the logical structure of data: determining the composition of data, structure and data sources; database structure design. Definition of the logical structure and physical implementation of data; generating data using queries from the database for the report; preparation of an analytical report								v						
		BD	UC	Educational practice	**Purpose:** Consolidation of knowledge and skills in the basics of algorithmization and programming technologies in C #, Python, Java environments. **Content:** 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. Using the basic laws and provisions of	1		v			v								

					algorithmization and programming in the environment of C #, Python, Java when performing an individual task.														
7	Theoretical foundations of information systems	BD	EC	Fundamentals of information systems	**Purpose:** Formation of knowledge and skills on the basics of designing information systems. **Contents:** Fundamentals of systems theory and system analysis; composition and general structure of information systems, key components of information systems, class diagrams, usage, interactions and other diagrams. The device and functioning of IS and the principles of interaction of IS components. Basic models of architectures of modern computing systems and networks. Life Cycle and Software Development Methodologies . Procedure and principles of software documentation . The composition of the hardware-software complex.	5		v	v										
		BD	EC	Fundamentals of Information Theory	**Purpose:** Mastering the methods of efficient coding **Contents:** Basic laws and provisions of information theory: theoretical foundations for measuring information, transmitting information, discretizing and quantizing information, representing information in human-machine systems; methods of efficient and noise-resistant coding of information, methods of analog-to-digital conversion of signals, basic color formation systems, methods of digital data compression; efficient coding technique according to Huffman; data coding in an error-correcting Hamming code.			v	v										
		BD	EC	Information security and information protection	**Purpose:** Teaching the principles, methods and means of implementing data protection, about the possession of the theoretical foundations of the cryptographic protection of electronic information **Contents:** Classification of methods, means and objects of information protection. Software protection from unauthorized access. Protection of information in open networks. Permutation ciphers. Encryption of information using a simple replacement cryptographic algorithm. Encryption of information using a complex substitution cryptographic algorithm. Encryption of information using cryptographic algorithms of gamma . Block encryption systems	5						v							
		BD	EC	Cryptographic methods of information protection	**Purpose:** mastering the theoretical foundations of cryptographic protection of electronic information , as well as the formation of practical skills in the use of symmetric and asymmetric cryptographic systems **Contents:** The concept of cryptography. Types of encryption. Permutation ciphers. Simple substitution ciphers. Encryption							v							

					of information using a complex replacement algorithm. Encryption by gamma method. Block encryption systems. Stream encryption systems. Asymmetric cryptosystems. Digital signature schemes. cryptographic protocols. Hash functions and message authentication. Key management														
8	Technical means of information systems	BD	EC	Computer systems architecture	Purpose: Mastering software maintenance skills Contents: Principles of construction of 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. Implementation of preparation for software maintenance; software technical support; software user support. Analysis of problems and software changes; transferring the software to a new environment, decommissioning the software. Manage the development of the software maintenance service.	4									v			
		BD	EC	IT infrastructure	**Purpose:** Training in methods of working with tools and systems for managing an organization's IT infrastructure **Contents:** Basic concepts of the organization's IT infrastructure: tasks and purpose, business architecture and information technology architecture, determining factors, standards and management methods, management tools and systems. The role and functions of IT-infrastructure in the activities of the organization. Standards and methods of IT-infrastructure management. Tools and systems for managing the IT infrastructure of an organization										v			
		DB	HF	Operating systems, environments and shells	**Purpose:** Mastering the skills of OS and DBMS system administration. **Contents:** Basic laws and regulations of Operating systems: composition, functions, classification, installation and configuration, kernel, shell program services, dispatcher. Network adapters. Physical structuring of the local network. Microsoft OS family. History of Windows. Windows versions. Areas of use for Windows. Structure: NT executive and protected subsystems. Multiple application environments. Object-oriented approach. Network tools. Fundamentals of system administration of OS and DBMS.	5							v			v			
		DB	HF	Network technologies	**Purpose:** Mastering the skills of working with network technologies **Contents:** Basic laws and provisions of network technologies: OSI model, protocol stack; client-server, peer-to-peer and hybrid networks; middleware; terminals and remote control;								v			v			

					shared access to resources; directory services; database servers; unification of interfaces to databases; application servers; Web services ; fundamentals of security in computer networks; prospects for the development of network technologies														
		PD	VC	Field trip I	**Purpose:** Consolidation of theoretical knowledge on the technical means used in information systems **Content:** The use of the basic laws and provisions of theoretical knowledge on network technologies, operating systems, IT infrastructure of the organization and the acquisition of practical skills in analyzing and building computer system architectures when performing an individual task. Development of options for setting up operating systems. Strengthening the skills of registration and protection of the report .	4							v			v			
9	Mathematical support of information	BD	EC	Finite Structures and Information Coding	Purpose: Acquisition of fundamental theoretical and practical knowledge by students through the study of discrete mathematics and mathematical logic, equipping them with modern mathematical tools. Content: Fundamental laws and principles of finite mathematics and coding theory, including combinatorial analysis, finite groups, finite graphs, mathematical models of discrete information processors such as finite automata, Turing machines, and algorithm theory. Application of these concepts in solving applied problems.	5		v							v				
		DB	HF	Mathematical Logic	Purpose: The objective is to acquire knowledge of the fundamentals of mathematical logic and equip students with modern mathematical tools. Content: The content covers the basic laws and principles of mathematical logic, set theory, Boolean algebra, general theory of formal calculus, set-theoretic and predicate logic, and the application of mathematical tools to solve typical problems. It also includes solving problems from related fields of science and their applications, studying concepts and theories of modern mathematical logic, and evaluating the adequacy of the proposed mathematical tools for problem-solving.			v							v				
		PD	HF	Blockchain Engineering	Purpose: The objective is to develop knowledge of basic blockchain technologies and concepts. Content: The content includes an introduction to blockchain technologies, cryptography in blockchain, fundamentals of blockchain, consensus algorithms, block mining, distributed ledger technologies, cryptocurrency, and smart contracts. It also	5				v										

					covers an introduction to smart contracts, Solidity programming language, decentralized applications, Web3, various applications of blockchain, tokenization, decentralized finance, basics of BNBChain, object-oriented programming in Solidity, smart contract development, smart contract testing, blockchain architecture design, and fundamental blockchain security.														
		PD	EC	Development of Smart Contracts and Applications for Distributed Resources	Purpose: The objective is to study distributed software systems, principles of P2P operation, and tools for working with distributed ledger systems. Content: The content includes the basics of distributed ledger technology, cryptographic techniques, symmetric and asymmetric encryption, hashing, private and public keys, digital signatures, fundamentals of distributed ledger technologies, cryptocurrencies, consensus algorithms, smart contract development tools and languages, public and private networks, basic Solidity types, smart contract structure, Ethereum virtual machine, Solidity language, tokens, and development of distributed applications.					v									
		PD	EC	Fundamentals of Theory of Automated Nanagement and decision-making.	Purpose: The objective is to develop scientific and theoretical knowledge and practical skills in the field of automation control and decision making for their application in information systems. Content: The content includes basic concepts and definitions, fundamental principles of automatic and automated control theory, organization of automated control systems based on information systems, automated control of production and technological processes, and mathematical foundations of decision making and optimization in automated information systems	5		v						v				
		PD	EC	Fundamentals of Scientific Research in the Field of Information Technology	Purpose: The objective is to develop knowledge in the field of information technology, understand the current state and conduct scientific research, and comprehend the directions of development in the field. Content: The content covers creativity in scientific and design work, methods of scientific research in engineering, classification of research methods, techno-economic justification and implementation of scientific research, information and patent search, experimental design, information systematization, research planning, experimental procedures in scientific research, mathematical processing of experimental results, reporting and analysis of research results			v										v
10	Information support of systems	PD	UC	Database management systems	Purpose: The objective is to acquire knowledge about the organization and functioning of databases and develop skills in working with databases. Content: The content includes basic	5			v					v		v			

					concepts of database organization, data models, functions of database management systems, modern technologies for data storage and retrieval, query languages, software tools for database design, mathematical model of databases based on relational algebra, description of basic operations in relational algebra. It also covers the development of client and server components of distributed databases using modern DBMS														
		PD	EC	Databases in information systems	Purpose: The objective is to acquire knowledge about database management systems (DBMS) and develop skills in working with them. Content: The content includes designing, installing, and configuring software for database management, ensuring the functioning of databases, coordination of access control to databases, coordination of software configuration to support user interactions with databases, monitoring of events, backup and recovery management of databases, regulation of backup activities, control of compliance with backup and recovery regulations, and management of data loss prevention and data integrity	4			v					v		v			
		PD	EC	Administration in information systems	Purpose: The objective is to acquire knowledge and skills in administration of information and graphical systems. Content: The content includes principles of operating system construction, operating system architecture, definition and classification of modern graphical systems, principles of reliability, fault tolerance, compatibility, security, and performance. It covers principles of designing graphical systems, tools and principles of data protection from unauthorized access, software tools for monitoring operating system processes, architecture of data processing centers, and methods of information recovery				v					v		v			
		PD	VC	Field trip II	**Purpose:** Consolidation of theoretical knowledge on information support of systems **Contents:** Use of the basic laws and provisions of theoretical knowledge on information support of IP with the help of database management systems. In-depth practical skills in the analysis of information flows of the subject area and the development of typical information objects and gaining experience in working in a team. Application of the method of analysis of the object of practice for structuring data when performing an individual task; Skills in the correct preparation and protection of the report	6	v		v					v		v			
11	Development of Web	PD	VC	Web Services Development	Purpose: The objective is to acquire knowledge in modern methods of programming web applications on the Java EE	6					v			v					

	applications and services /			(Java EE)	platform. Content: The content includes an introduction to web programming, basics of server-side technologies, server-side programming languages, and development environments. It covers the development of database-driven applications, client-side web programming technologies such as HTML, JavaScript, and CSS. It also includes an overview of modern web application models, content management systems (CMS), web services, cloud technologies, and an overview of contemporary SEO methods for improving the visibility of developed websites and web applications on the internet													
		BD	EC	Programming on Django platform	Purpose: The objective is to provide students with basic skills in designing and developing web applications on the Django platform, as well as skills in testing and debugging (advanced level of Python). Content: The content includes the structure of Django applications, installation, and configuration of Django, working with forms in Django, model forms, basics of template language in Django, filters, views as the implementation of the controller in the MVC model. It covers function-based views, named and positional view arguments, class-based views, authentication, authorization, and registration.	5					v								
		BD	EC	Python-based Web Application Development	Purpose: The objective is to provide students with knowledge and skills to develop and adapt websites and web applications using the Python programming language and the Django framework (advanced level of Python). Content: The content includes the fundamental concepts of Django, data output, relationships, data input, static files, basic Django tools, advanced tools, and additional libraries. It covers the configuration and administration of Django sites, class-based views, authentication, authorization, registration, session and cookie handling, access rights, decorators, and accessing sessions and cookies using the request object						v								
		BD	EC	Programming in JavaScript Environment	Purpose: The objective is to develop skills in using the JavaScript language for applications in the World Wide Web (advanced level of JavaScript). Content: The content includes an introduction to JavaScript, functional programming in JavaScript, object-oriented programming in JavaScript, built-in JavaScript objects, working with strings, working with the browser and the Browser Object Model (BOM). Manipulating the Document Object Model (DOM), handling events in JavaScript, working with forms in JavaScript, data storage in web applications, JSON, collections and iterators, AJAX	5					v								

					technology, and an introduction to jQuery.														
		DB	HF	Development of client Web applications	Purpose: The objective is to study modern directions in web programming, including frameworks for application development, latest technologies, and development tools for websites. Content: The content covers the main purpose of frameworks in web application development, development of applications that run on the client-side browser, advantages of ready-to-use solutions. It provides an overview of modern frontend frameworks and their usage for accelerating the development of client-side code. It explores the integration of frontend frameworks with the external part of the application and the connection of server-side frameworks with the application logic	5					v								
		PD	HF	Development of Applications and Web Services in C#	Purpose: The objective is to develop in-depth knowledge of programming in the C# environment and practical skills in developing web services using C# (advanced level of C#). Content: The content includes an overview of different ways to develop applications using C#. It covers the design of ASP.NET MVC web applications, working with the MVC pattern, creating models, views, and controllers, creating navigation controls, applying CSS styles, authentication and authorization, handling the state of web applications. It introduces Windows Azure and working with cloud services. It explores request processing in ASP.NET MVC, using WebSockets, and deploying ASP.NET MVC applications	4					v								
		PD	HF	Development of Desktop Aplications for Windows	Purpose: The objective is to develop in-depth knowledge of programming in the C# environment and practical skills in developing desktop applications for Windows (advanced level of C#). Content: The content includes the framework of a Windows application and the basics of the event-driven model. It covers advanced features of Windows forms, creating modal and non-modal dialog boxes, graphics fundamentals using the Graphics class, working with controls (properties, events, methods), menus, toolbars, and status bars. It also includes accessing databases using ADO.NET, data binding to controls using DataSource and DataBindings, and working with the DataGrid control						v								
12	Development mobile applications	PD	EC	Web technologies	Purpose: The objective is to provide knowledge of web technologies and develop application development skills. Content: The content covers web technologies in networks of different levels, including concepts like ISP (Internet Service Provider), POP (Point of Presence), NAP (Network Access	4					v			v					

					Point). It includes the TCP/IP protocol stack, application layer protocols of the OSI model. It also covers the specifics of HTML, DHTML, XHTML, XML. Server-side scripting with PERL, PHP, ASP, JavaScript. Technologies like Java, JavaScript, VBScript, and Flash. The toolkit for creating web applications. Supporting the processes of modernizing and promoting organization's internet resources, including website design, development, and testing of website functionality, formulation of requirements for website structure and services												
		PD	EC	Programming WEB-Applications	Purpose: The objective is to teach programming of web applications. Content: The content includes the fundamental laws and principles of programming web applications, technical specifications, standards, and protocols used on the Internet. It covers the architecture of web application design, development tools and technologies, client-side scripting for web applications. It includes JavaScript language, CGI technology, development of server-side applications using PHP scripts, XML language, web services. The architecture and security of building web applications based on CMS (Content Management Systems), Web 2.0, semantic web, and social web. Processing web logins within the framework of a DMP (Data Management Platform) system.						v			v					
		PD	EC	Development of Mobile Applications Based on Android	Purpose: The objective is to provide knowledge of the basic structure of the Android mobile platform and programming on Android. Content: The content includes the architecture of mobile devices and their components, operating systems for mobile devices, Java for mobile devices, Java ME (Micro Edition), configurations and profiles in Java ME, programming on Android, the Android library, the Java Virtual Machine in Android, creating applications for the Android OS, Android SDK (Software Development Kit) and third-party development, installation of tools, compilation, and installation of Android applications. It also covers the peculiarities of the Android ecosystem and the development of applications for Windows Phone	6					v			v					
		PD	EC	Development of Mobile Applications Based on iOS	Purpose: The objective is to develop solid knowledge of software development for mobile devices on the iOS platform. Content: The content includes an overview of mobile devices and development tools for various platforms, the developer''s toolkit, the architecture of the operating system, the structure and components of iOS applications. It covers the creation of the first iOS application, properties, categories, and blocks. It						v			v					

					also includes projects like iTahDoodle, Model-View-Controller (MVC), application delegate, execution in iOS Simulator, binding of table views, adding new tasks, introduction to Interface Builder, and binding of views														
13	Development of information systems	PD	EC	Business Information Systems	Purpose: The objective is to develop solid knowledge of the principles of developing information systems in a business environment and skills in designing information systems. Content: The content includes the fundamental laws and principles of information system development, the stage of formulating technical requirements, environmental management strategies, the systems approach, the circular model of the system life cycle, the general model of a firm"s system, AIS (Accounting Information Systems), technologies for accounting and auditing, AIS in banks, the development and implementation of CIS (Corporate Information Systems). It also covers the application of these principles in problem-solving, task formulation, execution, analysis, and formulation of conclusions	5		v	v										
		PD	EC	BigData technologies	Purpose: The objective is to provide knowledge and skills in working with big data. Content: The content includes the fundamental laws and principles of working with Big Data technologies, such as data processing and working with OLAP (Online Analytical Processing), Big Data and Data Mining, Big Data infrastructure, distributed computing, the Hadoop ecosystem, the MapReduce approach and its software implementations, parallel computing, the application of cloud technologies, machine learning, and data analysis using machine learning on the Microsoft Azure platform			v										v	

		PD	EC	Intelligent information systems	Purpose: The objective is to develop solid knowledge of the principles of developing intelligent information systems. Content: The content includes the fundamental laws and principles of developing intelligent information systems, including the typology of knowledge and intelligent information systems, typical structure of intelligent information systems, technological principles of creation and design stages - production, formal-logical, frame-based, and semantic-network models of knowledge representation, the structure, basic schemes, and algorithms of functioning of intelligent systems, foundations of machine learning, knowledge base creation, processing fuzzy knowledge and fuzzy logical inference, design patterns. The application of these principles in problem-solving, problem formulation, execution, analysis, and formulation of conclusions	5		v	v						v				
		PD	EC	Pattern recognition and image processing	Purpose: The objective is to develop skills in working with the "1C:Enterprise" software. Content: The content includes skills in working with the "1C:Enterprise" software, documentation management, and accounting registers. It covers setting up a chart of accounts, methods of entering information such as transactions and documents, and accounting and reporting in the "1C:Enterprise" program. Typical documents such as cash orders, payment orders, invoices, bills of lading, and invoices are also included. The application of the "1C:Enterprise" software for automating production tasks is addressed			v			v								
		PD	EC	Special Practicum in 1C Environment	Purpose: The objective is to develop skills in working with the "1C:Enterprise" software. Content: The content includes skills in working with the "1C:Enterprise" software, documentation management, and accounting registers. It covers setting up a chart of accounts, methods of entering information such as transactions and documents, and accounting and reporting in the "1C:Enterprise" program. Typical documents such as cash orders, payment orders, invoices, bills of lading, and invoices are also included. The application of the "1C:Enterprise" software for automating production tasks is addressed	5											v		
		PD	EC	Configuration in 1C environment	Purpose: The objective is to develop skills in configuring using the 1C:Enterprise platform. Content: The content includes understanding the basics of configuration in the 1C:Enterprise platform, developing and refining configurations, modifying standard 1C configurations, creating subsystems, documents, various report forms, accumulation registers, and calculation registers. It also involves designing user-friendly interfaces,												v		

					analyzing debugging results, and setting and modifying properties and methods of objects in the 1C:Enterprise environment														
		PD	EC	Information systems design	Purpose: The objective is to develop skills in designing various types of information system components. Content: The content includes the fundamental principles of information system design, including the basics of creating and operating information systems. Classification and consumer properties, new approaches in design technology, new tools and CASE technologies, hardware implementation of DBMS functions, designing all types of components, databases, working in a multi-user environment, and information security in LAN's (Local Area Networks).	5		v	v		v	v							
		PD	EC	Systems Analysis and Development	Purpose: The objective is to develop skills in designing various types of information system components and analyzing the results. Content: The content includes the development and description of business processes, principles of constructing business processes and workflow algorithms, methods of statistical and mathematical data analysis, requirements for preparing regulatory documents, tools for data analysis, and conflict management techniques. The development of skills and abilities includes creating demonstration materials for presentations, compiling statistical reports on the client base, and selecting methods for monitoring, evaluating, and correcting database work			v	v		v	v							
14	Module for acquiring new professional competencies	BD	EC	Disciplines for additional educational program	**Purpose:** Formation of theoretical knowledge and practical skills for solving problems in a set of disciplines to obtain additional competencies in a chosen area that is not a core one. **Content:** An additional educational program (Minor), which defines a set of disciplines and (or) modules and other types of educational work determined by the student in order to form additional competencies in a selected area that is not a core one; individualization of students' education, increasing students' motivation.	12		v			v								
15	Final assessment module	PD	EC	Undergraduate or industrial practice	**Purpose:** Application of theoretical knowledge on IS design; calculation of the economic efficiency of IP; ecology and basics of life safety; Fundamentals of Entrepreneurial Skills and Anti-Corruption Culture . **Contents:** Methodology for surveying an object and collecting the necessary materials for the development of an information system; development of the IS model and components; Database; writing the code of the program with the	10		v	v		v	v	v	v					

					compilation of a test case; program performance check; formulation of conclusions and recommendations .														
				Writing and defending a thesis, graduation project or preparing and passing a comprehensive exam	**Purpose:** Writing and defense of the thesis. **Content** : Confirm professional potential, demonstrate abilities in organizing and conducting independent research in the field of ICT; reasoned development of reasonable recommendations *;* disclosure of the level of qualification, theoretical knowledge and practical skills; demonstration of the internal unity of work and display of the progress and results of the development of the chosen topic; application of the rules for the design and defense of the thesis; determination of preparedness for independent work on the profile.	8		v	v		v	v	v	v					
	Total					240													

5 SUMMARY TABLE SHOWING THE VOLUME OF DISPUTED LOANS BY OP MODULES

Course of Study	Semester	Number of modules being mastered	Number of disciplines studied			Number of KZ credits					Total hours	Total loans KZ	Quantity	
			OK	VC	HF	Theoretical training	Physical Culture	Educational practice	Internship	final examination			copy	diff. offset
1	1	3	5	1	1	28	2				900	thirty	6	1
	2	4	3	3	1	27 _	2	1			900	thirty	5	3
2	3	4	2	3	3	28	2				900	thirty	6	2
	4	7	3	1	2	24	2		4		900	thirty	5	2
3	5	5		1	6	thirty					900	thirty	6	-
	6	4			4	24			6		900	thirty	3	1
4	7	2		1	4	2 1					6 3 0	2 1	4	-
	8	3			4	2 1					6 3 0	2 1	4	-
	9	1				-			10	8	54 0	18	-	1
total		15	8	1 0	23	20	38	1	20	8	7200	240	39	10

6 STRATEGIES AND METHODS OF TRAINING, MONITORING AND EVALUATION

Strategies and learning	**Student - centered learning** : learner – _ _ center teaching/learning And active participant in the process learning and acceptance solutions . **Practice-oriented learning** : focus on the development of practical skills.
Teaching methods	Conducting lectures, seminars, practical and laboratory work with: • application of innovative technologies: • problem learning; • case study; • group work; • discussions and dialogues, intellectual games, olympiads, quizzes; • software development; • presentations; • rational and creative using information sources : • multimedia educational programs ; • electronic textbooks ; • virtual laboratory work; • digital resources . Organization of independent work of students, individual consultations.
Monitoring and assessing the achievability of learning outcomes	**Current control** on each topic of the discipline, control of knowledge in classroom and extracurricular activities (*according to the syllabus*). Evaluation forms : • survey on classes; • testing By topics educational disciplines; • control work; • protection independent works; • discussions; • trainings; • colloquia; • essay , etc. **R intermediate control** at least two times during one academic period within the same academic discipline. **Intermediate certification** is carried out in accordance with the working curriculum, academic calendar. Conduct forms: • examination in the form of testing; • oral exam; • a written exam; • combined exam; • protection of projects; • reporting protection By practitioners . **Final state certification** .

7 EDUCATIONAL AND RESOURCE SUPPORT OF THE EP

Information Resource Center	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. The software of the JRC is AIBS "IRBIS-64" under MS Windows (basic set of 6 modules), stand-alone server for uninterrupted operation in the IRBIS system. 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. Thematic databases of their own generation have been created: " Almamater ", "Proceedings of SKSU scientists", "Electronic archive" . About online access from any device in 24/7 mode via the external link http://articles.ukgu.kz/ru/pps . 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". 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 divisions of the JIC; through the information network of the university for faculties and departments; remotely on the library website http://lib.ukgu.kz/ . Access to international and republican resources is open: SpringerLink, Plenipotentiary, Web of Science, EVSCO, Epigraph, electronic versions of scientific journals in open access, Zan, RMEB, Adebiet , Digital library "Aknurpress", "Smart-kitar", "Kitar.kz", etc. For persons with *special needs* and disabilities in the CRC adapted the library website for the work of users with visual impairments
Material and technical base	**Specialized Audiences:** Computer classes and lecture halls equipped with modern functional and presentation equipment. Modern hardware and licensed software are installed in computer classes. All laboratory rooms are equipped with new generation computers that are in working order, allow for scientific and laboratory work, and are used in full. The computers are united in a local network and connected to the high-speed network of the university. Lecture halls are equipped with computers, multimedia projectors, which allow teaching at a high level. **Laboratory instruments and installations** Standard kit - "Molecular Physics" (Processing the results of multiple direct measurements, Maxwell's Pendulum) - Installation "Electricity and magnetism" (Modeling, Determination of the specific charge of the Electron by the magnetron method, Hall effect) Standard kit - "Optics" (Dispersion, Diffraction, Polarization, Interference) - Installation for studying the electric hole transition - Installation for studying the external photoelectric effect - Installation for determining the resonant potential of an atom of an inert gas (mercury) with an oscilloscope - Installation for determining the width of the sealing layer P - n transition and impurity concentration in the region of avalanche breakdown - Devices and equipment

APPROVAL SHEET

on the Educational program 6B06120–«Information systems»

Director of DAA _____ Naukenova A.S.

Director of DASc _____ Nazarbek U.B.

Director of DE&C _____ Bazhirov T.S.

Annex 1

REVIEW
for the educational program
6B06120 "Information systems "
(code and name)
developed in the NJSC " SKU im. M. Auezov " , Shymkent

1. Brief description of the enterprise and the profile of its activities

The implementation of the proposed EP will be carried out on the basis of the Higher School of "Information Technology and Energy" NAO South Kazakhstan University. M. Auezov. The university is the leading multidisciplinary university in the Turkestan region. Responsible for the implementation of the educational program is determined by the graduating department "Information Systems and Modeling".

2. Relevance and relevance of the EP

Educational program ***6B06120 "Information systems "*** developed in accordance with the needs of the regional labor market in personnel with higher professional education. In the context of the formation and development of professionally oriented education, the problem of training highly qualified personnel for the implementation of managerial and analytical functions in the field of application of ICT technologies becomes relevant. Currently, the information space of the region is increasing the number of business objects, medical, educational and government, research organizations that need to develop, implement and maintain intelligent information technologies. systems. This circumstance imposes certain obligations on higher education institutions in terms of training personnel.

3. Learning outcomes and competencies, their relationship with labor market demands

The learning outcomes and competencies proposed in the EP fully comply with modern qualification requirements for specialized specialists of the bachelor's qualification, and also contribute to the formation of holistic theoretical knowledge, practical skills and professional skills .

4. The presence of components that develop practical skills

The academic disciplines of the EP provide the formation of the necessary practical skills of a specialist with fundamental and applied knowledge in the field of information systems development.

All practice programs are developed taking into account the requirements of the professional standard, as well as taking into account the opinion of employers. The types of practices included in the updated educational program are determined in accordance with the types of activities that the educational program is focused on. Their content, goals and objectives testify to the orientation of the updated educational program towards the development of practical skills and abilities of students.

5. Content of the updated educational program (modules, disciplines)

The modules "Module of social and ethnic development", "Mathematical and natural-scientific foundations", introduced disciplines that contribute to the formation of the competence of a modern specialist in the fields of application of information systems. The disciplines of the curriculum for the reviewed updated EP form the entire necessary list of general cultural, general professional and professional competencies.

One of the advantages is taking into account the requirements of employers in the formation of major disciplines, which, by their content, make it possible to ensure the competence of the graduate. The quality of the content of the curriculum is beyond doubt.

All types of educational activities are provided for the preparation of highly qualified specialists with the skills of research work - theoretical training, industrial practice, registration and defense of diploma theses.

The distribution of disciplines over academic periods is rationally and logically grounded. The planned volume and time resource for academic disciplines and types of training meet the qualification requirements for the level of graduates.

In accordance with the credit technology of education, the curriculum includes: compulsory academic disciplines, disciplines of the university component and an optional component.

The structure of the educational program is generally logical and consistent. Evaluation of the section of academic disciplines allows us to conclude about their high quality and sufficient level of methodological support. The content of the disciplines corresponds to the competence model of the graduate.

6. The quality of the modular guide

The content of the modular reference book of the educational program corresponds to the accepted competence model of the graduate. The composition of educational modules covers all relevant areas of training for specialists in the field of information systems.

7. Conclusion on EP

Based on the foregoing, I consider it possible to assert that the goals and content of the presented updated educational program meet the modern qualification requirements for training bachelors specializing in information systems.

Director of «Innova Corporation Company» LLP Turdaliev Zh.K.

Annex 2

Expert opinion
for the educational program
6B0612 0 - " Information systems "

1. The relevance of the updated OP

The relevance of this educational program lies in the fact that the development, maintenance and operation of information systems is widely used in modern life and has many areas of application.

The rapid development of interactive multimedia technologies requires the emergence of specialists of a new formation. There is a significant shortage of specialists in Kazakhstan who are able to create and successfully operate modern ICT

in the field of information systems. Due to the dynamic development of the industry and the rapid obsolescence of information technologies, constant updating and improvement of educational programs in this area is required.

The development of the sphere of information and telecommunication technologies largely depends on the choice of the concept of training specialists of higher professional education.

2. Compliance of the EP with the formulated goals, consistent with the mission of the university, the requests of employers and students

In the educational program ***6B06120 - "Information systems"*** formulated: the concept of the educational program, the goals and objectives of training specialists, the requirements for the organization of the educational process and for applicants, the learning outcomes for the updated EP, and also contains a description of the qualification characteristics of the graduate of the educational program, his key and professional competencies, information about the disciplines. The list of academic disciplines and their content content meet the modern qualification requirements for specialists in the direction of "Information Systems".

The selection of academic disciplines, the requirements laid down in relation to the formed knowledge, practical skills and professional competencies are fully consistent with the mission of the university *" Formation of the country's intellectual elite based on the generation of new knowledge and the transformation of the university into an entrepreneurial university ", meet the needs of employers and students.*

3. Compliance with the National Qualification Framework of the Republic of Kazakhstan

The objectives and content of the EP correspond to the 6th level of the National Qualification Framework of the Republic of Kazakhstan.

4. Reflection in the EP of learning outcomes and competencies based on the Dublin descriptors laid down in professional standards / industry frameworks

The educational program is aligned with the Dublin descriptors, cycle 2 of the Qualifications Framework of the European Higher Education Area (A frame work for Qualifications of the European Higher Education Area), level 6 of the European Qualifications Framework for Lifelong Learning (The European Qualifications Framework for Life long _ learning).

5. Compliance with the classifier of areas of training of personnel with higher education

The structure and content of the EP correspond to the requirements of the classifier of areas of training of personnel with higher education of the educational program 6B06120 - "Information Systems".

6. The structure and content of the EP, the application of the modular principle of their construction

The curriculum includes disciplines of the university component and disciplines of the elective component.

The disciplines of the university component provide the formation of general and professional competencies.

The disciplines of the elective component expand and deepen the training of students, contribute to the acquisition of additional competencies, knowledge and skills necessary to ensure the competitiveness of the graduate to the requirements of the labor market.

The modular construction of the educational program allows you to obtain integrated knowledge in modules containing interrelated disciplines. The modular approach is designed to ensure the gradual development of the educational program.

The composition of educational modules covers all relevant areas of training of highly qualified specialists in the field of application of information systems that are competitive in the domestic and international labor markets.

7. The presence in the EP of components for preparing for professional activities, developing key competencies, intellectual and academic skills, reflecting the changing demands of society, including the implementation of the presidential program for mastering three languages: Kazakh, Russian and English

The program deals with aspects of the development of information systems, their maintenance and operation of software; development of technical documentation. The updated OP submitted for consideration was executed qualitatively and competently. It is important to focus on the unity of theory and practice, focus on training a competent specialist in the development and application of information systems. The included academic disciplines cover the entire range of topical issues and problems in the profile of training, are fully capable of forming the necessary specialized knowledge, skills and abilities in the development and application of information systems.

8. The logical sequence of disciplines and the reflection of the main requirements in the curricula and training programs

Disciplines for study periods are placed in a logical sequence. Structural parts of the educational program: interconnected, aimed at achieving the planned result, successive, disclosed in full.

The content of the disciplines of the educational program corresponds to the accepted competence of the graduate model.

The educational program is fully provided with educational and methodological documentation and related materials.

In order to train highly qualified specialists, all types of educational activities are provided . The planned volume and time resource for academic disciplines and types of training meet the qualification requirements for the level of graduates, and also contributes to the comprehensive satisfaction of their educational needs.

The methodological equipment of the educational program contributes to the successful solution of problems in key areas of training, education and development of students.

9. Reflection in the EP of the system for accounting for the workload of students and teachers in credits, its compliance with the parameters of the credit system of education.

The content of the EP fully complies with the requirements of the credit technology of education, including in terms of taking into account the teaching load of teachers and students in loans. It is planned to study 240 credits.

10. The presence in the programs of industrial practice to consolidate the theoretical material, expressed in the workload in credits

The updated Educational program provides for three types of internships: educational in the amount of 1 credits, industrial practice I in the amount of 4 credits, industrial practice II in the amount of 6 credits and pre-diploma in the amount of 10 credits.

11. Information about the teaching staff involved in the implementation of the EP

The EP reflects information about the teaching staff involved in its implementation. The qualification requirements for teaching staff are met.

12. Qualifications obtained as a result of mastering the EP

Upon mastering the EP, it is envisaged that the graduate will be awarded **a bachelor's** degree in the field of information and communication technologies for the educational program 6B06120 - "Information Systems".

13. Recommendations

In accordance with the above, it seems possible to assert that the goals and content of the EP correspond to the modern qualification requirements for training bachelors specializing in information and communication technologies.

It is recommended to accept the presented updated educational program for implementation.

Expert Sembiev O.Z.
Doctor of Technical Sciences,
Professor of the Department of "Computing and Software"

Annex 3

Professional standards

Application No. 1
to the order of the Acting Chairman of the Board of the National Chamber of Entrepreneurs
Republic of Kazakhstan "Atameken"
No. 222 dated 12/05/2022

Professional standard
"Administration bases data"

1. General provisions

1. The professional standard "Database Administration" is intended for the formation of educational programs, including for training personnel at enterprises, for certification of employees and graduates of educational institutions, for solving a wide range of tasks in the field of personnel management.

On the basis of this professional standard, organizations can develop corporate professional standards for employees for internal use, specifying the level of professional education, the list of labor functions, knowledge, skills and abilities, taking into account the specifics of the organization of production, labor and management, and their responsibility.

2. The following terms and definitions apply in this professional standard:

1) qualification - the degree of readiness of an employee for the qualitative performance of specific labor functions;

2) skill level - a set of requirements for the level of training and competence of an employee, differentiated by the parameters of complexity, non-standard labor actions, responsibility and independence;

3) national qualifications framework - a structured description of qualification levels recognized in the labor market;

4) the national system of qualifications - a set of mechanisms for legal and institutional regulation of demand and supply for the qualifications of specialists from the labor market;

5) sectoral qualifications framework - a structured description of the qualification levels recognized in the industry;

6) professional group - a set of professional subgroups that has a common integration basis (similar or close purpose, objects, technologies, including labor tools) and assumes a similar set of labor functions and competencies for their performance;

7) professional subgroup - a set of professions, formed by a holistic set of labor functions and the competencies necessary for their performance;

8) professional standard - a standard that defines in a specific area of professional activity the requirements for the level of qualification and competence, content, quality and working conditions;

9) profession - the main occupation of a person's labor activity, requiring certain knowledge, skills and practical skills acquired as a result of special training and confirmed by relevant documents on education;

10) labor function - a set of interrelated actions aimed at solving one or more tasks of the labor process.

3. The following abbreviations are used in this professional standard:

1) SQF - sectoral qualification framework;
2) PS - professional standard;
3) KS - a qualification directory of positions of managers, specialists and other employees;
4) software - software;
5) DB - database;
6) IS - information security;
7) DBMS - database management system;
8) OS - operating system;
9) IS - information system.

2. Passport professional standard

PS name:	"Database Administration"
Purpose of PS development:	Systematic and structured description of labor functions, relevant requirements for knowledge, skills, abilities and personal competencies of employees.
Brief description of the PS:	Installing, configuring, monitoring the functioning of database management systems, providing information security, managing enterprise database backups, developing the area of enterprise activity in terms of ensuring fault tolerance of the database server(s).
Group names	Main group: Information and communication technologies. Professional group: Implementation and administration of database management systems. Professional subgroup: Database implementation and maintenance.

3. Cards professions

Scroll professions	DBA	4th level of ORK
	DBA	Level 5 ORC
	DBA	6th level of ORC

CARD PROFESSIONS
"SPECIALIST BY ADMINISTRATION BAZ DATA"

code :	2139 « IT -specialists, Not included V other groups"
Name professions:	"Administrator databases "
Level qualifications By ORC:	6. Higher education, practical experience

Level qualifications By KS	-
Labor functions	1) Installation And setting BY. 2) Security functioning DB. 3) Monitoring and managing database backups . 4) Security IS DB. 5) Analysis and tuning of DBMS performance. 6) Security uninterrupted work DBMS. 7) Control development DB.
Labor function 1	**Skills and skills:**
Installation And setting BY	1. Evaluation and development of requirements for the hardware and software complex, based on the prospects for using the database. 2. Designing a hardware-software complex for installing a database. 3. Choosing the most efficient DBMS for installing and configuring software . 4. Designing the structure of the database , taking into account the prospects for using the database. 5. Implementation of effective configuration of the hardware-software complex. 6. Usage technical documentation for installing and configuring software .
	Knowledge: 1. Hardware Specifications _ _ software complex. 2. Peculiarities various DBMS. 3. Requirements To DBMS. 4. Requirements To systemic And applied BY. 5. Mechanisms for resource management of the hardware - software complex. 6. Architecture IP using DB. 7. Design DB. 8. Methods And principles IB.
Labor function 2 Security functioning DB	**Skills and skills:** 1. Analysis and taking measures to resolve complex emergency situations and incidents that arise during the operation of the DBMS. 2. Analysis of information about the operation of the database obtained during the operation of the database. 3. Coordination of database administration work . 4. Development of regulatory and technical documentation on the functioning of the database. 5. Analysis of the need to upgrade the hardware and software complex based on the results of the operation of the database. 6. Forecast And grade risks failures V work DB.
	Knowledge: 1. The composition of the operating hardware and software complex and the technical characteristics of its components. 2. Compound And functional possibilities BY for database administration. 3. Methods monitoring functioning DB. 4. Methods information analysis . 5. Basics management risks.
Labor function 3 Monitor and manage database backups	**Skills and skills:** 1. Development of regulatory and technical documentation for backup DB. 2. Organization and control of execution of work on database backup . 3. Monitoring the implementation of regulatory documents By reserve copying DB.

	Knowledge: 1. Hardware and software complex used in various database backup systems and technical characteristics of its components. 2. Modern system and application software for performing procedures reserve copying and restoring the database. 3. Methods for creating database backup procedures. 4. Features and differences of the hardware - software complex for storing backup copies of the database.
Labor function 4 Security IS DB	**Skills and skills:** 1. Analysis possible threats security DB. 2. Development of normative and technical documentation to ensure database IS. 3. Usage funds And methods database access control. 4. Compliance politicians IS enterprises.
	Knowledge: 1. Various systems management DB. 2. Means and methods for managing database user accounts . 3. Various methods ensure database security when using application software . 4. Facilities And methods control access To DB. 5. Methods And principles IB.
Labor function 5 Analysis and tuning of DBMS performance	**Skills and abilities:** 1. Analysis of statistical information to assess the performance of the database. 2. Using the range of available database management tools and methods to assess the load when executing database queries. 3. Analysis and evaluation of the effectiveness of the functioning of the database. Development of a long-term plan for the development of a hardware and software complex in order to increase the performance of the DBMS.
	Knowledge: 1. Tools for monitoring, collecting and analyzing statistical information about the operation of the database. 2. Various methods and tools for analysis and database performance evaluations. The composition of the operating hardware and software complex and the technical characteristics of its components.
Labor function 6 Security uninterrupted DBMS work	**Skills and skills:** uilding And administration cluster architecture of database servers. 2. Inspection of the state of the DBMS and database servers in order to implement preventive measures for maximum IS availability. 3. Analysis and identification of the causes of failures in the operation of the DBMS with their subsequent elimination. 4. Development of procedures for emergency situations related to the operation of the DBMS, as well as when restoring the database.
	Knowledge: 1. Compound exploited BY And hardware and software complex. 2. Methods for effective recovery of DBMS and database functionality. 3. Existing methods for configuring database mirroring and database replication methods. 4. Means and mechanisms for updating the operated software .
Labor function 7 Control development DB	**Skills and skills:** 1. Analysis of the hardware and software complex market. 2. Development of a strategy for the development of the use of DBMS in the organization. 3. Learning best practices in database administration. 4. Planning for software upgrades and/or data migration. 5. Carrying out work on installing updates to the DBMS version after preliminary testing of updates in a test environment.

	Knowledge: 1. World experience in the use of database management systems . 2. Database development strategies and organization database management system. 3. Means and mechanisms for updating the operated software .	
Requirements for personal competencies	organization, initiative, attentiveness, responsibility, discipline, diligence, analytical thinking, planning, decision making, critical analysis, result orientation, striving for improvement professional level, Job V team .	
Relationship with other professions framework ORC –	2131	System Architect
	213	Supervisor teams
Technical characteristics professional standard		
Developed	JSC « National infocommunication Holding "Zerde" Approved by order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs Republic Kazakhstan "Atameken" No. 171 dated July 17, 2017 of the year	
Number versions And year of issue	Version 1, 2015 year	
date indicative revision	2018 _	
Updated:	CIB ICRIAP RK	
The expertise is provided by:	Organization: ALE " Kazakhstan Information Security Association " Experts and contact details of experts : General Director Pokusov V.V. +7 771 716 18 16	
Version number and year of release:	Version 2, 2022	
Date of indicative revision:	2025	

Application No. 6
to the order of the Acting Chairman of the Board of the National Chamber of Entrepreneurs
Republic of Kazakhstan "Atameken"
No. 222 dated 12/05/2022

Professional standard: "Conducting web monitoring"

Glossary

The following terms and definitions apply in this professional standard:

Information system (IS) is an organizationally ordered set of information and communication technologies, service personnel and technical documentation that implement certain technological actions through information interaction and are designed to solve specific functional problems.

Information technology (IT , IT) is a process that uses a set of tools and methods for collecting, processing and transmitting data to obtain new quality information about the state of an object, process or phenomenon. Information technology (IT , from the English Information Technology, IT) is a class of areas of activity related to technologies for managing and processing a huge flow of information using computer technology.

Maintenance of IS - ensuring the use of an IS put into commercial operation in accordance with its purpose, including measures for correcting, modifying and eliminating software defects, without upgrading and implementing additional functional requirements and subject to maintaining its integrity.

The architecture of an information system is a concept that defines the model, structure, functions performed and the relationship between the components of an information system.

Database - a collection of data organized according to a conceptual structure that describes the characteristics of this data, as well as the relationships between their objects.

Redesign - modification of the graphic and / or structural and functional components of an existing site or software product

Rendering - the process of obtaining an image from a model using a computer program

Graphical User Interface (GUI) is a specific program that provides the ability to use user interface elements in the form of graphical objects.

User Centered Design - provides a combination of ergonomic, aesthetic, artistic requirements for the system

User interface (UI) - elements of the system interface that are used by the user while working in the system (menus, buttons, dialog boxes) in the form of objects, which takes into account the color scheme, size, style and other graphic features.

SQL (Structured Query Language) is a structured query language, a declarative programming language for creating, modifying and managing data.

OLAP (English Online Analytical Processing, interactive analytical processing) is a data processing technology that consists in preparing summary (aggregated) information based on large data arrays structured according to a multidimensional principle.

Product Analyst – Analyst performing big data analysis to predict product behavior.

BI (Busines sintelligence) - translation of transactional business information into a human-readable form

ICT - Information and Communication Technologies;

SO - Software;

DB - Databases

CRM (Customer Relationship Management) - customer relationship management system

1. Professional Standard Passport		
Name of the Professional Standard:	Carrying out web monitoring	
Professional Standard Number:		
The names of the section, section, group, class, and subclass according to OKED:	J Information and communication 62 Computer programming, consulting and other related services 62.0 Computer programming, consulting and other related services 62.01 Computer programming activities 62.01.1. Software development.	
Brief description of the PS:	Providing transactional business information in a human-readable form, interpreting large amounts of data, modeling initial courses of action, maintaining a business solution . Working with big data, studying metrics, building a funnel, monitoring changes, using a statistical significance indicator. Applying the Data Driven Development approach. Monitoring website traffic, studying the behavior of visitors.	
2. Occupation cards		
List of profession cards	web analytics specialist	6th and 7th levels of ORC
	BI systems specialist	6th and 7th levels of ORC
	Product analytics specialist	6th and 7th levels of ORC

PROFESSION CARD: WEB ANALYSIS SPECIALIST		
Code:		
Group code:		
Profession:	web analytics specialist	
Other possible job titles:	-	
Qualification level for ORK:	6	
The main purpose of the activity:	Collection and analysis of data about site visitors	
Labor functions:	Mandatory job functions:	1. Analysis of the behavior of site visitors 2. Search engine optimization for website promotion
	Additional labor functions:	-
Labor function 1: Website visitor behavior analysis	**Task 1:** Development of programs for collecting information about the behavior of site visitors	**Skills:** 1. Program / create pop-up applications to attract visitors, automatic mailings by SMS and e-mail, chat bots for various social applications using common platforms Chatfuel, Manychat, Motion.ai, Flow.XO, Botsify 2. Use Node.js, PHP, Java, Python and other programs to create chat bots and mailing programs 3. Create Push Notifications
		Knowledge: 1. Fundamentals of programming, scripting programming languages, etc. 2. Methods and principles of marketing organization Chatbot Development Platforms
	Task 2: Work on processing data for the content and database of the site	**Skills:** 1.Develop SQL queries on the site and collect data on regular visitors 2. Organize a database for analyzing data on the behavior of visitors 3. Make analytical measurements and issue solutions for organizing the work of a marketer
		Knowledge: 1. Knowledge of current (modern) software tools for data analysis 2. SQL query language 3. Methods and principles of database design 4. Fundamentals of data analysis and working with big data
Labor function 2: Search engine optimization for website promotion	**Task 1:** Site Vulnerability Prevention	**Skills:** 1. Identify emerging PI errors 2. Make decisions about fixing emerging problems at the user level 3. Index content, disable page indexing, use keyword planner 4. Create reports on SearchConsole performance
		Knowledge: 1. Methods and principles of PI development 2. Programming languages 3. Website development technology 4. Types of attacks and methods to prevent them
	Task 2: Extracting data from web resources	**Skills** 1. Perform data parsing with subsequent saving in the required format. 2. Classify the data according to the requested criteria 3. Create a database and store the extracted data in a data warehouse
		Knowledge 1. Data extraction approaches: parsing DOM tree, using XPath, parsing strings, using regular expressions, XML parsing, visual approach. 2. Scripting programming languages and search algorithms, data types and so on
Requirements for personal competencies	Responsibility. performance. Logical thinking. Flexibility of thinking. Result orientation. Organization. Creativity. Attentiveness. Independence in decision making. Accuracy. Responsibility.	

Relationship with other professions within the OQF	6-7	BI systems specialist	
	6-7	Product analytics specialist	
Link to ETKS or KS or other job directories	KS	140. Software Engineer 96. Project manager 157. Programmer (web master, web designer)	
Relationship with the system of education and qualifications	Level of education: higher (ISCED level 6)	Direction of training: Information and communication technologies	Qualification: Bachelor in ICT
PROFESSION CARD: BI SYSTEMS SPECIALIST			
Code:			
Group code:			
Profession:	BI systems specialist		
Other possible job titles:			
Qualification level for ORK:	6		
The main purpose of the activity:	Conduct data analysis from the data warehouse		
Labor functions:	Mandatory job functions:	1. Designing and creating a database	
		2. Visualization and report generation of data for business analysis	
	Additional labor functions:	-	
Labor function 1: Designing and creating a database	**Task 1:** Database development and work with data	**Skills:**	
		1. Determine data types and database structure for implementation at the logical and physical levels 2. Perform normalization, denormalization of the database, labeling and standardization of data 3. Organize interaction with unstructured data sources	
		Knowledge:	
		1. Basics of database design 2. OLAP technologies and theoretical foundations of multidimensional databases 4. Knowledge of the SQL query language	
	Task 2: Providing reporting	**Skills:**	
		1. Create bots with analytical alerts (in case of significant deviations) in real time 2. Conduct group consolidation, budgeting and rolling forecasts . 3. Provide statistical inference and probabilistic modeling 4. Provide business information in a convenient, concise manner.	
		Knowledge:	
		1. Reporting tools for project budgeting, reporting consolidation 2. Real time basics 3. Data warehouse structure	
Labor function 2: Data visualization and reporting for business analysis	**Task 1:** Data Modeling and Rendering	**Skills:**	
		1. Apply data visualization algorithms 2. Process the received visual data 3. Organize the storage of visual data 4. Use and manage the data rendering program 5. Select data and produce to build a model with the desired accuracy	
		Knowledge:	
		1. Operating systems and programming basics 2. Fundamentals of data science 3. Principles and methods of modeling and rendering	
	Task 2: Organization of the process of documenting the results of the analysis	**Skills:**	
		1. Classify data according to the degree of application in business processes 2. Explore many different data sources and then draw accurate conclusions about them. 3. Use online business intelligence tools to conduct data analysis 4. Conduct analytical performance calculations that can be used for management decisions	
		Knowledge:	
		1. Business process management 2. Big data analysis 3. Programming languages for data analysis	
Requirements for personal competencies	Responsibility. performance. Logical thinking. Flexibility of thinking. Result orientation. Organization. Creativity. Attentiveness. Independence in decision making. Accuracy. Responsibility.		
Relationship with other professions within the OQF	6-7	web analytics specialist	
	6-7	Product analytics specialist	
Link to ETKS or KS or other job directories	KS	140. Software Engineer 96. Project manager	
Relationship with the system of education and qualifications	Level of education: higher (ISCED level 6)	Direction of training: Information and communication technologies	Qualification: Bachelor in ICT
3.Professional standard technical data			
Designed by:	Limited Liability Partnership “System Research Company “Factor” Project leader: Gabbasov M.B. Contact details of the head: Mars0@mail.ru +7 701 9082511		

	Project executors and contact details of executors: Isin N.K. info@itk.kz +7 701 1111871 Abdeshov H.U. habdeshov@rambler.ru +7 777 2505831 Akanova A.S. akerkegansaj@mail.ru +77054480680 Approved by the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs Republic of Kazakhstan "Atameken" dated December 24, 2019 No. 259
The expertise is provided by:	Organization: Helios Soft LLP Experts and contact details of experts: Director Butumbaev S.B. 8 777 777 7653
Version number and year of release:	Version 1, 2019
Date of indicative revision:	30.12.2022
Updated:	CIB ICRIAP RK
The expertise is provided by:	Organization: ALE "Kazakhstan Information Security Association" Experts and contact details of experts: General Director Pokusov V.V. +7 771 716 18 16
Version number and year of release:	Version 2, 2022
Date of indicative revision:	2025

Appendix No. 13
to the order of the Acting Chairman of the Board of the National Chamber of Entrepreneurs
Republic of Kazakhstan "Atameken"
No. 222 dated 12/05/2022

Professional standard: "Administration of graphics and operating systems"

Glossary

The following terms and definitions apply in this professional standard:

Information system (IS) is an organizationally ordered set of information and communication technologies, service personnel and technical documentation that implement certain technological actions through information interaction and are designed to solve specific functional problems.

Information technology (IT , IT) is a process that uses a set of tools and methods for collecting, processing and transmitting data to obtain new quality information about the state of an object, process or phenomenon. Information technology (IT , from the English Information Technology, IT) is a class of areas of activity related to technologies for managing and processing a huge flow of information using computer technology.

Maintenance of IS - ensuring the use of an IS put into commercial operation in accordance with its purpose, including measures for correcting, modifying and eliminating software defects, without upgrading and implementing additional functional requirements and subject to maintaining its integrity.

Database - a collection of data organized according to a conceptual structure that describes the characteristics of this data, as well as the relationships between their objects.

Graphical User Interface (GUI) - a specific program that provides the ability to use user interface elements in the form of graphical objects.

Graphic systems are a set of technical, software, language tools and methods for connecting a user with a computer at the level of visual images when solving problems of various classes. Two types of systems are used in automatic design systems: general and specialized.

ICT - Information and Communication Technologies;
IS - Information systems;
SO - Software;
PI - User Interface;
DB - Databases
CS - computer system
GS - graphic system
OS - operating system

1. Professional standard passport		
Name of the Professional Standard:	Administration of graphics and operating systems	
Professional Standard Number:		
The names of the section, section, group, class, and subclass according to OKED:	J Information and communication 62 Computer programming, consulting and other related services 62.0 Computer programming, consulting and other related services 62.01 Computer programming activities 62.01.1. Software development.	
Brief description of the Professional Standard:	Installation and maintenance of graphic and operating systems. Checking the stability, interoperability, portability, security, or scalability of graphics and operating system architectures. Interaction with software developers to ensure compatibility between graphics and operating system components. Determination of the system data of the operating system to interact with the hardware components necessary to meet the needs of users.	
2. Occupation cards		
List of profession cards	Graphics system administrator	5th - 6th levels of ORC
	Operating systems administrator	5th - 6th levels of ORC

<table>
<tr><th colspan="5">PROFESSION CARD: GRAPHICS ADMINISTRATOR</th></tr>
<tr><td>Code:</td><td colspan="4">2523-0-001</td></tr>
<tr><td>Group code:</td><td colspan="4">2523-0</td></tr>
<tr><td>Profession:</td><td colspan="4">Graphics system administrator</td></tr>
<tr><td>Other possible job titles:</td><td colspan="4">-</td></tr>
<tr><td>Qualification level for ORK:</td><td colspan="4">6</td></tr>
<tr><td>The main purpose of the activity:</td><td colspan="4">Carrying out configuration and support of graphic systems</td></tr>
<tr><td rowspan="3">Labor functions:</td><td colspan="2" rowspan="2">Mandatory job functions:</td><td colspan="2">1. Installation and maintenance of graphic systems</td></tr>
<tr><td colspan="2">2. Ensuring the smooth operation of the HS</td></tr>
<tr><td colspan="2">Additional labor functions:</td><td colspan="2">-</td></tr>
<tr><td rowspan="6">Labor function 1:
Installation and maintenance of graphic systems</td><td rowspan="3">Task 1:
Configuring, making changes, deleting the HS</td><td colspan="3">Skills:</td></tr>
<tr><td colspan="3">1. Install GS and DBMS and set application launch parameters
2. Configure and administer graphics applications and devices to support graphics systems
3. Install the driver for graphics devices
4. Apply knowledge of the characteristics of graphics devices when establishing interactions with applications</td></tr>
<tr><td colspan="3">Knowledge:</td></tr>
<tr><td colspan="3">1. Definition and classification of modern graphics systems: application programs for working with graphics
2. Modern programming languages
3. Principles of HW design;
4. Architecture for building data centers;
5. Application programming and information recovery methods, including the implementation of input-output subsystems and file subsystems;</td></tr>
<tr><td rowspan="3">Task 2:
Maintenance of graphic systems (software and hardware)</td><td colspan="3">Skills:</td></tr>
<tr><td colspan="3">1. Troubleshoot graphics systems at the application and hardware levels
2. Perform functional maintenance of the system
3. Implement modification changes in the HS
4. Solve problems related to the modification or uninstall the system</td></tr>
<tr><td colspan="3">Knowledge:</td></tr>
<tr><td colspan="3">1. Modern software applications for working with graphics (from simple to complex graphics systems)
2. International and national standards for the development and administration of graphics systems
3. Modern programming languages;
4. Control methods in HS by hardware-software complexes.</td></tr>
<tr><td rowspan="6">Labor function 2:
Ensuring the smooth operation of the GS</td><td rowspan="3">Task 1:
Management and performance control of the HW hardware and software</td><td colspan="3">Skills:</td></tr>
<tr><td colspan="3">1. Apply special skills to support troubleshooting in emergency situations;
2. Fix simple errors when working in the graphic system (applications + hardware)
3. Match system and peripheral devices to the required graphic applications</td></tr>
<tr><td colspan="3">Knowledge:</td></tr>
<tr><td colspan="3">1. Graphics system configuration systems
2. Software for diagnostics and troubleshooting;
3. Electrical engineering and construction of structured cable data transmission systems.
4. Ways and means of protecting information, including the administration of devices for the HS.</td></tr>
<tr><td rowspan="3">Task 2:
HS performance monitoring, HS operation and support</td><td colspan="3">Skills</td></tr>
<tr><td colspan="3">1. Monitor and diagnose graphic systems, collect statistical data;
2. Identify and eliminate errors in the operation of applied, system and hardware tools, elimination of errors.
3. Identify and describe the types of incorrect operation of the graphic system
4. Report system errors
5. Implement a set of measures to counter various threats of unauthorized access.</td></tr>
<tr><td colspan="3">Knowledge</td></tr>
<tr><td colspan="3">1. Knowledge of drivers to install the required devices
2. Modern graphics applications</td></tr>
<tr><td>Requirements for personal competencies</td><td colspan="4">Logical thinking. Flexibility of thinking. Learnability. Creativity. Organization. Discipline. Attentiveness. Independence in decision making. Accuracy. Responsibility</td></tr>
<tr><td>Relationship with other professions within the OQF</td><td>5-6</td><td colspan="3">Operating systems administrator</td></tr>
<tr><td>Link to ETKS or KS or other job directories</td><td>KS</td><td colspan="3">185. Programming Technician
140. Software Engineer</td></tr>
<tr><td>Relationship with the system of education and qualifications</td><td>Level of education: higher
(ISCED level 6)</td><td>Direction: Information and Communication Technologies</td><td colspan="2">Qualification:
Bachelor in ICT</td></tr>
<tr><th colspan="5">PROFESSION CARD: OPERATING SYSTEM ADMINISTRATOR</th></tr>
<tr><td>Code:</td><td colspan="4">2523-0-004</td></tr>
<tr><td>Group code:</td><td colspan="4">2523-0</td></tr>
<tr><td>Profession:</td><td colspan="4">Operating systems administrator</td></tr>
<tr><td>Other possible job titles:</td><td colspan="4">-</td></tr>
</table>

<table>
<tr><td>Qualification level for ORK:</td><td colspan="4">6</td></tr>
<tr><td>The main purpose of the activity:</td><td colspan="4">Ensure reliable operation of the OS</td></tr>
<tr><td rowspan="3">Labor functions:</td><td colspan="2">Mandatory job functions:</td><td colspan="2">1. Installation and maintenance of operating systems</td></tr>
<tr><td colspan="2"></td><td colspan="2">2. Determination of operating system system data for interaction with hardware components.</td></tr>
<tr><td colspan="2">Additional labor functions:</td><td colspan="2">-</td></tr>
<tr><td rowspan="6">Labor function 1:
Installation and maintenance of operating systems</td><td rowspan="3">Task 1:
Ensuring the smooth operation of the operating system</td><td colspan="2">Skills:</td></tr>
<tr><td colspan="2">1. Check the operating system for errors in establishing communication with peripheral equipment, network access and application software.
2. Carry out preventive work to determine the compatibility of the OS and peripheral equipment
3. Analyze and eliminate errors generated during the operation of the OS
4. Administer system security tools (planning and implementing a security policy that guarantees the protection of data and shared network resources).</td></tr>
<tr><td colspan="2">Knowledge:</td></tr>
<tr><td colspan="2">1. Principles of OS construction, architecture of different types of operating system.
2. Principles of reliability, fault tolerance and compatibility, security and performance.
3.Means and principles of data protection from unauthorized access.</td></tr>
<tr><td rowspan="3">Task 2:
Analysis and monitoring of OS operation</td><td colspan="2">Skills:</td></tr>
<tr><td colspan="2">1.Schedule the operating system
2. Prepare a report based on the results of the analysis and monitoring of processes
3. Document processes, changes, updates in the OS</td></tr>
<tr><td colspan="2">Knowledge:</td></tr>
<tr><td rowspan="6">Labor function 2:
Defining operating system system data for interacting with hardware components</td><td rowspan="3">Task 1:
Management of service programs and equipment</td><td colspan="2">Skills:</td></tr>
<tr><td colspan="2">1. Develop a plan for studying the production and marketing of operating systems to determine the OS required by the company for PCs and servers
2. Take part in conferences and forums on OS development, to maximize the use of OS functionality in the company's work
3. Submit requests for modifications and changes
4. Assess the impacts of proposed changes</td></tr>
<tr><td colspan="2">Knowledge:</td></tr>
<tr><td colspan="2">1. Classification of operating systems
2. Administration tools: for managing the console, editing the registry.</td></tr>
<tr><td rowspan="3">Task 2:
Using OS Features</td><td colspan="2">Skills:</td></tr>
<tr><td colspan="2">1. Expand the functionality of the OS
2. Create or supplement interfaces for interaction with other systems;
3. Use the console tree, snap-ins in the OS to manage OS functions
4. Administer users and user groups (planning, creating and maintaining account information for users and groups).</td></tr>
<tr><td colspan="2">Knowledge:</td></tr>
<tr><td colspan="2">1. Purpose, parameters of the system registry and registry keys (defined by the system, defined by the user)
2. Console commands for testing and running the operating system.
3. Purpose of root registry keys
4. Commands for working on the command line</td></tr>
<tr><td>Requirements for personal competencies</td><td colspan="4">Logical thinking. Flexibility of thinking. Learnability. Organization. Attentiveness. Independence in decision making. Discipline. Accuracy.</td></tr>
<tr><td>Relationship with other professions within the OQF</td><td colspan="2">5-6</td><td colspan="2">Graphics system administrator</td></tr>
<tr><td>Communication with ETKS or KS</td><td colspan="2">KS</td><td colspan="2">185. Programming Technician
140. Software Engineer</td></tr>
<tr><td>Relationship with the system of education and qualifications</td><td colspan="2">Level of education: higher (ISCED level 6)</td><td>Direction: Information and Communication Technologies</td><td>Qualification:
Bachelor in ICT</td></tr>
<tr><td colspan="5">3.Professional standard technical data</td></tr>
<tr><td colspan="2">Designed by:</td><td colspan="3">Limited Liability Partnership “System Research Company “Factor”
Project leader: Gabbasov M.B.
Contact details of the head:
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+7 701 9082511
Project executors and contact details of executors:
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Approved by the order of the Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken"</td></tr>
</table>

	No. 259 dated December 24, 2019
The expertise is provided by:	Organisation: 10Tech LLP Experts and contact details of experts: Deputy General Director Boldyrev V.A. 87017173689
Version number and year of release:	Version 1, 2019
Updated:	ALE "International Association for Certification and Development of Information Technologies Master-It" Chairman: Omarov Zh.B. Artists: Kaisenov K.K. master_it_rk@mail.ru +7 701 2140195 Danilov M.S. marymasterit@mail.ru +7 777 8151000 College of Kazakhstan Engineering and Technology University Shalabaeva M.Kh. m.shalabaeva@mai.ru +7 701 4735134 Kazakhstan Reading Association Zeynegul K. Zikonti24@gmail.com +7 701 1913948 “ Orleu ” _ _ _ _ Mukhamedzhanova S.T. orleualmaty@inbox.ru +7 778 2007402 IT-school of service LLP " SDM -Services" Rybalko L.V. sdm.k@bk.ru +7 705 2090213 Global Education Group Inc. Ltd (London) Nurzhanova H. eva.global.london@bk.ru +7 701 1119480 Agency of IT products PR-KZ-MEDIA LLP Zhrebtsov S.V. infoprkzmedia@bk.ru +7 707 7888101
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Version number and year of release:	Version 2, 2022
Date of indicative revision:	12/30/2025

Appendix No. 20
to the order of the Acting Chairman of the Board of the National Chamber of Entrepreneurs
Republic of Kazakhstan "Atameken"
No. 222 dated 12/05/2022

Professional Standard: Software Maintenance

Glossary

The following terms and definitions apply in this professional standard:

Information system (IS) is an organizationally ordered set of information and communication technologies, service personnel and technical documentation that implement certain technological actions through information interaction and are designed to solve specific functional problems.

Information technology (IT , IT) is a process that uses a set of tools and methods for collecting, processing and transmitting data to obtain new quality information about the state of an object, process or phenomenon. Information technology (IT , from the English Information Technology, IT) is a class of areas of activity related to technologies for managing and processing a huge flow of information using computer technology.

Maintenance of IS - ensuring the use of an IS put into commercial operation in accordance with its purpose, including measures for correcting, modifying and eliminating software defects, without upgrading and implementing additional functional requirements and subject to maintaining its integrity.

The architecture of an information system is a concept that defines the model, structure, functions performed and the relationship between the components of an information system.

Database - a collection of data organized according to a conceptual structure that describes the characteristics of this data, as well as the relationships between their objects.

Graphical User Interface (GUI) - a specific program that provides the ability to use user interface elements in the form of graphical objects.

User interface (UI) - elements of the system interface that are used by the user while working in the system (menus, buttons, dialog boxes) in the form of objects, which takes into account the color scheme, size, style and other graphic features.

Program development automation systems (CASE - tools) - a set of software engineering tools and methods for software design, which helps to ensure high quality programs, the absence of errors and ease of maintenance of software products.

IK - Information and Communication Technologies;

SO - Software;

DB - Databases

1. Professional standard passport

Name of the Professional Standard:	Software maintenance	
Professional Standard Number:		
The names of the section, section, group, class, and subclass according to OKED:	J Information and communication 62 Computer programming, consulting and other related services 62.0 Computer programming, consulting and other related services 62.01 Computer programming activities 62.01.1. Software development.	
Brief description of the Professional Standard:	Setting up, configuring, monitoring, upgrading, eliminating software failures, assessing the adequacy and effectiveness of the internal control system and the risk management system in the field of information technology, conducting and participating in comprehensive information security audits, managing planning and conducting audit procedures, developing programs, methods information technology audits.	
2. Occupation cards		
List of profession cards	Software Maintenance Specialist	5th - 6th levels of ORC
	ICT auditor	6th - 7th levels of ORC

PROFESSION CARD: SOFTWARE MAINTENANCE SPECIALIST

Code:	2513-0-001		
Group code:	2513-0		
Profession:	Software Maintenance Specialist		
Other possible job titles:	-		
Qualification level for ORK:	6		
The main purpose of the activity:	software upgrades based on bug fixes.		
Labor functions:	Mandatory job functions:	1. Software product monitoring and error detection	
		2. Participation in software upgrades	
	Additional labor functions:	-	
Labor function 1: Software product monitoring and error detection	**Task 1:** Organization of work to eliminate failures and errors	**Skills:**	
		1. Conduct an analysis to eliminate and restore the functionality of the software 2. Install virus protection. software reliability .	
		Knowledge:	
		1. Antivirus software 2. Modern programming languages 3. Theory of queuing	
	Task 2: System error detection and failure handling	**Skills:**	
		software databases 2. Maintain file systems 3 . Advise on the operation of the software 4. Conduct an analysis to determine the benefits of new software with evidence of its superiority over old software 5. Compile a report on the analysis of the software	
		Knowledge:	
		1. Knowledge of modern software applications. 2. Database management systems 3. Operating systems and their structure.	
Labor function 2: Participation in software upgrades	**Task 1:** Improvement of individual modules of the program	**Skills:**	
		1. Solve individual tasks in accordance with a new or additional technical task for a software product. 2. Perform procedures to enhance the functionality or improve the characteristics of the software 3. To carry out functional maintenance of software on the customer's machines.	
		Knowledge:	
		1. Software life cycle 2. Programming, types and data structures. 3. Architecture and functionality of the software	
	Task 2: Restoring, updating, deleting, modifying software files	**Skills:**	
		1 . Fix software bugs in software files 2. Restore the work of memory, files, register errors software maintenance (update, protect, upgrade) until decommissioning. 4. Monitor the work of the software, take notes and make suggestions for improving the place where conflicts are systematically detected	
		Knowledge:	
		1. The structure of operating systems 2. Fundamentals of project activities and phases of the software life cycle 3. International and national standards and requirements for software maintenance	
Requirements for personal competencies	Logical thinking. Flexibility of thinking. Organization. Creativity. Sociability. Learnability. Attentiveness. Discipline. Independence in decision making.		
Relationship with other professions within the OQF	6-7	ICT auditor	
Link to ETKS or KS or other job directories	KS	185. Programming Technician 140. Software Engineer	
Relationship with the system of education and qualifications	Level of education: higher (ISCED level 6)	Direction of training: Information and communication technologies	Qualification: Bachelor in ICT

3.Professional standard technical data	
Designed by:	Limited Liability Partnership “System Research Company “Factor” Project leader: Gabbasov M.B. Contact details of the head: Mars0@mail.ru +7 701 9082511 Project executors and contact details of executors: Isin N.K. info@itk.kz +7 701 1111871 Abdeshov H.U. habdeshov@rambler.ru +7 777 2505831 Akanova A.S. akerkegansaj@mail.ru +77054480680 Approved by the order of the Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" No. 259 dated December 24, 2019
The expertise is provided by:	Organization: LLP "Tamur" Experts and contact details of experts : General Director Berentaev B. 870171476511
Version number and year of release:	Version 1, 2019
Updated:	ALE "International Association for Certification and Development of Information Technologies Master-It" Chairman: Omarov Zh.B. Artists: Kaisenov K.K. master_it_rk@mail.ru +7 701 2140195 Danilov M.S. marymasterit@mail.ru +7 777 8151000 College of Kazakhstan Engineering and Technology University Shalabaeva M.Kh. m.shalabaeva@mai.ru +7 701 4735134 Kazakhstan Reading Association Zeynegul K. Zikonti24@gmail.com +7 701 1913948 “ Orleu ” _ _ _ _ Mukhamedzhanova S.T. orleualmaty@inbox.ru +7 778 2007402 IT-school of service LLP " SDM -Services" Rybalko L.V. sdm.k@bk.ru +7 705 2090213 Global Education Group Inc. Ltd (London) Nurzhanova H. eva.global.london@bk.ru +7 701 1119480 Agency of IT products PR-KZ-MEDIA LLP Zhrebtsov S.V. infoprkzmedia@bk.ru +7 707 7888101
Expertise provided by:	ALE "International Association for Certification and Development of Information Technologies Master-It" Chairman: Omarov Zh.B. master_it_rk@mail.ru +7 777 8151000
Version number and year of release:	Version 2, 2022
Date of indicative revision:	12/30/2025

Appendix No. 36
to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs
Republic of Kazakhstan "Atameken"
dated December 24, 2019 No. 259

professional standard
"Testing Web and multimedia applications"

Glossary

The following terms and definitions apply in this professional standard:

Information system (IS) is an organizationally ordered set of information and communication technologies, service personnel and technical documentation that implement certain technological actions through information interaction and are designed to solve specific functional problems.

Information technology (IT , IT) is a process that uses a set of tools and methods for collecting, processing and transmitting data to

obtain new quality information about the state of an object, process or phenomenon. Information technology (IT , from the English Information technology, IT) is a class of fields of activity related to technologies for managing and processing a huge flow of information using computer technology.

Maintenance of IS - ensuring the use of an IS put into commercial operation in accordance with its purpose, including measures for correcting, modifying and eliminating software defects, without upgrading and implementing additional functional requirements and subject to maintaining its integrity.

The architecture of an information system is a concept that defines the model, structure, functions performed and the relationship between the components of an information system.

Database (DB) is a collection of data organized according to a conceptual structure that describes the characteristics of this data, as well as the relationships between their objects.

Software - a set of programs, program codes, as well as software products with technical documentation necessary for their operation **.**

Software interface - a system of unified links designed to exchange information between the components of a computing system, specifying a set of necessary procedures, their parameters and methods of access **.**

A software product is an independent program or a piece of software that is a commodity, which, regardless of its developers, can be used for the intended purposes in accordance with the system requirements established by the technical documentation.

Redesign - modification of the graphic and / or structural and functional components of an existing site or software product

Graphical user interface (GUI) , graphical user interface (GUI) (English graphical user interface, GUI) - a type of user interface in which interface elements (menus, buttons, icons, lists, etc.) presented to the user on the display are executed in the form of graphic images.

Web - page (English **Web page**) - a document or information resource of the World Wide Web, which is accessed using **a web** browser. Typical web page is a text file in HTML format

A Web resource is a page or set of pages hosted on the Internet, which may include both text and graphic information, as well as multimedia components (video, music, etc.).

Front-end is the client side of the user interface to the software and hardware part of the service. This type of development includes everything that the user sees when opening a web page.

Back-end is a set of hardware and software tools that implement the logic of the web resource.

search engine optimization *search engine optimization , SEO*) - a set of measures for internal and external optimization to raise the position of the site in the search results search engines for certain user requests, in order to increase network traffic (for web resources) and potential customers (for commercial resources) and subsequent monetization (revenue generation) of this traffic. SEO can target a variety of search types, including image search, video search, news search, and industry-specific search engines.

Obfuscation (from lat. *obfuscare* - obscure, obscure; and English. *obfuscate* - make it non-obvious, confusing, confusing) or code obfuscation - bringing the source text or executable code of the program to a form that preserves its functionality, but makes it difficult to analyze, understand the operation algorithms and modify during decompilation . One of the goals of obfuscation is to optimize the program in order to reduce the size of the running code and (if a non-compiled language is used) speed up the work.

IK T - Information and Communication Technologies;

SO - Software;

ISCED - International Standard Classification of Education

1. Professional Standard Passport

PS name:	Web and multimedia application testing
PS number:	
The names of the section, section, group, class, and subclass according to OKED:	J Information and communication 62 Computer programming, consulting and other related services 62.0 Computer programming, consulting and other related services 62.01 Computer programming activities 62.01.1. Software Development 63.12 Web portals 63.12.0 Web portals
Brief description of the PS:	Creation, modification and maintenance of websites, corporate portals of organizations, multimedia and interactive applications, web resources on the Internet.

2. Occupation cards

List of profession cards	web developer	5th-6th levels of ORC
	Web page developer	5th-6th levels of ORC
	Application developer	5th-6th levels of ORC
	Graphical user interface specialist	5th-6th levels of ORC
	GUI Architecture Specialist	5th-6th levels of ORC
	webmaster	5th-7th levels of ORC

PROFESSION CARD
"WEB-DEVELOPER"

Code:	2512-2-001	
Group code:	2512-2	
Profession:	web developer	
Other possible job titles:	web specialist web programmer Full stack developer	
Qualifying ORC level :	6	
The main purpose of the activity	Design, creation and modification of web resources, integration of web resources with other computer applications.	
Labor functions	Mandatory labor functions	1. Performing work on the creation (modification) of web-resources
		2. Ensuring the safe and uninterrupted operation of the web resource
		3. Development of technical documentation
	Additional labor functions	-
Labor function 1: Performing work on the creation (modification) of web-resources	**Task 1** Design and development of a front-end web resource	**Skills:** 1. Model domain structures 2. Use existing standard solutions and web resource templates . 3. Apply methods and tools for designing web resources, data structures, databases, programming interfaces

		4. Apply methods and tools for assembling software modules and components, developing procedures for software deployment, data migration and transformation, creating programming interfaces 5. Generate reporting documentation based on the results of the work performed.
		Knowledge:
		1. Simulation Technique with Simulators 2. The device and functioning of modern web resources. 3. Modern principles of building user interfaces 4. Modern methods for testing the ergonomics of user interfaces 5. The main requirements for the design of graphical interfaces, methods of transmitting information in text, graphic, sound, visual and other multimedia formats, depending on the user category, taking into account the age and characteristics of disabilities 6. Network protocols and basics of web technologies 7. Modern interpreted programming languages 8. Software life cycle 9. HTML and CSS 10. Features of the chosen programming environment and database management system 11. Software Development Methodologies 12. Methodology of object-oriented programming 13. Principles of building architecture of web -resources 14. Typical solutions, libraries of program modules, templates, object classes used in the development of web resources
	Task 2 Design and development of a back-end web resource	**Skills:**
		1. Design software in detail 2. Define relationships between objects. 3. Define processes produced by objects 4. Set process priority 5. Design database models and processes of its interaction with server applications. 6. Code in server-side programming languages (PHP , Ruby , Python , etc.)
		Knowledge:
		1. Software life cycle 2. Typical IS architectures. 3. Database Models 4. Basic knowledge of HTML 5. Web server administration 6. Methods for Designing Processes and Codes 7. Server programming languages (PHP , Ruby , Python , etc.) 8. Work with web servers 9. SQL - database query language 10. Network protocols and fundamentals of web technologies 11. Understanding how web servers work 12. Understanding the functioning of modern DBMS 13. Components of software and hardware architectures of web resources, existing applications and interfaces for interacting with them 14. Methods and tools for assembling and integrating software modules and components 15. Typical solutions, libraries of program modules, templates, object classes used in the development of web resources
Labor function 2: Ensuring the safe and uninterrupted operation of the web resource		**Skills:**
		1. Install and configure information security software 2. Analyze event log messages 3. Develop regulatory documents 4. Identify incidents of violation of safe operation, and decide on changes in procedural procedures 5. Use regulatory and technical documentation in the field of software
		Knowledge:
	Task 1 Ensuring the safe and uninterrupted operation of the web resource	1. The essence and concept of information security, the main characteristics of its components 2. Sources of threats to information security and measures to prevent them 3. Modern software and hardware tools and ways to ensure the security of web resources 4. Architecture, device and functioning of computing systems 5. Principles of operation of communication equipment 6. Network protocols and fundamentals of web technologies 7. Fundamentals of modern database management systems 8. The device and functioning of modern web resources 9. Modern standards of interaction between components of distributed applications 10. Fundamentals of information security of web resources 11. English at the level of reading technical documentation in the field of information and computer technology
	Task 3	**Skills:**

	Integration testing of a web resource with external services and accounting systems	1. Interpret customer business requirements to write test cases 2. Set requirements for test results 3. Work independently with information 4. Work in a team with other testers and developers 5. Develop regulatory documents
		Knowledge:
		1. Subject area of the project for drawing up test plans 2. Change Management Basics 3. Architecture, device and functioning of computing systems 4. Principles of operation of communication equipment 5. Network protocols and fundamentals of web technologies 6. Fundamentals of modern database management systems 7. The device and functioning of modern web resources 8. Database theory 9. Database storage and analysis systems 10. Basics of programming 11. Modern standards of interaction between components of distributed applications 12. Software tools and platforms for developing web resources 13. Fundamentals of information security of web resources
Labor function 3: Development of technical documentation	**Task 1** Analysis of requirements for a web resource and their formalization	**Skills:**
		1. Analyze compliance requirements 2. Develop options for implementing requirements 3. Evaluate and justify recommended solutions 4. Apply methods and techniques for formalizing tasks 5. Use software products for graphical display of algorithms
		Knowledge:
		1. Architecture, device and functioning of computing systems 2. Network protocols and basics of web technologies 3. Fundamentals of modern database management systems 4. The device and functioning of modern information resources 5. Database theory 6. Database storage and analysis systems 7. Modern principles of building user interfaces 8. Modern methods for testing the ergonomics of user interfaces 9. Modern standards of interaction between components of distributed applications 10. Software tools and platforms for developing web resources 11. Methods for describing and modeling processes, process modeling tools 12. Fundamentals of the theory of system analysis and construction of interaction diagrams
	Task 2 Development of technical specifications for a web resource	**Skills:**
		1. Choose means of implementing the requirements for a web resource 2. Develop options for implementing a web resource 3. Evaluate and justify recommended solutions 4. Communicate with stakeholders 5. Develop and approve technical specifications for a web resource
		Knowledge:
		1. Functional specification formalization languages 2. Methods and techniques for formalizing tasks 3. Methods and tools for designing a web resource . 4. Interface Design Methods and Tools 5. Database Design Methods and Tools 6. Architecture, device and functioning of computing systems 7. Network protocols and basics of web technologies 8. The device and functioning of modern web resources 9. Modern principles of building user interfaces 10. Modern standards of interaction between components of distributed applications 11. Software tools and platforms for developing web resources 12. Fundamentals of information security of web resources 13. Methods for describing and modeling processes, process modeling tools
Requirements for personal competencies	Analytical thinking, Critical analysis, Responsibility organization	
Relationship with other professions within the OQF	5	webmaster
	6	webmaster
Communication with ETKS or KS	KS	185. Technician - programmer 140. Software engineer (programmer)
Relationship with the system of education and qualifications	The level of education: Higher (5V ISCED code)	Direction of training: Information and communication technologies / Qualification: Bachelor in ICT
PROFESSION CARD "WEB PAGE DEVELOPER"		
Code:	2512-2-002	
Group code:	2512-2	
Profession:	Web page developer	

<table>
<tr><td>Other possible job titles:</td><td colspan="2">web designer
Front end developer</td></tr>
<tr><td>Qualification level for ORK:</td><td colspan="2">6</td></tr>
<tr><td>The main purpose of the activity</td><td colspan="2">Design, layout of web pages, content filling, administration and updating of a web resource</td></tr>
<tr><td rowspan="4">Labor functions:</td><td rowspan="3">Mandatory job functions:</td><td>1. Work with requirements for web resource _</td></tr>
<tr><td>2. Web page layout</td></tr>
<tr><td>3. Technical and informational support of the web resource</td></tr>
<tr><td>Additional labor functions:</td><td>-</td></tr>
<tr><td rowspan="2">Labor function 1:
Working with requirements for a web resource</td><td rowspan="2">Task 2:
Determination of the customer's initial requirements for a web resource and the possibility of their implementation</td><td>Skills:</td></tr>
<tr><td>1. Conduct negotiations.
2. Conduct presentations.
3. Prepare event protocols.
4. Translate requirements concepts into content
5. Translating requirements concepts into visual design</td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td>Knowledge:</td></tr>
<tr><td>1. Examples of implementation in the subject area of the project.
2. Methods for identifying requirements .
3. Technologies of interpersonal and group communication in business interaction, the basics of conflictology.
4. Technologies for preparing and conducting presentations .
5. Principles of operation of communication equipment
6. Network protocols and basics of web technologies
7. Fundamentals of modern database management systems.
8. The device and functioning of modern web resources
9. Business Correspondence Rules
10. Legal requirements for web resources
11. Information structure
12. Style sheet languages
13. Knowledge of the principles and processes of providing client and personal services.</td></tr>
<tr><td rowspan="2">Labor function 2:
Web page layout</td><td rowspan="2">Task 1:
Web page optimization</td><td>Skills:</td></tr>
<tr><td>1. Analyze web pages and their components, analyze the stages of loading web pages and analyze the characteristics of browsers with which web pages are usually loaded
2. Minify, obfuscate and compress code (HTML , CSS and JS).
3. Perform image optimization (compression, format)
4. Eliminate redundant code (for optimization purposes)
5. Optimize the number of requests
6. Optimize layout for different browsers
7. Optimize the structure of web pages</td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td>Knowledge:</td></tr>
<tr><td>1. Optimization Goals
2. Web services that allow you to get a comprehensive assessment of the client performance of the tested site
3. Key Features of Common Browsers
4. Scripting programming languages
5. Markup languages
6. Style sheet languages
7. obfuscation and compression methods
8. Image optimization methods
9. Methods for eliminating redundant code
10. Methods for reducing the number of requests
11. Setting up caching
12. Layout optimization methods
13. Features of displaying web pages
14. Web page structure
15. Features of loading external objects by browsers
16. Page loading stages
17. Distributed content storage
18. Compression methods supported by browsers
19. Setting up web servers</td></tr>
<tr><td rowspan="2">Labor function 3:
Technical and informational support of the web resource</td><td rowspan="2">Task 1:
Web resource administration</td><td>Skills:</td></tr>
<tr><td>1. Define or document backup and recovery plans
2. Identify, standardize and communicate levels of access and security
3. Solve computer software problems
4. Develop specifications or procedures for the development or maintenance of websites
5. Develop test procedures
6. Identify sources of problems with web pages and take action to fix them.</td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td>Knowledge:</td></tr>
<tr><td>1. The essence and concept of information security, the main characteristics of its components
2. Sources of threats to information security and measures to</td></tr>
</table>

		prevent them 3. Modern software and hardware tools and ways to ensure the security of a web resource 4. Architecture, device and functioning of computing systems 5. Principles of operation of communication equipment 6. Network protocols and fundamentals of web technologies 7. Fundamentals of modern database management systems 8. The device and functioning of modern wb -resources 9. Modern standards of interaction between components of distributed applications 10. Fundamentals of information security of web resources 11. English at the level of reading technical documentation in the field of information and computer technology	
Requirements for personal competencies	Organization, Attention, Discipline diligence, high learning ability, teamwork		
Relationship with other professions within the OQF	5	web developer	
	6	web developer	
Communication with ETKS or KS	KS	185. Programming Technician 140. Software engineer (programmer)	
Relationship with the system of education and qualifications	The level of education: Higher (5V ISCED code)	Direction of training: Information and communication technologies	Qualification: Bachelor in ICT
PROFESSION CARD "APP DEVELOPER"			
Code:	2512-2-004		
Group code:	2512-2		
Profession:	Application developer		
Other possible job titles:	Programmer Programmer-developer		
Qualification level for ORK:	6		
The main purpose of the activity	Develop, maintain applications and draw up related technical documentation		
Labor functions:	Mandatory job functions:	1. Integration of software modules and components, and verification of software product releases	
		2. Requirements engineering and software design	
	Additional labor functions:	-	
Labor function 1: Integration of software modules and components, and verification of software product releases	**Task 1:** Development of procedures for integration of software modules	**Skills:** 1. Write program code for integration procedures for program modules. 2. Use the selected programming environment to develop procedures for integrating software modules. 3. Apply methods and tools for assembling modules and software components, developing procedures for deploying software, migrating and transforming data, and creating programming interfaces.	
		Knowledge: 1. Methods and tools for assembling modules and software components. 2. Interfaces for interaction with the external environment. 3. Interfaces of interaction of internal modules of the system. 4. Methods and tools for developing procedures for software deployment 5. Methods and means of data migration and transformation 6. Languages, utilities and programming environments, tools for batch execution of procedures	
Labor function 2: Requirements engineering and software design	**Task 1:** Software requirements analysis	**Skills:** 1. Analyze compliance requirements 2. Develop implementation options. 3. Evaluate and justify recommended solutions. 4. Communicate with stakeholders	
		Knowledge: 1. Possibilities of the existing software and hardware architecture 2. Possibilities of modern and perspective development tools for software products, hardware 3. Software Development Methodologies and Programming Technologies 4. Methodologies and technologies for designing and using databases	
	Task 2: Development of technical specifications for software components and their interaction	**Skills:** 1. Choose means of implementing software requirements 2. Develop software implementation options 3. Evaluate and justify recommended solutions 4. Communicate with stakeholders	
		Knowledge: 1. Functional specification formalization languages 2. Methods and techniques for formalizing tasks 3. Software design methods and tools	

		4. Methods and tools for designing software interfaces 5. Database Design Methods and Tools
	Task 3: Software design	**Skills:**
		1. Leverage existing blueprints and software design patterns 2. Apply methods and tools for designing software, data structures, databases, programming interfaces 3. Communicate with stakeholders
		Knowledge:
		1. Software architecture principles and types of software architecture 2. Standard solutions, libraries of program modules, templates, object classes used in software development 3. Software design methods and tools 4. Database Design Methods and Tools 5. Methods and tools for designing software interfaces
Requirements for personal competencies	Structural thinking, perseverance and mindfulness Creative approach, Self-learning ability, Responsibility, Focus on the end result and customer requirements, Business communication skills	
Relationship with other professions within the OQF	6	Software Engineer
Communication with ETKS or KS	KS	185. Programming Technician 140. Software engineer (programmer)
Relationship with the system of education and qualifications	The level of education: Higher (5V ISCED code)	Direction of training: Information and communication technologies / Qualification: Bachelor in ICT

PROFESSION CARD "SPECIALIST IN LAYOUT OF THE GRAPHIC INTERFACE"		
Code:	2512-2-005	
Group code:	2512-2	
Profession:	Graphical user interface specialist	
Other possible job titles:	Graphic interface designer	
Qualification level for ORK:	6	
The main purpose of the activity	Design and develop a graphical user interface.	
Labor functions	Mandatory labor functions	1. Design, design and heuristic evaluation of the graphical user interface 2. Designing user interaction with the system
	Additional labor functions	-
Labor function 1: Design, design and heuristic evaluation of the graphical user interface	**Task 1:** Formal assessment of the graphical user interface and analysis of user interaction with the graphical interface	**Skills:** 1. Perform interface expertise 2. Calculate the expected speed of the interface 3. Evaluate use cases for the software interface 4. Use user experience analytics tools 5. Use systems for collecting and analyzing user interaction with the interface 6. Get user experience data from open sources 7. Develop reporting documentation
		Knowledge: 1. Interface Ergonomic Quality Assessment Systems 2. Standards governing the requirements for ergonomics of human-system interaction 3. Software Development Techniques 4. Methods for describing user requirements for a product 5. Interface peer review techniques 6. Ways to make interfaces available 7. Features of ensuring the accessibility of interfaces for users with disabilities 8. Methods of statistical data analysis
Labor function 2: Designing user interaction with the system	**Task 1:** Identification of user needs in the operation of software in terms of graphical user interfaces	**Skills:** 1. Obtain relevant professional information about user interaction with interfaces from open sources and analyze it 2. Conduct user interviews 3. Analyze received information about user interaction with graphical user interfaces 4. Create marketing personas (characters that reflect the target audience) and detailed user interaction paths with the product
		Knowledge: 1. Information collection methods 2. Activity Analysis Methods

		3. Techniques for compiling marketing personas and customer journeys 4. Patterns of human behavior when using software products and hardware 5. Standards governing the requirements for ergonomics of human-system interaction 6. Marketing Basics
	Task 2: Designing styles of user interaction with the graphical user interface of a software product	**Skills:** 1. Develop user experience management mechanisms 2. Use mental models in interface design 3. Create uniform interface solutions **Knowledge:** 1. Factors Affecting User Experience 2. Learning Heuristics 3. Patterns of human behavior when using software products and hardware 4. General Practices for Designing Graphical User Interfaces 5. Standards governing the requirements for ergonomics of human-system interaction 6. Standards governing the interface of software products from different manufacturers 7. Fundamentals of psychology
	Task 3: UI prototype development and testing	**Skills:** 1. Work in interface prototyping tool environments 2. Define objects and methods for testing the graphical and/or user interface 3. Organize the interface prototype testing process 4. Documenting interface test results **Knowledge:** 1. User Experience Test Objects 2. Types and Types of User Experience Testing 3. Patterns of people's behavior when using software products 4. Common Interface Design Practices 5. Standards governing the requirements for ergonomics of human-system interaction 6. Standards governing the interface of software products from different manufacturers 7. Fundamentals of psychology
Requirements for personal competencies	Organization, Initiative, Attentiveness, Responsibility Discipline, diligence, result orientation High Learner, Business Communication Skills, Teamwork	
Relationship with other professions within the OQF	5	GUI Architecture Specialist
	6	GUI Architecture Specialist
Communication with ETKS or KS	KS	185. Programming Technician 140 Software Engineer
Relationship with the system of education and qualifications	The level of education: Higher (5V ISCED code)	Direction of training: Information and communication technologies / Qualification: Bachelor in ICT

PROFESSION CARD "GRAPHIC INTERFACE ARCHITECTURE DEVELOPER"		
Code:	2512-2-006	
Group code:	2512-2	
Profession:	GUI Architecture Specialist	
Other possible job titles:	Lead Graphic Interface Designer	
Qualifying ORC level :	6	
The main purpose of the activity	Design and study of the architecture of a graphical interface that provides high operational (ergonomic) characteristics of software products and systems	
Labor functions	Mandatory labor functions	1. GUI Architecture Design 2. Expert analysis of the ergonomic characteristics of software products and/or hardware 3. Optimization of graphic interface solutions
	Additional labor functions	-
Labor function 1: GUI Architecture Design	**Task 1:** Conceptual GUI Design	**Skills:** 1. Sketch interfaces 2. Prototype interfaces

		3. Create conditional interface layouts 4. Read, create, modify and design interface block diagrams
		Knowledge:
		1. Technical aesthetics within visual interface design 2. Feature classification systems and their applicability 3. Notations for recording structural diagrams, descriptions of the logic of the application 4. Design requirements for relevant platforms and operating systems 5. Appropriate platform and operating system design guides 6. Standards governing the requirements for ergonomics of human-system interaction 7. Interface Design Trends
	Task 2: Creation of structural guidelines for interface design and product standards for the graphical interface	**Skills:**
		1. Develop training material and interface design instructions 2. Use a text markup language 3. Use a stylesheet language 4. Work with layout and layout programs using markup languages
		Knowledge:
		1. Software Development Methods 2. Software development technologies 3. Areas of applicability of template interface solutions 4. Ergonomic standards 5. human-system interaction 6. Methods for working with glossaries of terms 7. Nomenclature of controls for target platforms and operating systems
Labor function 2: Expert analysis of the ergonomic characteristics of software products and/or hardware	**Task 1:** Analysis of ergonomic characteristics of software products and hardware	**Skills:**
		1. Evaluate the results of the initial analysis carried out and the limitations identified 2. Conduct user interviews 3. Analyze the received information about the user's activity 4. Create marketing personas (characters that reflect the target audience) and detailed user interaction paths with the product
		Knowledge:
		1. Information collection methods 2. Activity Analysis Methods 3. Techniques for compiling marketing personas and customer journeys 4. Patterns of human behavior when using software products and hardware 5. Ergonomic standards 6. human-system interaction 7. Marketing Basics
	Task 2: Analysis of software products for compliance with user tasks	**Skills:**
		1. Work with various software products and devices (computers, smartphones, tablets, terminals). 2. Identify interface features that affect the performance of tasks by the user (simplify or complicate) 3. Detect non-compliance of the software product with standard solutions
		Knowledge:
		1. Laws of perception of visual information 2. Patterns of human behavior when using software products and hardware 3. Common Interface Design Practices 4. Standards governing the requirements for ergonomics of human-system interaction 5. Standards governing the interface, manufacturers of various software products
Labor function 3: Optimization of graphic interface solutions	**Task 1:** Development of recommendations for optimizing interface solutions for software products and hardware	**Skills:**
		1. Develop interface solutions. 2. Follow the standards governing the characteristics of the interface of manufacturers of various software products. 3. Be aware of software and hardware limitations.
		Knowledge:
		1. Principles of perception of information 2. Patterns of human behavior when using software products and hardware 3. Ergonomic standards 4. human-system interaction 5. Standards governing the interface, manufacturers 6. software products, operating systems, platforms 7. Fundamentals of technical aesthetics
	Task 2: Determination of possible options for interface solutions that best suit the tasks	**Skills:**
		1. Work with various software products and devices (computers, smartphones, tablets, terminals) 2. Identify interface features that critically affect the performance of tasks by the user (significantly simplify or complicate) 3. Identify inconsistencies between the interface and the standard

	of users	solutions of the target platform of the system under study	
		Knowledge:	
		1. Principles of perception of visual information 2. Patterns of human behavior when using software products and hardware 3. Standards governing the requirements for ergonomics of human-system interaction 4. Standards governing the interface, manufacturers of software products, operating systems, platforms	
Requirements for personal competencies	Analytical thinking, Critical analysis, Responsibility Organization, Teamwork, Discipline		
Relationship with other professions within the OQF	5	Graphical user interface specialist	
	6	Graphical user interface specialist	
Communication with ETKS or KS	KS	185. Programming Technician 140 Software Engineer	
Relationship with the system of education and qualifications	The level of education: Higher (5V ISCED code)	Direction of training: Information and communication technologies	Qualification: Bachelor in ICT

PROFESSION CARD "WEB-MASTER"			
Code:	2512-2-008		
Group code:	2512-2		
Profession:	webmaster		
Other possible job titles:	web programmer 2512-1-002 Software Engineer		
Qualifying ORC level :	6		
The main purpose of the activity	Perform work on the creation (modification) and maintenance of web resources		
Labor functions	Mandatory labor functions	1. Creation and support of a web resource	
		2. Testing a web resource	
		3. Web resource design	
	Additional labor functions	-	
Labor feature 1: Creation and support of a web resource	**Task 1:** Leading the software development process	**Skills:**	
		1. Apply methods and means of planning and control (monitoring) of the execution of plans . 2. Apply the basic principles and methods of personnel management 3. Apply regulatory and technical documents (standards and regulations), the best world practices for managing the software product development process 4. Plan the software development process 5. Assess the quality of the software product development plan (resources, deadlines, risks) . 6. Monitor the execution of software product development plans 7. Adjust the software development plan	
		Knowledge:	
		1. Methods and means of planning and control (monitoring) of the execution of plans 2. Methods for assessing the quality of a software product development plan (resources, deadlines, risks) 3. Basic principles and methods of personnel management 4. Regulatory and technical documents (standards and regulations), the best world practices for managing the software product development process	
Labor function 2: Testing a web resource	**Task 1:** Organization of work on integration testing of a web resource with external services and accounting systems	**Skills:**	
		1. Test a web resource using test plans 2. Work with test data preparation tools 3. Interpret customer business requirements to write test cases 4. Set requirements for test results 5. Work independently with information 6. Work in a team with other testers and developers	
		Knowledge:	
		1. Subject area of the project for drawing up test plans 2. Change Management Basics 3. Architecture, device and functioning of computing systems 4. Principles of operation of communication equipment 5. Network protocols and basics of web technologies 6. Fundamentals of modern database management systems 7. The device and functioning of modern web resources 8. Database theory 9. Database storage and analysis systems 10. Basics of programming 11. Modern standards of interaction between components of distributed applications 12. Software tools and platforms for developing web resources 13. Fundamentals of information security of web resources	
	Task 2: Web Resource Health	**Skills:**	
		1. Prepare test datasets	

	Check Guide	2. Apply methods and means of checking the health of a web resource 3. Interpret data from message logs, protocols 4. Leverage existing technical and/or software architecture 5. Apply a collaborative software development environment and version control system 6. Apply management decision-making methods
		Knowledge:
		1. Regulatory documents that define the requirements for checking the health of the program code 2. Basic principles of debugging code 3. The main types of diagnostic data and ways to present them 4. Basic methods for measuring and evaluating software performance 5. Methods for preparing test datasets 6. Methods and means of checking the health of the software
Labor function 3: Web resource design	**Task 1:** Designing sections of a web resource	**Skills:**
		1. Apply software tools for designing the interface of a web resource 2. Carry out the interface design process taking into account the existing rules for the subject area of the project . 3. Apply tools to evaluate the effectiveness and convenience of the created interface, apply the data obtained to optimize the interface
		Knowledge:
		1. Best Practices for Project Domain 2. The device and functioning of modern web resources 3. Modern principles of building user interfaces 4. Modern methods for testing the ergonomics of user interfaces 5. Basic requirements for the design of graphical interfaces, methods of transmitting information in text, graphics, sound, video and other multimedia formats, depending on the user category 6. Basics of pedagogical design (for developers of educational web - resources) 7. Modern domestic and foreign experience in professional activities
Requirements for personal competencies	Analytical thinking, Critical analysis, Responsibility organization	
Relationship with other professions within the OQF	5	web developer
	6	web developer
Communication with ETKS or KS	KS	185. Technician - programmer 140. Software Engineer
Relationship with the system of education and qualifications	The level of education: Higher (5V ISCED code)	Direction of training: Information and communication technologies Qualification: Bachelor in ICT

3.Professional standard technical data	
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