Institute of Automation and Information Technology
Department of "Cybersecurity, Information Processing and Storage"

EDUCATIONAL PROGRAM
6B06103 – Information systems
Code and name of educational program

Code and classification of the field of education: **6B06 - Information and communication technologies**
Code and classification of training directions: **6B061 Information systems**
Group of educational programs: **057 – Information Technology**
Level based on NQF: 6
Level based on IQF: 6
Study period: 4
Amount of credits: 240

Almaty 2024

Educational program «6B06103 - Information systems» was approved at the meeting of the Academic Council of KazNTU named after K.I.Satpayev.

Protocol No. 1 of August 18, 2022

Reviewed and recommended for approval at a meeting of the Educational and Methodological Council of Kazntu named after K.I.Satpayev.

Protocol No. 7 of "26" April 2022

Educational program "6B06103 - Information systems"
developed by the academic committee in the direction of «6B061 Information Systems»

Full name	Academic degree/ academic title	Position, course	Place of work, contact phone number.	Signature
The cipher and the name of the educational program				
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Students				
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Table of contents

List of abbreviations and designations

IS Information Systems
IUP Individual training plan
OP Educational Program
NRK National Qualifications Framework
ORC Industry Qualifications Framework

1. Description of educational program

The professional activity of graduates of the program is aimed at the development and maintenance of information systems, namely, the management of the development process.

Training of specialists in information systems will be carried out according to the educational program (OP) "Information Systems". The content of the disciplines of the educational program has been developed taking into account the relevant educational programs of the world's leading universities and the international classifier of professional activity in the field of Information Systems.

Graduates of the educational program "Information Systems" are focused on the organization, design and development of systems. The program is designed to implement the principles of the democratic nature of education management, expand the boundaries of academic freedom and the powers of educational institutions, which will ensure the training of qualified, highly motivated personnel for innovative and knowledge-intensive sectors of the economy.

The educational program ensures the application of an individual approach to students, the transformation of professional competencies from professional standards and qualification standards into learning outcomes. Student–centered learning is provided - the principle of education, which assumes a shift of emphasis in the educational process from teaching (as the main role of the teaching staff in the "translation" of knowledge) to teaching (as an active educational activity of the student).

The educational program provides training of specialists in the field of information systems in the following areas:

– development, implementation and operation of information retrieval systems;

– development, implementation and operation of information and analytical systems;

– development, implementation and operation of information management systems;

– development, implementation and operation of information and organizational systems.

The educational program was developed based on the analysis of labor functions, information systems specialists, stated in professional standards and the Atlas of Professions.

Representatives of Kazakhstani companies and associations, specialists in the field of development and support of software systems participated in the development of the educational program.

The tasks and content of the OP are given in section 9 "Description of disciplines".

In case of successful completion of the full bachelor's degree course, the graduate is awarded a bachelor's degree in the field of information and communication technologies under the educational program "Information Systems".

2. Purpose and objectives of educational program

Purpose of EP:

High-quality training of specialists in the field of information systems, including software, hardware, information, legal and management support for the development and maintenance of information systems.

Tasks of EP:

- training of a competitive generation of information systems specialists for the labor market, proactive, able to work in a team, possessing high personal and professional competencies;

- integration of educational and scientific activities;

- establishing partnerships with leading universities of the near and far abroad in order to improve the quality of education;

- expansion of relations with customers of educational services, employers in order to determine the requirements for the quality of training of specialists, conducting courses, seminars,

master classes, internships, industrial practices.

The content of the educational program "Information Systems" is implemented in accordance with the credit technology of training and is carried out in the state and Russian languages.

The educational program will make it possible to implement the principles of the Bologna process. Based on the students' choice and independent planning of the sequence of studying disciplines, they independently form an individual study plan (IUP) for each semester according to the Working Curriculum and the Catalog of elective disciplines. The volume of mathematical, natural science, basic and language disciplines has been increased in the educational program.

Students have internships in banking structures, government and departmental structures, in such companies as JSC "National Information Technologies", Special Economic Zone PARK of Innovative Technologies (SEZ "PIT"), LLP "Pacifica" - integrator in the field of information systems, LLP "Galaxy", LLP "Vella IT", etc.

According to the academic mobility program, the best students have the opportunity to study at leading foreign universities according to the corresponding OP.

The field of professional activity of the bachelor is public and private enterprises and organizations that develop, implement and use organizational, software methods and means of information systems in all spheres of human activity that operate with information.
The subjects of the bachelor's professional activity are: mathematical, informational, technical, organizational support in the field of information systems.

Types of labor activity:

- design and engineering;
- production and technological;
- experimental research;
- organizational and managerial;
- operational;
- scientific.

Objects of professional activity:

The objects of professional activity of graduates are:
- Computer information processing and management systems;
- Automated control systems;
- Software of information systems.

3. Requirements for evaluating the educational program learning outcomes

Mandatory standard requirements for the completion of the OOP of the university and the assignment of an academic bachelor's degree: the development of at least 240 academic credits of theoretical training and defense of the final qualifying work (thesis or state examination in the specialty).

In the process of mastering the educational program "Information Systems", the Bachelor of Engineering and Technology must have the key competencies described in section 4.11. The key competencies must reflect the results of the educational program described in section 4.12.

4. Passport of educational program

4.1. General information

№	Field name	Comments
1	Code and classification of the field of education	6B06 - Information and communication technologies
2	Code and classification of training directions	6B061 Information systems
3	Educational program group	B 057 Information Technology
4	Educational program name	6B06103 – Information systems
5	Short description of educational program	The professional activity of graduates of the program is aimed at the development and maintenance of information systems, namely, the management of the development process.
6	Purpose of EP	Training of highly qualified specialists in the field of information systems using modern information and communication technologies for all spheres of the national economy of Kazakhstan, capable of solving the tasks of effective management of both elements, processes and resources of the information system itself, and other elements, processes and resources of enterprises and organizations.
7	Type of EP	New EP
8	The level based on NQF	6
9	The level based on IQF	6
10	Distinctive features of EP	The program trains specialists in three areas: DevOps engineering, Business Analytics and IT project management, IP Architecture
11	List of competencies of educational program	Fluent monolingual oral, written and communicative skills, special mathematical thinking using induction and deduction, generalization and concretization, analysis and synthesis, classification and systematization, abstraction and analogy; understanding of basic hypotheses, laws, methods, formulation of conclusions and error estimation
12	Learning outcomes of educational program	1. Classify and generalize the acquired knowledge, describe individual phenomena and events of the historical past through a common paradigm of the world-historical development of human society and their country. 2. Possess written and oral communication in the state and foreign languages, establish

		professional contacts and develop professional communication. The ability to logically correctly, argumentatively and clearly build oral and written speech. Readiness to use one of the foreign languages. 3. Apply knowledge about the basic provisions and knowledge of mathematics, mechanics, physics, electricity. 4. Create algorithms for solving problems, develop programs using the means of languages of various levels, organize the necessary data structures, use well-known application software packages. 5. To make an information model of the subject area for the design of an information system. 6. Use modern DBMS to build databases in IS, present data using various models, manage database objects. 7. Apply methods of computer modeling, selection of optimal solutions, analysis and interpretation of data of various volumes and structures. 8. To choose methods and means of building information security systems of modern ICT. 9. Design and develop ergonomic user interfaces. 10. To draw up technical specifications for the development of information systems for various purposes and different architectures. 11. Perform WEB layout and create WEB applications using modern technologies.

		12. Design the network infrastructure of information systems. 13. Make managerial and technical decisions, show sociability, initiative and psychological readiness for work, including when working in a team. 14. To develop information systems and their components in various subject areas using modern methods of IT project management.
13	Education form	Full - time
14	Period of training	4-7 years old
15	Amount of credits	240
16	Languages of instruction	Kazakh, Russian, English (30%)
17	Academic degree awarded	Bachelor of Engineering and Technology
18	Developer(s) and authors	

4.2. Relationship between the achievability of the formed learning outcomes based on educational program and academic disciplines

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)													
				PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14
	Cycle of general education disciplines Required component																
1	Foreign language	English is a discipline of the general education cycle. After determining the level (according to the results of diagnostic testing or IELTS results), students are divided into groups and disciplines. The name of the discipline corresponds to the level of English proficiency. During the transition from level to level, the prerequisites and post-prerequisites of discipline are observed	10		V												
2	Kazakh (Russian) language	The socio-political, socio-cultural spheres of communication and functional styles of the modern Kazakh (Russian) language are considered. The course highlights the specifics of the scientific style in order to develop and activate professional and communicative skills and abilities of students. The course allows students to practically master the basics of scientific style and develops the ability to perform structural and semantic analysis of the text.	10		V												
3	Physical Culture	The purpose of the discipline is the practical use of the skills of performing the basic elements of	8													V	

		athletics techniques, sports games, gymnastics and a set of standards for general physical training, including professionally applied physical training or one of the sports, methods of conducting independent physical exercises.															
4.	Information and communication technologies (in English)	Required component. The task of studying the discipline is to acquire theoretical knowledge about information processes, about new information technologies, local and global computer networks, methods of information protection; to acquire skills in using text editors and tabular processors; to create databases and various categories of application programs.	5			V											V
5	History of Kazakhstan	The course studies historical events, phenomena, facts, processes that took place on the territory of Kazakhstan from ancient times to the present day. The sections of the discipline include: introduction to the history of Kazakhstan; steppe empire of the Turks; early feudal states on the territory of Kazakhstan; Kazakhstan during the Mongol conquest (XIII century); medieval states in the XIV-XV centuries. The main stages of the formation of the Kazakh statehood are also considered: the era of the Kazakh Khanate of the XV-XVIII centuries. Kazakhstan as part of the Russian Empire; Kazakhstan	5	V													

		during the period of civil confrontation and under the conditions of a totalitarian system; Kazakhstan during the Great Patriotic War; Kazakhstan during the period of independence and at the present stage.															
6	Philosophy	Philosophy forms and develops critical and creative thinking, worldview and culture, provides knowledge about the most general and fundamental problems of existence and gives them a methodology for solving various theoretical and practical issues. Philosophy expands the horizon of vision of the modern world, forms citizenship and patriotism, promotes self-esteem, awareness of the value of human existence. It teaches how to think and act correctly, develops practical and cognitive skills, helps to search and find ways and means of living in harmony with oneself, society, and the world around us.	5	V													
7	Module of socio-political knowledge (sociology, political science)	The discipline is designed to improve the quality of both general humanitarian and professional training of students. Knowledge in the field of sociology and political science is the key to effective professional activity of a future specialist, as well as for understanding political processes, for the formation of political culture, developing a personal position and a clearer understanding of	3	V													

		the measure of their responsibility.															
8	Module of socio-political knowledge (Cultural studies and psychology)	The module of socio-political knowledge (cultural studies, psychology) is designed to familiarize students with the cultural achievements of mankind, to understand and assimilate the basic forms and universal patterns of formation and development of culture, to develop their aspirations and skills of independent comprehension of the wealth of values of world culture for self-improvement and professional growth. During the course of cultural studies, the student will consider the general problems of the theory of culture, the leading cultural concepts, universal patterns and mechanisms of formation and development of culture, the main historical stages of the formation and development of Kazakh culture, its most important achievements. During the course, students acquire theoretical knowledge, practical skills and skills, forming their professional orientation from the perspective of psychological aspects.	5	V													
	Cycle of general education disciplines University component																
1	Fundamentals of anti-corruption culture	The discipline studies the essence, causes, causes of sustainable development of corruption from both historical and modern points of view.	5	**v**												**v**	

		Examines the prerequisites and impacts for the development of an anti-corruption culture. Studies the development of anti-corruption on the basis of social, economic, legal, cultural, moral and ethical norms. Studies the problems of the formation of an anti-corruption culture based on the relationship with various types of social relations and various manifestations.															
2	Fundamentals of Entrepreneurship and Leadership	The discipline studies the basics of entrepreneurship and leadership from the point of view of science and law; features, problematic aspects and prospects of development; theory and practice of entrepreneurship as a system of economic, organizational and legal relations of business structures; readiness of entrepreneurs for innovative receptivity. The discipline reveals the content of entrepreneurial activity, career stages, qualities, competencies and responsibilities of an entrepreneur, theoretical and practical business planning and economic expertise of business ideas, as well as risk analysis of innovative development, introduction of new technologies and technological solutions.	5	v	v												v	
3	Ecology and life safety	The discipline studies the	5			v											v	

		problems of ecology as a science, environmental terms, the laws of the functioning of natural systems and aspects of environmental safety in working conditions. Environmental monitoring and management in the field of its safety. Sources of pollution of atmospheric air, surface, groundwater, soil and ways to solve environmental problems; life safety in the technosphere; natural and man-made emergencies															
	Cycle of basic disciplines University component																
1	Mathematics I	The course is designed to study the basic concepts of higher mathematics and its applications. The main provisions of the discipline are used in the study of all general engineering and special disciplines taught by graduate departments. The course sections include elements of linear algebra and analytical geometry, an introduction to analysis, differential calculus of a function of one and several variables. The questions of methods for solving systems of equations, the application of vector calculus to solving problems of geometry, mechanics, physics are considered. Analytical geometry on the	5			v	v										

		plane and in space, differential calculus of functions of one variable, derivative and differentials, study of the behavior of functions, Directional derivative and gradient, extremum of a function of several variables.															
2	Physics	Objectives: to study the basic physical phenomena and laws of classical, modern physics; methods of physical research; the influence of physics on the development of technology; the relationship of physics with other sciences and its role in solving scientific and technical problems of the specialty. The sections are considered: mechanics, dynamics of rotational motion of a solid, mechanical harmonic waves, fundamentals of molecular kinetic theory and thermodynamics, transport phenomena, continuum mechanics, electrostatics, direct current, magnetic field, Maxwell equations.	5			v											
3	Mathematics II	The discipline is a continuation of Mathematics I. The sections of the course include integral calculus of a function of one variable and several variables, series theory. Indefinite integrals, their properties and methods	5			v	v										

		of their calculation. Definite integrals and their applications. Improper integrals. Theory of numerical series, theory of functional series, Taylor and Maclaurin series, application of series to approximate calculations.															
4	Mathematics III	The discipline is a continuation of Mathematics II. The course includes sections: ordinary differential equations and elements of probability theory and mathematical statistics. Differential equations with separable variables, homogeneous, in full differentials, linear inhomogeneous differential equations with constant coefficients, systems of linear differential equations with constant coefficients, finding the probability of events, calculating the numerical characteristics of random variables, using statistical methods for processing experimental data are studied.	5			v	v										
5	Discrete mathematics	Discrete mathematics is a branch of mathematics dealing with objects that can take discrete values.	5				v			v							

		This course studies the basic concepts of sets, relations and functions of mathematical logic, group theory, computational theory, probabilities, mathematical induction and recurrent relations, graph theory, trees and Boolean algebra.															
6	Computer graphics	The course examines the generation of images on a computer, namely the mathematical and algorithmic foundations of computer graphics, raster graphics algorithms, 2D and 3D modeling, polygonal models. The technologies of using the OpenGL graphics library for generating 2D and 3D images, the use of auxiliary libraries are considered. After studying the discipline, students will be able to master any graphic tools, continue studying and using graphic libraries.	5				v					v		v			
7	Fundamentals of information systems	This course is devoted to the full life cycle of	4				v		v						v		v

		information systems development, starting from modeling specifications, software debugging , calculation of a feasibility study of the cost of developing an information system, ending with a presentation for the customer. The course also covers theoretical and practical issues of building and functioning of IP, namely IP classification, UML modeling, ADO technology, criteria for evaluating IT projects.															
8	Algorithmization and programming basics	The course examines the fundamental concepts of programming: operator, variable, procedure, function, data type. The basic structures of algorithms, such as linear, branched, cyclic, are considered. The course examines the basic forms of data representation: strings, structures, arrays, lists. Separate topics are devoted to the creation of widespread sorting	5				**v**			**v**							

		algorithms, the search for the minimum and maximum values in an array, string processing, iterative and recursive algorithms, the construction of block diagrams of algorithms and the development of programs based on them.															
9	Algorithms and data structures	The course discusses the main approaches to the analysis and design of algorithms and data structures. The course covers topics such as asymptotic estimation of algorithm complexity in the worst case, efficient algorithms for sorting and selecting ordinal statistics, data structures (binary search trees, heaps, hash tables), methods of algorithm design (divide and conquer, dynamic programming, greedy strategy), basic algorithms on graphs (shortest paths, topological sorting, connectivity components, minimal spanning trees).	5				v			v							
10	Introduction to Web Programming	The methods of designing WEB applications using modern web programming technologies and software tools for solving applied	5									v		v			

		problems using methods of debugging and testing web applications in the loop-back system are studied. The discipline studies the basics of creating web applications; classification of software tools; structure of web programs; web applications running on the client and server side; principles of developing an interactive user interface; organization of navigation; interface of server interaction with application programs; syntax and notations of markup languages, data structures, and scripting languages. Students gain skills and an understanding of the current prospects and trends in the development of web programming.															

11	Databases in information systems	The methods and practical skills of creating realisational databases as a component of information systems are studied.The conceptual apparatus of databases, relational databases, SQL query language, entity-relationship models, database design, query processing in multi-user databases, network and distributed databases are considered. Promising directions in this subject area. As a result of studying the discipline, students should: be able to create databases in relational databases, use the SQL language, apply information security technologies in databases in practice.	6					v	v								
12	Object-oriented programming	The course includes: Encapsulation, inheritance, polymorphism. Creating classes. Creating useful client applets and standalone applications based on real requirements	5				v	v									

		that students receive from real clients or employers.															
13	Basics of Cybersecurity	Application of information theory in information security systems, basic concepts of information theory, measures and forms of representation of discrete information, number systems for the representation of numerical information, problems of information transmission, alphabetical representation of information, basics of encoding and encryption of discrete information.	5								v						
14	Computer networks and telecommunication technologies	The course explores network communications from local area networks (LAN) to the global Internet. Standard problems and a number of solutions for each of them are considered, with special emphasis on the TCP/IP protocol suite. In addition, it will prepare students for real information security operations. Knowledge of the basics of working with networks will refresh students with attention to	5								v				v		

		the problems faced by modern infrastructure.															
15	Operating systems	The course will provide an introduction to the design and implementation of the operating system. The course will begin with a brief historical overview of the development of operating systems over the past fifty years, and then cover the main components of most operating systems. This discussion will cover the trade-offs that can be made between performance and functionality during the design and implementation of an operating system. Special attention will be paid to three main OS subsystems: process management (processes, threads, CPU scheduling, synchronization and deadlocks), memory management (segmentation, pagination, paging), file systems and operating system support for distributed systems. Bash language proficiency, network management, network security.	5			v											

16	Database administration and application development	The purpose of studying the discipline is to form basic knowledge and skills of database administration and application development. The course covers methods of data access control and privilege management; basic methods and means of data protection in databases; concepts of development of distributed database applications. In addition, various data access mechanisms are analyzed, the issues of implementing access to databases via ODBC, OLEDB are highlighted.	5					v	v								v
	Cycle of profile disciplines University component																
1	Human-computer interaction	A discipline dealing with the design, evaluation and implementation of interactive computing systems for human use, as well as with the study of the main phenomena related to these issues. The main place is devoted to approaches, methods and tools for the formation and evaluation of the user	4									v		v			

		interface. The procedures of iterative prototyping of the interface, types of prototypes, software packages for prototyping and their comparative capabilities are considered.															
2	NoSQL databases and application development	The purpose of studying the discipline is to study the main NoSQL databases: document-oriented, column-based, key-value, graph, etc. The course examines the features of the built-in language of each type of database, methods of designing storage systems, ways to create queries and optimize them for execution speed, features of modern NoSQL solutions and comparative analysis of relational and NoSQL approaches. The issues of ensuring reliability, fault tolerance and scalability of databases are discussed.	5					v	v								
3	Basics of Cloud Computing	The concept of cloud computing. History and characteristics. Trends in the development of infrastructure solutions of information systems of	4											v	v		v

		enterprises. Hardware development. Modern infrastructure solutions. Virtualization technologies. Advantages of virtualization. Virtual machine. Server virtualization. Full virtualization. Paravirtualization. Virtualization at the OS kernel level. Application virtualization. Virtualization of views (workstations). Reference (reference) architecture of cloud computing. Implementation of cloud services. Infrastructure as a service. Platform as a service. Software as a service. Private cloud. Public cloud. Mixed (hybrid) cloud. Advantages, disadvantages and problems of cloud computing. Cloud technologies in information systems. Trends and prospects for the development of cloud solutions.															

4	IT infrastructure	The following issues are considered: IT infrastructure of the enterprise. Business processes and organization of IT infrastructure. Modern approaches to improving the organization's IT infrastructure. Enterprise OT infrastructure management concepts: ITIL (Information Technology Infrastructure Library), CobiT (Control Objects for Information and Related Technologies). Fundamentals of process management FROM. Processes of support and presentation of OT services. OT infrastructure management tools and systems. OT infrastructure management platforms. Software tools for managing OT infrastructure. Ensuring the security of the OT infrastructure. Promising areas of IT infrastructure development.After studying, students gain skills in managing the IT	6													**v**		

		infrastructure of the enterprise.															

5. Curriculum of educational program

NJSC "KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I. SATPAEV"

SATBAYEV UNIVERSITY

APPROVED
Chairman of the Management Board - Rector of KazNRTU named after K.Satbayev
M.M. [illegible]
2024

CURRICULUM
of Educational Program on enrollment for 2024-2025 academic year

Educational program 6B006106 - "information systems."
Group of educational programs B057 - "Information technology"

Form of study: full-time | Duration of study: 4 years | Academic degree: Bachelor's Degree in Information and Communication Technology

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	classroom volume of lek/lab/pr	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training based on courses and semesters							
								I курс		II курс		III курс		IV курс	
								1 semester	2 semester	3 semester	4 semester	5 semester	6 semester	7 semester	8 semester
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)															
M-1. Module of language training															
LNG 108	Foreign language	GED, RC	5	150	0/0/3	105	E	5							
LNG 108	Foreign language	GED, RC	5	150	0/0/3	105	E		5						
LNG 104	Kazakh (russian) language	GED, RC	5	150	0/0/3	105	E	5							
LNG 104	Kazakh (russian) language	GED, RC	5	150	0/0/3	105	E		5						
M-2. Module of physical training															
KFK 101-104	Physical Culture	GED, RC	8	240	0/0/8	120	Diff.credit	2	2	2	2				
M-3. Module of information technology															
CSE 677	Information and communication technology	GED, RC	5	150	2/1/0	105	Э	5							
M-4. Socio-cultural development module															
HUM 137	History of Kazakhstan	GED, RC	5	150	1/0/2	105	SE	5							
HUM 132	Philosophy	GED, RC	5	150	1/0/2	105	E					5			
HUM 120	Module of socio-political knowledge (sociology, political science)	GED, RC	3	90	1/0/1	60	E			3					
HUM 134	Module of socio-political knowledge (cultural studies, psychology)	GED, RC	5	150	2/0/1	105	E				5				
M-5. Module on the basis of anti-corruption culture, ecology and life safety															
HUM136	Fundamentals of anti-corruption culture and law	GED, CCH	5	150	2/0/1	105	E				5				
MNG489	Fundamentals of economics and entrepreneurship														
MNG564	Fundamentals of financial literacy														
CHE 656	Ecology and life safety														
CYCLE OF BASIC DISCIPLINES (BD)															
M-6. Module of physical and mathematical training															
MAT 101	Mathematics I	BC, UC	5	150	1/0/2	105	E	5							
MAT 102	Mathematics II	BC, UC	5	150	1/0/2	105	E		5						
MAT103	Mathematics III	BC, CCH	5	150	1/0/2	105	E			5					
SEC525	Optimization methods and operation research														
CSE603	Discrete mathematics	BC, UC	5	150	2/0/1	105	E			5					
SEC517	Statistics and data analysis	BC, UC	4	120	1/1/1	75	E					4			
PHY 111	Physics I	BC, UC	5	150	1/1/1	105	E			5					
M-7. Module of basic training															
CSE155	Algorithmization and programming basics	BC, UC	5	150	1/1/1	105	E	5							
CSE678	Algorithms and data structures	BC, UC	5	150	1/1/1	105	E		5						
CSE127	Object-oriented programming	BC, UC	5	150	1/1/1	105	E			5					
CSE565	Fundamentals of information systems	BC, UC	4	120	1/1/1	75	E		4						
SEC522	Databases and SQL language	BC, UC	6	180	2/1/1	120	E			6					
SEC527	Database administration	BC, UC	4	120	1/1/1	75	E					4			
SEC506	Web programming	BC, UC	5	150	1/1/1	105	E				5				
CSE681	Operating systems	BC, UC	5	150	1/1/1	105	E				5				
CSE122	Computer networks	BC, UC	5	150	1/1/1	105	E				5				
CSE524	Basics of cybersecurity	BC, UC	5	150	1/1/1	105	E					5			
SEC518	Integration of information systems	BC, UC	5	150	1/1/1	105	E						5		
SEC533	IT Project Management	BC, UC	6	180	1/1/1	120	E							6	
SEC523	Databases and web service development	BC, CCH	5	150	1/1/1	105	E					5			
CSE831	Fundamentals of artificial intelligence				1/0/2										
CSE571	Devops Engineering	BC, CCH	5	150	1/1/1	105	E					5			
SEC507	Business process analysis														
CSE581	Architecture of information systems														
SEC502	Development of an IP prototype				0/0/3										

SEC519	Continuous integration and deployment of CI/CD	BC, CCH	5	150	1/1/1	105	E						5		
CSE575	Business process modeling														
SEC510	Design patterns														
SEC503	Query language and report development				0/0/3										
SEC510	The basics of students' research work	BC, CCH	5	150	1/1/1	105	E							5	
CSE551	Capstone project 1				0/0/3										
MNG563	Fundamentals of sustainable development and ESG projects in Kazakhstan				2/0/1										
CSE830	Startups and technology entrepreneurship	BC, CCH	5	150	1/0/2	75	E								5
SEC532	Capstone project 2				0/0/3										
MNG562	Legal regulation of intellectual property				2/0/1										
NSE428	Communication skills	BC, CCH	4	120	2/0/1	75	E								4
MNG801	Design thinking				1/0/2										
AAP173	Educational practice	BC, UC	2						2						
CYCLE OF PROFILE DISCIPLINES (PD)															
M-8. Module of professional activity															
SEC509	UI/UX design	PD, UC	5	120	1/1/1	75	E								5
SEC515	Development of cross-platform mobile applications	PD, UC	5	150	1/1/1	105	E						5		
CSE570	The basics of cloud computing	PD, UC	4	120	1/1/1	75	E						4		
SEC528	Development of a business specification for IS	PD, UC	5	150	1/1/1	105	E							5	
SEC514	Artificial intelligence and machine learning	PD, UC	6	180	2/1/1	120	E								6
CSE569	IT infrastructure	PD, UC	6	180	2/1/1	120	E							6	
CSE573	Virtualization and containerization systems	PD, CCH	5	150	1/1/1	105	E						5		
SEC511	Data visualization and reporting				1/1/1										
SEC529	Distributed data processing systems				1/1/1										
SEC501	Development of IS for trade automation				0/0/3										
SEC520	System design	PD, CCH	5	150	1/1/1	120	E							5	
SEC512	Automation of business processes				1/1/1										
CSE585	Digital transformation technologies				1/0/2										
SEC504	Development of IS for financial accounting				0/0/3										
SEC505	Data Management for Data Sciences	PD, CCH	5	150	1/1/1	105	E							5	
SEC524	Intelligent Data Analysis														
CSE594	IT audit and control	PD, CCH	5	150	2/0/1	105	E						5		
CSE596	Emerging technologies in IS				1/1/1										
SEC521	VBA Business Modeling				1/1/1										
AAP102	Production practice 1	PD, UC	2								2				
AAP183	Production practice II	PD, UC	3										3		
M-9. Final certification module															
ECA109	Writing and defending a thesis (project)	HA	8												8
M-10. Additional training module															
AAP500	Military training	ДВО	0												
Total based on UNIVERSITY:								32	28	31	29	28	32	32	28
								60		60		60		60	

Number of credits for the entire period of study					
Cycle code	Cycles of disciplines	Credits			
		required component (RC)	university component	component of choice (CCH)	Total
GED	Cycle of general education disciplines	28		5	33
BD	Cycle of basic disciplines		86	5	124
PD	Cycle of profile disciplines		27	6	
	Total for theoretical training:				*233*
FA	Final attestation	8			8
	TOTAL:	8	0	0	240

Decision of the Academic Council of Kazmu named after K.Satpayev. Protocol №12 "22" ___04___ 2024 y.

Decision of the Educational and Methodological Council of Kazmu named after K.Satpayev. Protocol № 6 "19" __04____2024y.

Decision of the Academic Council of the Institute_____. Protocol №8 or "29" __02___2024 y.

Vice-Rector for Academic Affairs — Ukenbayeva R.K.

Acting Directors of the Institute — Kalpeyeva Z.B.

Department Head CIPaS — Satybaldiyeva R.Zh.

Representative of the Council from employers — Kenzhaev A.T.

Remark:

1. The names and amount of modules related to Module of basic training and professional activity are prescribed by departments themselves
2. * - Division into types of work is at the department's discretion
3. If necessary, the disciplines: Physics II, Mathematics III, General Chemistry of the department include, at the expense of credits, the department's component of BD, UC from the basic training module
4. The full academic load of one academic year should be 60 academic credits
5. The application of elective disciplines catalog in the same way as Curriculum is divided into modules, with the inclusion of "R&D" module