

1. DESCRIPTION OF THE EDUCATIONAL PROGRAM

The purpose of the educational program: Preparation of a Master of Technical Sciences with fundamental and applied knowledge in the field of information and digital technologies

1.1. GENERAL INFORMATION ON THE EDUCATIONAL PROGRAM

Type of educational program	existing
Name of educational program	Information systems in education
Field of education	7M06 Information and communication technologies
Training direction	7M06 Information and communication technologies
The group of the educational program	M094 Information technology
License for educational activity №, date, month, year	№ KZ75LAA00018542 from 04.08.2020.
Educational level by NQF	Master's degree, level 7
Awarded degree:	Master of Technical Sciences in the educational program 7M06102 "Information Systems"
Total academic credit	120
Study duration	2 years

1.2. VISION, MISSION, PROGRAM GOAL, CORE VALUES, UNIVERSITY GRADUATE ATTRIBUTES.

Vision:

An intelligent platform that develops teachers who can manage in a rapidly changing world.

Mission:

Developing teachers who are leaders in creating, developing and disseminating advanced educational knowledge and values for the benefit of the country and the world.

Program goal:

The university aims to become a hub of innovative methods of teaching, teaching and research, as well as the development of rural education in Central Asia.

Core values:

Integrity, dedication, care for others

Attributes of a University graduate:

- Self-taught, able to reflect and investigate their practice
 - Have moral and ethical qualities and responsibility
- Have a deep subject, digital knowledge and a broad intellectual outlook
 - Creative and critically-minded, collaborative and communicative
- Practice leadership in teaching and learning, and are adaptable to rapidly changing environments
 - Diverse, inclusive and for equal opportunities in society

1.3. JUSTIFICATION OF THE EDUCATIONAL PROGRAM

In accordance with the Strategic Development Plan of the Republic of Kazakhstan until 2025.

https://POline.zakPO.kz/document/?doc_id=38490966&doc_id2=38490966#activate_doc=2&pos=1;-8&pos2=434;-99

The educational program covers all the key requirements of the Strategic Development Plan of the Republic of Kazakhstan until 2025 (Initiative 1.14 "Development of educational programs and

evaluation of learning outcomes based on professional standards", the task "Development of people with digital competencies").

To spread digitalization, it is necessary to provide the economy with personnel, both specialists and managers. In order to accelerate the development of the necessary skills and competencies, the training of a significant part of the first specialists will take place in international centres and organizations both abroad and on the territory of Kazakhstan.

It is important to ensure the demand for digital technologies on the part of the population by explaining the advantages to citizens and teaching them to use them in everyday life, which will accelerate the development of demand for digital products and solutions.

The relevance of the OP. The training program for Masters of Technical Sciences in the educational program "7M06 Information and Communication Technologies" is determined by the results of training, which are formed on the basis of Dublin descriptors and are expressed through the competencies of general, methodological and subject training.

The graduate of the educational program has the following competencies:

- in modern trends in the development of information technologies and their fields of application
 - in research, design, production and technological, organizational and managerial activities;
- in the application of models, methods and tools for the development of mathematical, linguistic, information and software of information systems;
 - in methods and means of ensuring information security of objects of professional activity.

The educational program has been developed taking into account the generalization of modern domestic and international experience of training in this area, author's and collective scientific achievements and educational and methodological developments in the field of specialization, the requirements of employers and the demands of the labour market.

Market demand. Statistical analysis was carried out on the basis of the official website "<http://stat.gov.kz/official/industry/11/statistic/5>", the National Collection "Statistics of the education system of the Republic of Kazakhstan" published in 2018 by JSC "Information and Analytical Center", as well as the official response of the regional departments of education of the Republic of Kazakhstan.

According to the data, there are more than 800 educational institutions of technical and vocational education in the Republic of Kazakhstan, including more than 450 public and more than 300 private. At the same time, more than 300 trained IT specialists, and students of higher and postgraduate education for 2013-2018 amounted to 808.4 thousand people, including 70 thousand people in IT specialties, which is 8.7% in percentage. VPS (virtual dedicated server) support specialists, web programmers, designers, and SEO optimizers.

In the structure of the information technology market (hereinafter – IT) of Kazakhstan, the IT equipment sales sector is dominant in the total volume, which is a reflection of the increased demand for computers, network and peripheral computer equipment accompanying the process of informatization of Kazakh society.

The need for personnel exceeds the supply by 6.1%. Taking into account the projected growth of the market and the existing rates of training of young specialists by universities and secondary specialized educational institutions, this shortage will not be eliminated in 2017, when the need for personnel will exceed the supply by 16.8%.

The Ministry of Labor has developed a vision of the future of the labour market of Kazakhstan, taking into account global challenges and emerging trends in the country.

The population is projected to grow to 19.8 million by 2025, or 1.6 million. (9% of 2017). The labour force will increase by 6.7% and will amount to 9.8 million people (from 9.0 million in 2017).

Taking into account the technological modernization of the economy, the need for personnel by 2025 will amount to more than 570 thousand people.

It is expected to increase the number of medium and highly-skilled jobs by 766 thousand.

1.4. FEATURES OF THE EDUCATIONAL PROGRAM

Specification	Short Description
Field of professional activity	<p>The sphere of professional activity of graduates are enterprises and organizations of various forms of ownership that develop, implement and operate information systems in various fields, namely: mechanical engineering, metallurgy, transport, telecommunications, science and education, healthcare, agriculture, service sector, administrative management, economics, business, management of various technologies, that is in almost all spheres of human activity.</p>
Objects of professional activity	<p>in the direction of scientific and pedagogical training:</p> <ul style="list-style-type: none"> • information services of research institutions; • information services of public administration organizations; • educational institutions; • information services of project organizations; <p>• information services of a manufacturing institution and others.</p> <p>in the direction of profile training:</p> <ul style="list-style-type: none"> • services for the use of computers of public administration organizations; <p>• computer usage services for manufacturing enterprises;</p> <ul style="list-style-type: none"> • services of financial organizations for the use of a computer and others.
Practice bases	<ol style="list-style-type: none"> 1. The company "QSTEM"; 2. Institute of Information Technology
Other unique characteristics	<p>The training program for Masters of Technical Sciences in the educational program "7M06102 Information Systems" is based on Dublin descriptors and is determined by the results of the course determined by general, methodological and subject-specific training competencies. A language module was developed to teach undergraduates computerization of the entire education system in our country, master the language education system of the student, understand the mechanisms of language functioning and speech algorithms, master strategies and develop developed cognitive abilities and develop multilingual skills in this educational program.</p> <p>The educational program has been developed taking into account modern domestic and international teaching experience in this field, authors and collective scientific achievements, educational and methodological developments in the field of specialization, employers' requirements and demand in the labor market.</p>

Coincidence with similar surveys of leading universities of the far and near abroad The disciplines taught at the Department of Master's degree in the speciality "Information Systems" of the Atlantic International University (Atlantic International University), the New Jersey Institute of

Technology (New Jersey Institute of Technology), the Prague University of Economics (University of Economics Prague), compliance of the disciplines conducted by undergraduates of the Kazakh National Women's Pedagogical University in the speciality "Information Systems". As a result, 64% of matches were found with Atlantic International University, 57% with the New Jersey Institute of Technology and 71% with the Prague University of Economics.

1.5. POTENTIAL CAREER PATHS FOR GRADUATES

The Master of the speciality 7M06102 "Information Systems" can work as:

with specialized training:

- engineer;
- software engineer (programmer);
- system engineer (network administrator);
- engineer for automated control systems and other positions in accordance with his qualifications;
- with scientific and pedagogical training:
- system engineer (network administrator);
- specialist of the highest qualification level of the highest category;
 - research associate;
 - teacher of universities and colleges.

1.6. AREAS OF PROFESSIONAL COMPETENCE

- **scientific and technical:** systematically study scientific and technical information, as well as a holistic experience, find solutions to the problems under study with the compilation of models and algorithms, simulate technological processes using computer programs and computer-aided design tools, work on new innovative projects and implement the results of scientific research.

- **Expert-analytical:** collects processes and analyzes information. Writes queries to databases, identifies trends, checks hypotheses, conducts tests and, based on the results, draws certain conclusions that help solve a particular problem.

- **Information and communication:** can share tasks in teamwork, and is able to present himself and the results of his work in a professional environment.

1.7. LEARNING OUTCOMES OF THE EDUCATIONAL PROGRAM

LO 1. Defines the current problems of modern philosophy of science, professional foundations of speech communication (listening, reading, speaking, writing) and skills of working with business correspondence (writing, e-mail and others);

LO 2. Possess the skills of public speech, argumentation, discussion and polemics; practical analysis of the logic of various kinds of reasoning, possess the professional basics of speech communication (listening, reading, speaking, writing) skills of working with business correspondence (letter, e-mail and others);

LO 3. Provides information security when using information services;

LO 4. Mastering the basic concepts, theories and methods of information systems research, preparation for solving professional tasks using various groups of strategies for working with information, and information objects;

LO 5. Study of methods of analysis and optimization of information systems and technologies;

6. Use the skills of preparing publications and scientific and technical reports based on the results of scientific research in the field of design and development of information systems;

LO 7. Planning of digital experiments, interpretation of results and conclusions when conducting research in this field;

LO 8. Develops new tools and applications for modelling research tasks and data collection, storage, analysis and management.

Matrix comparing EP learning outcomes (LO) with the attributes of the graduate (AG)

	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8
AG1	+	+	+	+	+	+	+	
AG 2								+
AG 3			+	+	+	+	+	+
AG 4						+		+
AG 5			+		+		+	
AG 6	+	+		+				

1.8. REGULATORY REFERENCES

The programme was developed on the basis of the following legal and regulatory acts:

- 1) The State general education standard of postgraduate education. Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 № 2.
- 2) Professional standard "Teacher". Order of the Acting Minister of Education of the Republic of Kazakhstan № 500 dated December 15, 2022.
- 3) Professional standard «Management and Design of Computer Hardware and Embedded Systems» approved by the order of the Chairman of the Board of the National Chamber of entrepreneurs of the Republic of Kazakhstan «Atameken» № 259 dated December 24, 2019.
- 4) SQF information, Informatization, communications and telecommunications, approved by the minutes of the meeting of the Industry Commission in the field of information, Informatization, communications and telecommunications dated December 20, 2016, № 1.
- 5) Professional standard « Creation and management of information resources » approved by the order of the Chairman of the Board of the National Chamber of entrepreneurs of the Republic of Kazakhstan «Atameken» dated January 1, 2016.
- 6) Professional standard « Business analysis in information and communication technologies» approved by the order of the Chairman of the Board of the National Chamber of entrepreneurs of the Republic of Kazakhstan «Atameken» dated January 1, 2016.
- 7) SCES 20.07.2022 State mandatory standards of higher and postgraduate education. Approved by the Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 № 2 (with amendments and additions dated 02/20/2023 № 66)

2. CONTENT OF THE EDUCATIONAL PROGRAM

№	Module name	Acad. credits	№	Discipline code and name	Acad. credit discipline.	Cycle/ component
1	ISE Module-1 Integration of science and education	21	1	ICE 501 History and Philosophy of Science	4	CC/ UC
			2	ISE 502 Foreign Language (Professional)	4	CC/ UC
			3	ISE 503 Higher School Pedagogy	4	CC/ UC
			4	ISE 504 Psychology of management	4	CC/ UC

			5	ISE 505 Analysis, modelling and design of IS	5	MC/ UC
2	RMIS Module 2. Research and management of information systems	15	1	RMIS 501/ Research Methodology in Information Systems	5	CC/ OC
			2	RMIS 501/2 Methodology of organizing the design and development of information systems		
			3	RMIS 502/ Multi-criteria decision making tasks	5	CC/ OC
			4	RMIS 502/2 Theoretical foundations of decision making		
			5	RMIS 602/1 Project Management Information Systems	5	CC/ OC
			6	ASSR 602/2 Management of IT projects		
3	DCIT Module 3. Design and development of information technologies	15	1	DCIT 501/1 Principles of object-oriented design and programming	5	MC/ OC
			2	DCIT 501/2 Methodology of organizing the design and development of information systems		
			3	DCIT 502/1 Computer networks and telecommunications	5	MC/ OC
			4	DCIT 502/2 Computer Network Architecture and Technology		
			5	DCIT 503/1 Methods of artificial intelligence in information systems	5	MC/ OC
			6	DCIT 503/2 Knowledge Engineering and Intelligent Systems		
4	ASSR Module 4. Automated research systems	23	1	ASSR 601/1 Integrated security of information technology and systems	6	MC/ OC
			2	ASSR 601/2 Methods and means of protecting computer information		
			3	ASSR 602/1 Modeling and visualization in big data systems	6	MC/ OC
			4	ASSR 602/2 Big Data Processing Technologies		
			5	ASSR 603/1 Quality management of IT projects	6	MC/ OC
			6	ASSR 603/2 Distributed IS Design		
			7	ASSR 604/1 Web site design and development tools	5	MC/ OC
			8	ASSR 604/1 Design and analysis of Web-interfaces		
5	RW Module 5 Research work	38	1	RW601 Pedagogical practice	4	CC/ UC
			2	RW 602 Research practice	10	MC UC
			3	RW5(6)03	24	RWM

				Master students' research work, including internships and the implementation of a Master's thesis (MRW)		
6	FE Final evaluation	8	1	FE 601 Preparation and defense of a master's thesis	8	FE
Total:		120			120	

2.1. INTRODUCTION TO MODULES AND DISCIPLINES

ISE module-1 Integration of science and education							
<p><i>Module description:</i> The integration of science and education is a multifaceted approach that seems to enhance the learning experience and promote the advancement of knowledge. It encompasses various disciplines, including the history of science and philosophy, foreign languages, higher school pedagogy, management psychology, and design modelling and analysis of information systems. The integration of these diverse areas promotes a comprehensive and holistic approach to science and education. By incorporating historical perspectives, linguistic proficiency, pedagogical expertise, psychological insights, and advanced information system design principles, we can foster an environment that nurtures scientific discovery, facilitates effective education, and drives technological advancements.</p>							
№	Code and name of the discipline	Cycle/ component	Acad. credits	Short description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	ISE 501 History and philosophy of science	CC/ UC	4	Описание обязательных дисциплин дадим после согласования!!!		LO 1; LO 2; LO 3	
2	ISE 502 Foreign language (professional)	CC/ UC	4	Описание обязательных дисциплин дадим после согласования!!!		LO 1; LO 2; LO 3	
3	ISE 503 Higher School Pedagogy	CC/ UC	4	Описание обязательных дисциплин дадим после согласования!!!		LO 1; LO 2; LO 3	
4	ISE 504 Pedagogical practice	CC/ UC	4	Описание обязательных дисциплин дадим после согласования!!!		LO 1; LO 2; P L O O 3	
5	ISE Analysis, modelling and design of IS	MC/ UC	5	As a result of studying the discipline, undergraduates master the competence of using computational experiments and an object-oriented analysis apparatus in modelling and designing information	Cognitive-problematic presentation Case study	LO 4, LO 6, LO 7	written

				processes it is. The use of a systematic approach in the study, design and operation of IS, as well as the development of modelling algorithms and their implementation using application software packages of modelling with algorithmic languages.			
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RMIS Module 2. Research and management of information systems

Module description: Research and Management in Information Systems is a dynamic field that encompasses various aspects of scientific research, system design, decision-making, and project management within the realm of information systems. By understanding and applying research methodologies, system design principles, decision-making techniques, and project management practices, professionals in the field of information systems can contribute to the development and successful implementation of innovative IT solutions that drive organizational efficiency and competitiveness.

No	Code and name of the discipline	Cycle/ component	Acad. credits	Short description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	RMIS 501/Research Methodology in Information Systems	CC/ OC	5	The study of the conceptual apparatus of the discipline, the main theoretical provisions and methods, the acquisition of skills in applying theoretical knowledge to solve practical problems.	Discussion Partially-search Study Case study Role-playing games	LO 1, LO 4, LO 6	written
2	RMIS 501/2 Methodology of organizing the design and development of information systems			As a result of studying the discipline, undergraduates can gain systematic knowledge about the principles of object-oriented design, programming and testing of software systems, make a template for standard solutions and components of information processing systems; make technical specifications for the designed			

				automation object taking into account the results of research and development work.			
3	RMIS 502/Multi-criteria decision-making tasks	CC/ OC	5	As a result of studying the discipline, the student is able to study more deeply the principles of building information systems based on mathematical modeling using analytical, digital and simulation methods; optimize information systems taking into account the requirements for the quality of their functioning.	Problem-based modular training	LO 4, LO 5, LO 7	written
4	RMIS 502/2 Theoretical foundations of decision making			Basic concepts of the decision-making process. Modern methods of building decision support systems(DSS), principles of visualization of the decision-making process (DMP). Methods for achieving goals.			
5	RMIS 602/1 Project Management Information Systems	CC/ OC	5	As a result of studying the discipline, students acquire theoretical knowledge and practical skills in the application of a set of technological and organizational methods and tools that support project management in organizations and contribute to improving the effectiveness of their implementation.	Role play Competence-based learning	LO 3, LO 7	Project
6	ASSR 602/2 Management of IT projects			As a result of studying the discipline, students develop theoretical knowledge and practical skills in organizing the management of the enterprise's IT infrastructure based on the concept of information services, information systems management model (ITSM), ITIL libraries (IT infrastructure library).			

DCIT Module 3. Design and development of information technologies

Module description: The design and creation of information technologies is a crucial aspect of the field of information systems. It encompasses various topics and principles that enable the development of efficient and intelligent systems. By understanding the principles of object-oriented design, following a systematic methodology for information system development, grasping the fundamentals of computer networks, leveraging artificial intelligence methods, and harnessing knowledge engineering techniques, professionals in the field of information systems can create innovative and intelligent technologies that address complex challenges and drive organizational success.

№	Code and name of the discipline	Cycle/ component	Acad. credits	Short description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	DCIT 501/1 Principles of object-oriented design and programming	MC/ OC	5	As a result of studying the discipline, undergraduates can get a systematic knowledge of the principles of object-oriented design, programming and testing of software systems, make a template for standard solutions and components of information processing systems; make technical specifications for the designed automation object, taking into account the results of research and development work.	Competence-based learning Method of reflection	LO 4, LO 6, LO 7	Project
2	DCIT 501/2 Methodology of organizing the design and development of information systems			The study of the conceptual apparatus of the discipline, the main theoretical provisions and methods and the acquisition of skills for applying theoretical knowledge to solve practical problems.			
3	DCIT 502/1 Computer networks and	MC/ OC	5	Competence of students as a result of studying the discipline: analysis of the functioning of computer communication systems based on modern	Role play Competence-based learning	LO 3, LO 5, LO 8	written

	telecommunications			telecommunications equipment, network technologies and protocols; administration of corporate networks with regard to fault tolerance, scale and quality of service.			
4	DCIT 502/2 Computer Network Architecture and Technology			As a result of studying the discipline, the student receives knowledge about modern routing protocols, modern network design, routing optimization principles, the use of multiple routes in a hierarchical network, the operation of the IPv6 Protocol; understanding the capabilities of the IPv6 Protocol, extended address space, IPv6 addressing architecture, MPLS Multiprotocol switching, Softswitch technology, multiservice network management devices.			
5	DCIT 503/1 Methods of artificial intelligence in information systems	MC/ OC	5	As a result of studying the discipline, students acquire knowledge and practical skills on the General rules of the theory of artificial neural networks and their application in IC, the structure of single-layer and multi-layer neural networks, the development of specific methods of training a neural network, classification of learning algorithms, and determining the class of problems solved using a perceptron.	Discussion Partially-search Study Case study Role play	LO 3, LO 5, LO 7	Verbal
6	DCIT 503/2 Knowledge Engineering and Intelligent Systems			Acquisition of intellectual knowledge and skills in the field of data processing, the method of presenting knowledge and its use in information systems. The tasks of mastering disciplines include studying students to solve a number of problems that require the development of			

				basic principles and algorithms for processing intelligent data, knowledge representation, and adjusting the system for changing data that can be considered intelligent.			
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ASSR Module 4. Automated scientific research systems

Module description: Automated research systems encompass various aspects of information systems, security, data management, project management, and web design. By understanding information technology security, utilizing big data processing technologies, practising quality management in IT projects, employing distributed system design principles, and mastering web design and interface analysis, professionals in the field of information systems can build secure, efficient, and user-friendly automated research systems that effectively handle big data, protect information assets, and deliver high-quality IT solutions.

№	Code and name of the discipline	Cycle/ component	Acad. credits	Short description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	ASSR 601/1 Integrated security of information technology and systems	MC/ OC	6	As a result of studying the discipline, students acquire theoretical knowledge and practical skills to ensure comprehensive security of information technologies and systems at modern enterprises in accordance with the requirements of regulatory legal acts, regulatory methodological documents of the Republic of Kazakhstan and advanced world innovative technologies.	Role play Competence-based learning	LO 3, LO 4, LO 6	written
2	ASSR 601/2 Methods and means of protecting computer information			Familiarization with the main methods of providing and determining indicators of reliability and quality of automated systems related to information systems, familiarization with the main provisions of this theory, the concepts of calculating and			

				evaluating the reliability of computers and systems			
3	ASSR 602/1 Modeling and visualization in big data systems	MC/ OC	6	As a result of studying the discipline, the student has theoretical knowledge and practical skills in the development and use of systems for analyzing and processing large amounts of data, allowing them to perform the following professional tasks: setting tasks for analyzing big data, pre-processing data, data visualization, development, implementation and application of data mining methods in a large data set, presentation of wor results.	Problem-based modular training	LO 4, LO 5	written
4	ASSR 602/2 Big Data Processing Technologies			As a result of studying the discipline, the student has theoretical knowledge and practical skills in the development and use of systems for analyzing and processing large amounts of data, allowing them to perform the following professional tasks: setting tasks for analyzing big data, pre-processing data, data visualization, development, implementation and application of data mining methods in a large data set, presentation of work results.			
5	ASSR 603/1 Quality management of IT projects	MC/ OC	6	Relationship of project management methodology with other management disciplines, project structuring, models used for project structuring, main works on project justification, project plan development, organizational structures, responsibility matrix, project risk	Problem-based modular training	LO 3, LO 4, LO 8	written

				management, project Monitoring and reporting.			
6	ASSR 603/2 Distributed IS Design			As a result of studying the discipline, undergraduates can get a systematic knowledge of the principles of object-oriented design, programming and testing of software systems, make a template for standard solutions and components of information processing systems; make technical specifications for the designed automation object, taking into account the results of research and development work.			
7	ASSR 604/1 Web site design and development tools	MC/ OC	5	Web Application Development Fundamentals. Software classification. Programming for web programming. Both the client and server execute the application. Development of application interface, interactive interface, navigation. Syntax notation and scripting language (HTLM, XML, JS, VBS, PERL, PHP).	Problem-based modular training		
8	ASSR 604/1 Design and analysis of Web- interfaces			The use of web technologies in industrial enterprises stages of development, design and implementation of information systems in the field of energy. Technology case. Industrial ERP - development - systems. Development of telecommunication information systems using web technologies.		LO 6, LO 7, LO 8	Project

RW Module 5 Research work

Module description: Research work is a vital component of graduate studies in information systems, and it involves various stages and activities that contribute to a student's academic and professional growth. Through pedagogical practice, research practice, internships, and the completion of a master's thesis, graduate students in information systems gain valuable experience in teaching, research, and practical applications of their knowledge.

Engaging in research methods and pursuing academic publications further strengthens their research skills and establishes their presence in the academic community. Overall, these experiences lay the foundation for successful careers as researchers and practitioners in the field of information systems.

№	Code and name of the discipline	Cycle/ component	Acad. credits	Short description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	RW601 Pedagogical practice	CC/UC	4	Develop the skills of a teacher-researcher who owns modern means of science for searching and interpreting information material on specialized subjects for use in teaching activities.	Educational process		
2	RW 602 Research practice	MC UC	3	Formation and development of professional knowledge in the field of the chosen speciality, consolidation of the obtained theoretical knowledge in the areas and special disciplines of the master's program, mastering the necessary professional competencies in the chosen field of specialized training, gaining experience in the study of an actual scientific problem, forming the skills of choosing materials necessary for the implementation of the master's thesis.	Experimental work	—	Report
3	RW 602 Research practice	MC UC	7	Formation and development of professional knowledge in the field of the chosen speciality, consolidation of the obtained theoretical knowledge in the areas and special disciplines of the master's program, mastering the necessary professional competencies in the chosen field of specialized training, gaining experience in the study of an actual scientific problem, forming the skills of choosing materials necessary for the implementation of the master's thesis.	Experimental work	—	Report

4	RW5(6)03 Master students' research work, including internships and the implementation of a Master's thesis (MRW)	RWM	1	2	Forms the ability and practical skills of the master's student to independently carry out scientific research related to solving complex scientific and technological problems in the field of training in innovative conditions	Research Work	—	Report
	Research methods		1		Описание дисциплины дадим после согласования!!!			
5	RW5(6)03 Master students' research work, including internships and the implementation of a Master's thesis (MRW)	RWM	2	4	Forms the ability and practical skills of the master's student to independently carry out scientific research related to solving complex scientific and technological problems in the field of training in innovative conditions	Research Work	—	Report
	Академическое письмо		2		Описание дисциплины дадим после согласования!!!			
6	RW5(6)03 Master students' research work, including internships and the implementation of a Master's thesis (MRW)	RWM	3	7	Forms the ability and practical skills of the master's student to independently carry out scientific research related to solving complex scientific and technological problems in the field of training in innovative conditions	Research Work	—	Report
	Academic writing		4		Описание дисциплины дадим после согласования!!!			

7	RW5(6)03 Master students' research work, including internships and the implementation of a Master's thesis (MRW)	RWM	11	Forms the ability and practical skills of the master's student to independently carry out scientific research related to solving complex scientific and technological problems in the field of training in innovative conditions	Research Work	—	Report
8	Final evaluation	8	FE	Preparation and defense of a master's thesis	Completion and registration of the thesis	—	Protection

3. RESOURCE SUPPLY OF THE EDUCATIONAL PROGRAM

3.1. LIBRARY FUND

One of the important indicators of the quality of personnel training in the educational program is the provision of students with educational, educational-methodical, scientific, reference, fiction and periodicals.

The library fund for EP 6B06102-Information Systems as of 1-st May 2022 is 5,701 copies, including 4,275 copies in the state language, 1,369 copies in Russian and 57 copies in foreign languages.

The University Library provides students and PS with access to databases: IPRbooks, Polpred, Alembook, Web of Science and Elsevier (Scopus).

Access to the Republican Interuniversity electronic library (RMEB), which combines electronic educational and scientific resources of universities of the Republic of Kazakhstan, has been provided.

Since 2010, the library has been providing an opportunity for KazNWTTU students to familiarize themselves with the content of master's theses in the traditional format (more than 150 titles), half of which, to date, have been translated into PDF format.

Also, students can use the "Kaznatszhenpu Electronic Library" service, which provides access to the electronic library from a computer from anywhere in the world in 24/7 format (website address: lib.kazmkpu.kz). The electronic library database offers students about 10,000 units of full-text sources, more than 1,000 units of licensed books, 6676 units scanned by library staff, and about 300 units of books belonging to the sources of the rare fund.

3.2. STAFFING

The educational program is implemented by the Chairs of Science and Applied Mathematics. Quantitative and qualitative indicators of faculty serving the educational program (disciplines of basic and major cycles):

Total number of faculty - 31 people, including

Doctor of science – 3

Candidate of Sciences – 6

PhD – 3

Masters' – 16

The degree of the Educational program is 36%.

Qualification characteristics of the faculty members within the educational program are reflected in the Human Resources Manual.

3.3. MATERIAL AND TECHNICAL BASE

Practical and laboratory classes in the educational program are carried out in 17 computer classes:

1. computer class 1-13 seats (47.1 sq. m)
2. computer class 2-11 seats (70,7 sq. m)
3. computer class 3-13 seats (87.2 sq. m)
4. computer class 4-12 seats (69.9 sq. m)
5. computer class 5-13 seats (86.9 sq. m)
6. computer class 6-12 village places (70 sq. m)
7. computer class 7-15 seats (87.1 sq. m)
8. computer class 8-12 seats (70,7 sq. m)
9. computer class -9 16 seats (87.7 sq. m)
10. computer class 10-10 seats (47.1 sq. m)
11. computer class 11-11 seats (69.9 sq. m)
12. computer class 12-12 seats (69.9 sq. m)
13. Multimedia class – 13 seats (39.7 sq. m)

14. Computer class №220-10 seats (55.2 sq. m)
15. Computer class №212-10 seats (55.5 sq. m)
16. Computer class №222-10 seats (56.7 sq. m)
17. Computer class № 210-9 seats (47.1 sq. m)

Practice bases:

№	Name of company	№ and contract date
1	Educational centre" QSTEM"	01.06.2022
2	Institute of Information Technology	01.06.2022

4. LONG-TERM PLAN FOR THE DEVELOPMENT OF THE EDUCATIONAL PROGRAM

№	Content of the activities	Implementation period	Responsible persons
Educational and methodological direction			
1	Development and implementation of online courses in open education systems	2023	Teaching staff of the department, K.Turganbay
2	Preparation and publication of textbooks	2024	Teaching staff of the department Zh. Abuova
3	Conducting methodological seminars to improve teaching skills of teaching staff	During the implementation of EP	Teaching staff of the department G. Mukeeva
4	Provision of academic mobility of students and teaching staff on a permanent basis	During the implementation of EP	Program leader, advisors
Research direction			
1	Attracting students to research activities	During the implementation of EP	Teaching staff of the department Zh. Alimbayeva
2	Preparing students to participate in the Republican Olympiad in Computer Science	During the implementation of EP	Teaching staff of the department O. Auelbekov
3	Realization of intellectual competition, hackathon among students of universities of Kazakhstan	2024	Program leader, A.Bazarbayeva
4	Attracting foreign professors from abroad to give lectures	During the implementation of EP	Director of the institute PhMDT, Program Leader
5	Preparation and publication of scientific articles in the journals of the incoming databases Scopus, Web of science and CCES MES RK	During the implementation of EP	Program leader, Teaching staff of the department
6	Implementation of scientific-technical projects financed by the Committee of Science MES RK	During the implementation of EP	Program leader, Teaching staff of the department
Educational direction			
1	Conducting educational work in the classroom and outside of school hours through observation, conversations on an ongoing basis	During the implementation of EP	Teaching staff of the department
2	Work on education of hygiene rules, culture of behavior in the university, public places, care, protection and promotion of health	During the implementation of EP	Program leader, Teaching staff of the department
3	Systematic work on the distribution and employment of graduates	During the implementation of EP	Program leader, Teaching staff of the department
Advanced training			

1	Completion of professional PC courses and retraining of teaching staff in IT direction (professional certification)	2023	Program leader, Teaching staff of the department
2	Improvement of teaching methods with a focus on the personality of the undergraduate, disclosure of his potential, activation of cognitive activity	During the implementation of EP	Teaching staff of the department
3	Conducting trainings on planning and organizing independent work of undergraduates	During the implementation of EP	O. Auelbekov
Career guidance work			
1	Organization of diverse career guidance in secondary schools and colleges	During the implementation of EP	Teaching staff of the department
2	Development of media products aimed at supporting the professional choice of young people	During the implementation of EP	Program leader
4	Conducting career guidance work for the department graduates	During the implementation of EP	Program leader