Ф.7.02-10

MINISTRY OF SCIENCES AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN

M. Auezov SOUTH KAZAKHSTAN UNIVERSITY

Chairman of the Board-Rector
_____ Ahmed-Zaky
27 05 2025.

EDUCATIONAL PROGRAMME

7M01530 - "Computer science"

Registration number	7M01500001
Code and classification of the field of education	7M01 Pedagogical Sciences
Code and classification of training areas	7M015 Teacher training in natural science subjects
Group of educational programs	M012 Teacher training in mathematics
Typeof EP	Current
ISCE level	7
NQF level	2
SQF of education level	7
Language of learning	Kazakh, Russian
Typical duration of study	2 years
Form of study	Scientific and pedagogical
The complexity of the EP, not less	120 credits
Distinctive features of EP	-
University Partner (JEP)	-
University Partner (TDEP)	-
Social Partner (DE)	-

Shymkent, 2025

Drafters:

Name	Position	Sign
Zhaydakbayeva L.K.	c.p.s., Senior Lecturer Head. Department of " Informatics»	
Beisenova G. I.	c.p.s., Associate Professor, Department of "Computer Science"	
Anarmetova M.T.	Master's student of the MEP-23-3 nc group	
Suleimenova L.A.	c.t.s., Senior Lecturer, Head.Department of Informatics»	
Utegenov M.K.	Director of the Higher College of New Technologies named after M.Utebaev	
Amandikov M.A.	c.t.s., associate rofessor Senior Lecturer Head. Department of " Informatics»	

The EP was considered at a meeting of the Academic Quality Committee of the Natural Sciences Pedagogy or the Higher School, Minutes # 6 «17» 03 2025 y.

Chairman of the Committee _____ A.Z.Tursynbayev

The EP was considered and recommended for approval at Educational-methodical meeting of M. Auezov SKU
Minutes # 4 «18» 03 2025 y.

Chairman of the UMS _____ E.I. Imangalyev

The EP was approved by the decision of the Academic Council of the University
Minutes # 10 «27» 03 2025 y.

CONTENT

1 CONCEPT OF THE EDUCATIONAL PROGRAM

University Mission	Generation of new competencies, training of a leader who translates research and entrepreneurial 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 in rapidly changing conditions. • 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.
The Uniqueness of the educational program	• The program is aimed at training specialists in scientific and academic fields, capable of conducting independent research. • It develops creativity and critical thinking, communication skills, and the ability to work in a team to solve modern scientific problems. • The practical focus of the program is ensured through the use of project-based learning, real-world case studies in practical classes, and innovative teaching methods.
Academic Integrity and Ethics Policy	The university has taken measures to maintain academic integrity and academic freedom, protection from any type of intolerance and discrimination: • Rules of academic integrity (order No. 212 of October 10, 2022); • Anti-corruption standard (order No. 221 n/a dated 12/07/2021). • Code of Ethics (Order No. 212 of October 10, 2022)
Regulatory and legal framework for the development of EP	1. Law of the Republic of Kazakhstan "On Education"; 2. Model rules for the activities 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.Standard rules for admission to educational organizations implementing educational programs of higher and postgraduate education, approved by Order of the Ministry of Education and Science of the Republic of Kazakhstan dated October 31, 2018 No. 600 with amendments and additions dated 06/02/2023 No. 252. 4. State mandatory standards for higher and postgraduate education, approved by Order No. 2 of the Ministry of Education and Science dated July 20, 2022, with amendments and additions dated March 4, 2025, as amended by Order No. 90 of the Ministry of Education and Science of the Republic of Kazakhstan. 5. Rules for the organization of the educational process on credit technology of education, approved by Order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152; with amendments and additions dated 09/23/2022 No. 79. 6. Qualification directory of positions of managers, specialists and other

	employees, approved by order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan dated December 30, 2020 No. 553. 7. Methodological recommendations for the implementation of ECTS principles in the educational process and the expansion of academic freedom. Appendix to the order of the Minister of Science and Higher Education. Of the Republic of Kazakhstan dated February 12, 2024 No. 57. 8. Guidelines for the development of educational programs of higher and postgraduate education, Appendix 1 to the order of the Director of the National Center for the Development of Higher Education of the Ministry of Education and Science of the Republic of Kazakhstan dated 05/24/2023 No. 601 н/к.
Organization of the educational process	• Implementation of the principles of the Bologna Process • Student-centered learning • Availability • Inclusivity
Quality assurance of the Educational program	• Internal quality assurance system • Involvement of stakeholders in the development of the Educational Program and its evaluation • Systematic monitoring • Actualization of the content (updating)
Requirements for applicants	They are established in accordance with the Standard Rules for admission to training in educational organizations implementing educational programs of higher and postgraduate education by order of the Ministry of Education and Science of the Republic of Kazakhstan No. 600 dated October 31, 2018, with changes and additions dated June 2, 2023. No. 252
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	Preparation of competitive masters in computer science, ready to carry out professional activities in research and educational fields.
Tasks of the EP	- to provide conditions for the development of a high intellectual level of development, the acquisition of logical and critical thinking skills of scientific and organizational work in scientific and pedagogical activities; - establishing conditions for the development of in-demand knowledge and skills, as well as a conscious attitude towards enhancing the welfare of society and conserving the planet within the framework of the SDGs; - development of the ability to use system theoretical and practical knowledge on the methodology of teaching mathematics and computer science in professional activities in solving scientific, managerial and educational tasks and making operational decisions in problem situations; - development of self-service skills to ensure the possibility of rapid employment in the specialty or continuing education in the doctoral program and ensure continuous professional development of professional activities; - formation of graduates ' competitiveness in the field of education, training of highly qualified and consistently popular undergraduates in scientific and pedagogical areas for the domestic and international labor market.
Harmonization of EP	• 7th level of the National Qualifications Framework of the Republic of Kazakhstan; • Dublin descriptors of the 7th level of qualification; • 2 cycle of a Framework for Qualification of the European Higher Education Area); • 7 th Level of European Qualification Framework for Life long Learning).
Connection of the EP with the professional sphere	The Professional Standard "Teacher" was approved by Order No. 591 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated November 20, 2023. The professional standard for teachers in educational organizations was approved by Order of the Minister of Education of the Republic of Kazakhstan dated February 24, 2025, No. 31. Professional standard Teacher (Abrogated by the Order of the Minister of Education of the Republic of Kazakhstan dated 06/03/2025 No. 133) approved by the Order of the Acting Minister of Education of the Republic of Kazakhstan dated December 15, 2022, No. 500.
Name of the degree awarded	After successful completion of this educational program, the graduate is awarded a Master of Pedagogical Sciences degree in the educational program "7M01530 – Computer Science".
List of qualifications and positions	Masters of educational program 7M01530 – " Computer Science " may hold positions of university lecturer, research teacher, researcher in (research institutions, design and design organizations) in accordance with the qualification requirements of the Qualification Directory of positions of managers, specialists and other employees., approved by the Order of the Minister of Labor and Social Protection of the Republic of Kazakhstan dated May 21, 2012 No. 201-p-m and the Order of the Minister of Education and Science of the Republic of Kazakhstan dated June 9, 2011 No. 241 on amendments and additions to the Order of the Minister of Education and Science of the Republic of Kazakhstan dated July 13, No. 338, 2009 "Approval of standard qualification characteristics of positions of teaching staff and their equivalents" and according to the qualification

	directory of officials by Order No. 512 dated December 27, 2013.
Field of professional activity	Field of professional activity: - education; - research in computer science; - Research in the field of methods of teaching computer science; - Research in the field of information and communication technologies.
Objects of professional activity	Objects of professional activity of graduates: - educational organizations (universities, educational institutions); - state educational bodies; - centers of educational services; - training and research centers; - various forms of ownership that use the methods of computer science in their work. - research institutions and centers for informatization of education; - organization of educational systems of various forms of ownership, using computer technology in their work.
Subjects of professional activity	- A system of theoretical knowledge; - Theoretical and methodological bases of scientific research in pedagogy; - Methodology of research in the field of information education; - A system of methods for implementing research results in practical training; - Mechanisms for commercialization of research results; - a system of practical skills for the development of scientific and methodological complexes, author's courses; - system of higher education pedagogy; - systems of educational psychology; - pedagogical management system; - development of educational and methodical materials; - application of norms, rules, forms, methods and tools of international cooperation in the professional sphere; - Methods of teaching computer science in secondary and special educational institutions; - The system of research of the educational process and its value-oriented orientations, content, methods, forms and results; - Research system in the field of computer science, applied mathematics, pedagogy, psychology and teaching methods; - Innovation and information-analytical services; - Technological process of design, implementation and maintenance of software, mathematical, information software.
Types of professional activity	- education; - training; - management; - research and development.
Learning outcomes	**LO1** Demonstrate knowledge of a foreign language in interpersonal communication, professional activity, writing scientific articles. **LO2** To analyze the main ideological and methodological problems, including interdisciplinary ones, arising in science at the present stage of its development, to evaluate various facts and phenomena based on the provisions and categories of the philosophy of science. **LO3** - To evaluate the development and effective use of personnel in the organization, to possess socio-psychological technologies for managing mass behavior.

	LO4 - To develop educational and methodological complexes of disciplines, taking into account the integration of education, science and innovation. **LO5** - Implement and apply AI tools to solve specific tasks in their pedagogical and teaching-methodical activities. **LO6** - To develop the content of educational robotics courses, technologies for different levels of education, demonstrating the skills of designing and programming robots, developing mobile applications. **LO7** - Develop applications that interact with objects through virtual reality based on 3D modeling. **LO8** - To develop electronic educational publications and design using information technology, Internet resources, and telecommunication means**.** **LO9 -** To design security systems using modern information security software and hardware. **LO10 -** To participate in research work using the methodology of scientific research and obtain new scientific, applied results as part of an independent and scientific team..

3 COMPETENCES OF THE GRADUATE OF EP

SOFT SKILLS (Behavioral skills and personality qualities)	
SS 1. Competence in managing one's own literacy	SS1.1. Strive for professional and personal growth throughout life. SS 1.2. Constantly update own knowledge within the chosen trajectory and in an interdisciplinary environment, carry out further learning with a high degree of independence and self-regulation. SS 1.3. To be capable of reflection, an objective assessment of one's achievements, an awareness of the need to form new competencies and continue education in doctoral studies.
SS 2. Language competence	SS2.1. The ability of possessing a sufficient level of communication in the professional field in the state, Russian and foreign languages for negotiating and business correspondence. SS 2.2. The ability of mastering the skills of mediation and intercultural understanding.
SS 3. Mathematical Competence and Competence in the field of Science	SS3.1. The ability to interpret the methods of mathematical analysis and modeling for solving applied problems in the field of study. SS3.2. The ability to plan the setting of scientific experiments, integrate and implement the results of scientific research in the professional field. SS 3.3. The ability to analyze and comprehend modern methods of pedagogical and psychological science and apply them in pedagogical activity.
SS 4. Digital competence, technological literacy	SS 4.1. The ability to confidently use modern information and digital technologies, artificial intelligence systems for work, leisure and communications. SS 4.2. Proficiency in the use, recovery, evaluation, storage, production, presentation and exchange of information in a wide range of digital devices. SS 4.3. Ability to confidently use global information resources and apply technological literacy in research and computational and analytical activities.
SS 5. Personal, social and academic competencies	SS 5.1. Possession of the norms of business ethics, social and ethical values and focus on them in professional activities. SS 5.2. Formation of a personality capable of mobility in the modern world, critical thinking and physical self-improvement. SS 5.3. Ability to work in a team, correctly, clearly and reasonably defend one's position during discussions and make decisions of a professional nature. SS 5.4. Ability to adequately navigate in various social spheres of activity and in conditions of uncertainty. SS 5.5. Ability to find compromises, correlate own opinion with the opinion of the team.
SS 6. Entrepreneurial competence	SS 6.1. The manifestation of leadership qualities and the ability to have a positive impact on others, to lead a team. SS 6.2. The ability to create conditions for the development of creative and entrepreneurial skills of the team. SS 6.3. The ability to work in a mode of uncertainty and rapidly changing task conditions, make decisions, respond to changing working conditions, allocate resources and manage your time. SS 6.4. Ability to work with consumer needs.
SS 7. Cultural awareness	SS7.1. The ability to show worldview, civil and moral positions.

and ability to express yourself	SS7.2. The ability to be tolerant of the traditions and culture of the peoples of the world, to have high spiritual qualities.
HARD SKILLS	
PC1 scientific research	PC1.1 The ability to creatively use knowledge of fundamental and applied sections of biology in scientific and technological activities using the latest domestic and foreign experience.
PC2 scientific and innovative	PC2.1 The ability to show professional values: professionalism; innovation; creativity; meritocracy; integrity. PC2.2 The ability to apply the methodological foundations of design, implementation of field and laboratory, biological, physiological and medical research, use modern equipment, computer systems in accordance with the direction of the master's program.
PC3 organizational and managerial	PC3.1. Ability to plan and organize the educational process • to develop and implement educational programs, working curricula and classes; • to determine the goals, objectives and results of training; • to organize classroom, extracurricular, research and project activities of students. PC3.2. To organize scientific seminars and conferences; the ability to use the skills of preparation and design of scientific and technical documentation, scientific reports, reports and articles.
PC4 pedagogical and educational	PC4.1 The Ability to organize and conduct lectures, seminars, and practical classes taking into account the principles of student-centered learning and assessment, and to develop teaching and learning materials for the subjects taught, taking into account the integration of education, science, and innovation. PC4.2 Possess the skills and abilities to design and implement a holistic pedagogical process, be capable of positive thinking, be familiar with the system of national values, be committed to ethical values, and be inclined towards humanism and optimism.
PC5 innovation and design	PC5.1. The ability to use innovative solutions in the development of new technologies, the ability to assess innovative business risks in the implementation of new solutions in the field of technology development for various fields of activity; the ability to develop plans and programs for the organization of innovative activities of research teams.

3.1 Matrix for correlating learning outcomes in the EP as a whole with the competencies being developed

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10
SS1			+							+
SS2	+	+						+		
SS3			+	+		+	+		+	
SS4				+	+	+		+		
SS5	+	+							+	+
SS6	+	+	+							
SS7	+		+	+		+				
PC 1		+								+
PC 2				+			+			
PC 3			+							+
PC 4				+	+			+		
PC 5				+				+	+	+

4 Matrix of the influence of modules and disciplines on the formation of learning outcomes and information on labor intensity

Module name	Cycle	Component	Name of the discipline	Brief description of the discipline	Number of credits	Formed PO (codes)									
						RO1	RO2	RO3	RO4	RO5	RO6	RO7	RO8	RO9	RO10
Module of Scientific and Pedagogical Training	BD	UC	History and Philosophy of Science	**Purpose:** the acquisition of knowledge by students, the development of skills necessary for the successful implementation of research activities on the basis of the philosophical and methodological culture of scientific knowledge, including ideas about the ways of organization and functioning of science, the general laws of its development, rational methods and norms for achieving knowledge, socio-cultural conditionality of scientific and technical creativity. **Content:** History and philosophy of pedagogical sciences. New European science in culture and civilization, the emergence of science, its historical dynamics, the structure of scientific knowledge, philosophical problems of a specific sciences. Communication technologies of the XXI century in the	4		✓							

				field of intercultural communication. Understand and integrate philosophical problems of the development of modern global civilization, modern topical methodological and philosophical problems of the pedagogy and linguistics.											
	BD	UC	Foreign Language (Professional)	**Purpose:** further development of foreign language communicative competence (speech, language, socio-cultural, compensatory, educational and cognitive), the development of professional skills in translating texts of professional subjects from a foreign language into Kazakh, the formation of the ability to analyze scientific texts in the specialty. **Content:** Basic concepts and terms of mathematics and informatics. The content of the mathematics and computer science course in English. Methods of abstracting and translating literature in the specialty. Analysis of texts in English. Examples of the use of English in professional activities. Levels B2,C1 are presented in the form of a pragmatic professional orientation for professional and academic purposes at an advanced level: scientific information base, interpretation of scientific information, argumentation, beliefs, scientific polemics, academic	4	✓										

				writing. The use of innovative methods and technologies, and the involvement of modern means (Internet resources). Demonstration of knowledge of language material in any related discipline											
	BD	UC	Psychology of Management	**Purpose:** formation of knowledge about the psychological content and structure of management activities, psychological characteristics of the personality of the head and psychological patterns of joint activity of people to achieve organizational goals, formation of practical skills of psychological support of management activities in various fields of education. **Content:** Management psychology as a field of scientific knowledge. Basic concepts and laws in management psychology. The main methods of psychological influence. The role of a psychologist in the organization and system of management relations. Features of conducting psychological research in organizations of various forms of ownership. The head as a subject of management activity. Leadership and leadership. Leadership style. Psychological support of management activities. Structural organization of management activities. Psychological management methods.	3			✓							

				Psychology of business relations. Psychological conditions of effective psychological interaction. Management of organizational conflicts.											
	BD	UC	Pedagogy and psychology of higher school	**The purpose of the course** is to develop undergraduates' skills and abilities to effectively organize professional and pedagogical activities at a university based on modern psychological and pedagogical knowledge **Course content:** Modern paradigms of higher education. History, trends and strategies of higher education development in Kazakhstan. The subject, tasks, and categories of higher school pedagogy and psychology. Methodological foundations of higher school pedagogy and psychology. Professional competence of a university teacher. The communicative competencies of a university teacher. Higher school didactics. Psychological features of student age.The university learning process and its patterns. The content of education at the university. Forms of organization of the educational process at the university. Technologies of organization and implementation of the educational process at the university. Features of the credit training system. Methods and	4				✓							

				methods of teaching.											
Methodical Fundamentals of Teaching	BD	UC	Automation of software development using artificial intelligence	**Purpose:** formation of undergraduates' theoretical knowledge and practical skills in using artificial intelligence methods to automate the processes of designing, writing, testing and maintaining software. **Content:** Applications of artificial intelligence in software development. Artificial intelligence in the development of mobile applications. AI tools for software development. Modern ways of using AI. Program optimization and DevOps process management. The use of AI in management systems and continuous integration. An overview of the software lifecycle and automation capabilities. Automating everyday tasks using AI. Software automation and the importance of analytics. Machine learning and artificial intelligence.	5					✓					
	BD	UC	Pedagogical practice	Knowledge and understanding of the methodological foundations of modern education, the dialectical connection of pedagogical theory and school practice. To be able to present their new scientific results in the form of well-founded conclusions, to draw up the results of work in the form of reports, to draw up the research results in the form of articles, reports, to analyze the essence of the main modern methods	4					✓					

				and technologies of school education											
Theoretical problems of computer science	PD	EC	Informatization of Education and Learning Problems	**Purpose:** formation of basic concepts of informatization of education among undergraduates, identification of the main learning problems and finding optimal solutions to various learning problems. **Content:** Computer science and education. The main directions of using ICT in teaching and education management. Methods of using ICT in teaching. Informatization of education as a direction of scientific research and training of teaching staff. Multimedia technology. Computer software and methodological support. Informational educational environment. Information culture of teachers. The concept of "information culture". Psychological and pedagogical foundations of informatization of education. The influence of informatization on the methodological system of education. Pedagogical possibilities of a modern computer.	4				✓						
	PD	EC	Innovative Processes in Education	**Purpose:** formation of a system of general cultural and professional pedagogical competencies among undergraduates when mastering educational methods and activities related to innovative processes in modern education.	4				✓						

				Content: Pedagogical innovations in education. Innovation processes as a modern educational phenomenon. Innovative processes in education management. Innovative educational processes in secondary schools. Innovative processes in professional and pedagogical education. Innovative teaching methods. Interactive methods. Virtual reality technologies. Artificial intelligence in education. Blended learning. Project-based training. Learning through research methods. Cloud computing training.											
	PD	EC	Information Security and Protection in Information Systems	**Purpose:** undergraduates study the theoretical foundations and methods of information protection, the mathematical structure of secret systems, consideration of the mathematical representation of information, methods for analyzing information characteristics and redundancy of language systems, the theoretical foundations of correcting and restoring information characteristics of arbitrary texts, the creation of information protection systems, the development of basic methods and means of information protection. **Content:** Principles of information security. Information protection. Information security. Analysis of the	6									✓	

				software and hardware platform of information systems. Security models of information systems. Examples of practical implementation of protection and security systems. The main characteristics of a secure information system. Methodology of information security reliability. Information protection measure. Optimal management of protection processes. Evaluation of the protection system. Computer system security.											
	PD	EC	Data Protection in Computer Networks	**Purpose:** training of undergraduates in the main types and methods of information protection and mastering the ability to design information security systems, possess modern software and hardware information security tools. **Content:** Common information security issues. The State information security system. Security threats. Theoretical foundations of information system protection methods. Methods of protection of metering devices. Fundamentals of cryptography. Architecture of secure economic systems. Algorithms for binding software to the hardware environment. Security algorithms in computer networks.	6									✓	
	BD	EC	Principes of	**Purpose:** formation of undergraduates'	5							✓			

			Virtual and augmented reality	knowledge and skills in the field of virtual and augmented reality applications within the framework of digital technologies. **Contents:** Theoretical foundations of virtual and augmented reality technologies. The concept of augmented and virtual reality technologies. Opportunities, threats, and recommendations of virtual reality technologies. Visualization and interaction devices for immersive environments. Augmented reality applications. Virtual reality applications. High-performance virtual and augmented reality applications. Virtual reality technologies in education. The current state of the use of augmented and virtual reality in education. Methodological recommendations on the use of augmented and virtual reality in the educational process.											
	BD	EC	SMART education	**Purpose:** to increase the level of professional competencies of future teachers in the implementation of SMART learning in the educational process in order to personalize and optimize learning outcomes and instill skills in the application of modern teaching methods. **Content:** SMART-educational	5							✓			

				technology, goals and objectives. The role of SMART technologies in the modern educational process. SMART is an educational methodology. The concept of "Smart education". The meanings of Smart concepts. The experience of using Smart technologies in the educational process. The experience of using SMART technologies in the process of teaching the subject "Computer Science". The use of SMART learning in the educational process. Mobile learning. Smart textbook and Smart teacher. Smart tutorials. Modern problems of Smart technologies. The impact of Smart technologies on education and society. Smart technologies in higher education. Smart society.											
	PD		Research practice	To know and understand the definition of an object, the patterns of development of research discipline. Justification of the relevance of the chosen topic of the dissertation, a description of the current state of the problem under study, the selection of the main literature used as the basis of the theoretical basis of the study, the collection of specific materials for the dissertation. Formation of conclusions, modeling, processing and interpretation of the results.	6										✓

Information and Communication Technologies	PD	EC	Big Data	**Purpose:** mastering the theoretical and practical knowledge of undergraduates and using modern information technologies and software tools, acquiring skills that make it possible to manage time more effectively based on available resources and limitations in solving professional tasks. Contents: Basic definitions, terms, and tasks of big data analysis. Modern software tools for big data analysis. Prerequisites for the formation of a big data trend.Big data tools. Big data analysis. Cognitive data analysis. Mathematical statistics. Visual display of data. Data MINING methods. The mathematical apparatus of DM. DM standards. Graph analysis methods. Tools for applied data analysis. Data warehouses. A distributed NoSQL database. Solving data production problems. Problems of classification and clustering. Big data: modern approaches to processing and storage. Technical difficulties of working with big data. The role of big data in solving analytical and research tasks of professional activity.	4									✓	
	PD	EC	Data Analysis	**Purpose:** formation of skills in applying computer methods for solving data analysis and interpretation problems in the development of	4									✓	

				algorithms for analyzing and processing measurement information, acquisition of practical skills in working with modern application software packages for solving data analysis and interpretation problems. **Content:** An introduction to data analysis. The problem of data processing. The data matrix. Classification of data using deterministic models. Classification of data based on statistical models. Cluster analysis. Methods for reducing data size. Data MINING systems in data analysis and interpretation tasks. Modern application software packages for solving experimental data processing problems.											
	BD	EC	Introduction to STEM	**Purpose:** to give an idea of the concepts and current issues of STEM education at the national and global levels. **Content:** General understanding of STEM. STEM education. Relevance, purpose and objectives of STEM education. Principles and advantages of STEM education. Areas of application of STEM technology. STEM Skills: definition and examples. International and Kazakhstani experience in the implementation of STEM education. . Kazakhstan's experience in implementing STEM education. The	5					✓					

				experience of foreign countries in the field of STEM education. The use of STEM technology in preschool education. The introduction of elements of STEM education in elementary schools. Teaching natural sciences using STEM technology. STEM education through modern programs. STEM education using 3D modeling. STEM and robotics.											
	BD	EC	Innovation	**Purpose:** the study of the patterns of the innovation process, the transformation of scientific achievements into innovations and the features of innovation management. **Content:** The formation of the theory of innovation and its modern concepts. Innovative processes in modern education: essence, structure, features. The content of innovative education: goals and principles. Innovative pedagogical activity: content and structure. The individual style of innovative activity of the teacher. The main features of innovation. Theories of innovation. Innovative technologies in education.	5					✓					
Pedagogical basis of computer science	PD	EC	Educational Software Evaluation and Design	**Purpose:** ability to work with raster and vector graphics programs, creation of computer graphics and design elements, formation of editing skills. **Content:** Categories of educational	5								✓		

				software. Evaluation of educational software in four categories of points. Working with software. Assessment and testing in a virtual environment. Software products for computer design. Trends in the development of computer design.											
	PD	EC	Development and Use of Educational Electronic Publications and Internet Resources	**Purpose:** be able to use electronic educational publications and Internet resources, know how to develop electronic educational publications, the use of telecommunications in education, know the methods of using information technology in education. **Content:** Fundamentals and specifics of electronic educational publications and resources. Ways to create electronic educational publications about the state program of informatization of education. Technical base and basic basic means of informatization of education. Multimedia technologies. Computer software and methodological support. Informational educational environment. The use of telecommunication facilities for educational purposes. Pedagogical possibilities of a modern computer.	5								✓		
	PD	EC	Methodological training of teacher of informatics in	**Purpose:** designing the educational process in computer science using modern technologies for undergraduates; implementation of the	6				✓						

			High School	pedagogical process in various age groups and various types of educational institutions; expansion and deepening of applied knowledge in computer science using the latest scientific achievements. **Content:** The goals of computer science education. Didactics and principles of teaching computer science. The content of school education in computer science. Methods and organizational forms of computer science education. Technical and software tools for teaching computer science. Control and assessment of computer science knowledge. Substantive characteristics of computer science curricula, textbooks and teaching aids. Methodological features of teaching the basics of algorithmization and programming. Methods of teaching hardware and system software. Methods of teaching information-related problems. Teaching methods for text and image editors. Methods of teaching spreadsheet and database management systems. Methods of teaching information and communication technologies.												
	PD	EC	Methodical System of Teaching Informatics	**Purpose:** formation of undergraduates' knowledge about the system of education in the field of computer science, the main components of	6				✓						

				professional activity in computer science and examples of its implementation. **Content:** Methods of teaching computer science. Computer science as a science and academic discipline. The role and place of computer science education in modern society. The structure of the subject area of computer science. The subject of computer science teaching methodology. The initial goals and objectives of the discipline "Computer Science". Analysis of curricula and textbooks of the school computer science course. The content and structure of school education in computer science. The content and structure of the school computer science course. Propaedeutic computer science course for elementary school. The basic course of school computer science. Professional computer science courses for natural mathematics and social sciences and humanities. Computer science course software.											
	PD	EC	Digital teacher	**Purpose:** development of information culture in modern education, creation of a digital learning environment, experimental development of new electronic educational products, acceleration and simplification of the	6					✓					

				educational process; broadening the horizons of students, opening the possibility of obtaining new knowledge. **Content:** The main directions and trends in the development of digital education in modern society. State policy in the field of digitalization of the education system. Artificial intelligence in education. The paradigm of digital education. Digital pedagogy in the educational space and its place in the system of science. Basic concepts and categories of digital pedagogy. The formation of digital pedagogy as a new direction of pedagogical science. Personal development in digital pedagogy. Digital pedagogy in the context of personal self-education. Methodological knowledge in the field of quantitative learning theory. Didactics of digital learning. Independent work of students in digital pedagogy. E-learning tools as a resource for organizing the educational process in digital pedagogy.The role and functions of a teacher in digital pedagogy and modern requirements for his competencies.											
	PD	EC	Pedagogical Informatics	**Purpose:** familiarization of undergraduates with the theoretical foundations, basic methods of pedagogical informatics and the main	6					✓					

				directions of the process of informatization of education and the formation of information culture of future pedagogical specialists. **Content:** General problems of pedagogical informatics. The purpose of teaching pedagogical informatics. Pedagogical informatics as a scientific and methodological direction. The object and subject of the study of pedagogical informatics. Basic concepts and categories of pedagogical informatics. Tasks of pedagogical informatics. The connection of pedagogical informatics with other sciences.											
	PD	EC	Scientific and pedagogical bases of computer modeling	**Purpose:** formation of systematic knowledge about modern computer modeling methods, their place and role in the system of sciences, expansion and deepening of the concepts of mathematics, computer science, development of abstract thinking, modeling methods, algorithmic culture and general mathematical and information culture. **Content:** Methods and means of computer modeling. Introduction to the theory of modeling. The concept of models and modeling, classification of modeling methods and properties of models. The object and its model. The	5							✓	✓		

				problem of adequacy. Classification of models. Cyclicity of modeling processes. The main stages of modeling. Examples. Mathematical and computer models. Computer modeling tools. Types of computer modeling. Features of geometric modeling. Methods of stochastic and simulation modeling. Examples of building and using computer models. Information modeling. Features of the construction and analysis of information models.											
	PD	EC	Scientific and pedagogical basis of information modeling	**Purpose:** formation of systematized knowledge in the field of mathematical and computer modeling methods; skills of using information models on graphs in solving professional problems in the subject area. **Content:** Information model. Signs of the model. The purpose of modeling is the classification of models. Model construction technology types of information models analysis and processing of modeling results. Quantitative and qualitative assessment of models by parameters. Mathematical model. Interpretation in mathematical modeling. Modeling of queuing systems. Methods of modeling continuous systems. Stages of modeling. Building a model. Modeling of socio-economic systems. Modeling	5							✓	✓		

				of production processes.											
	BD	EC	Planning and Organization of Scientific Research	**Purpose:** training in the selection of scientific topics, basic research methods, design of research results, development of skills in working on a manuscript, report, scientific publications and articles. **Content:** Classification and organization of science. The concept of science. Science and art. Classification of science. Scientific ethics. Organization of science. Academic and university science. Priority areas of academic and university science. Features of scientific research. Science and scientific research. Stages of scientific research. The algorithm of scientific research. Topics of scientific research. The choice of the topic of scientific research. Significance and relevance of the topic. Research work of undergraduates. Methods of preparation of master's theses.	5					✓					✓
	BD	EC	Organization of Educational and Research Work on Methods of Teaching Informatics	**Purpose:** theoretical and practical training of students in the field of teaching modern computer science and the formation of practical skills for the effective conduct of educational and educational work in general education and vocational schools, the development of creative potential necessary for teaching computer	5					✓					✓

				science. **Content:** Characteristics of educational and methodological complexes of the subject "methods of teaching computer science", features of teaching computer science in annual experimental classes. Features of teaching computer science by the method of technological design. Methods of active learning in a 12-year-old school. Interactive technologies in education. Forms and methods of management of pedagogical systems, basic principles, meaning. Learning management as a self-managed system. Monitoring as an aspect of management activity. The place of computer science in the education system. The use of innovative technologies in teaching computer science. The system of professional training of future teachers based on information, computer and mathematical modeling.											
	PD	EC	Methods and technologies of STEM education	**Purpose:** training of professionals interested in research work in STEM laboratories, trained to work with modern technologies of modern equipment and innovative programs, ready to master new knowledge about new technologies. **Content:** STEM-theoretical foundations of education. Conducting STEM education. STEM learning	6						✓				

				opportunities. STEM technology methodology. The demand for STEM technology. STEM learning opportunities. STEM-ways of organizing the educational process. The use of AI in STEM education. Development of STEM education in Kazakhstan. Directions of STEM education. International and domestic experience in organizing research work of students in STEM areas. International cooperation in the field of STEM education development.											
	PD	EC	Methods of Teaching Robotics in Education	**Purpose:** to teach the basic concepts of robotics in future professional activity, to give an overview of the main definitions and their content, capabilities and to form the necessary qualifications and skills. **Content:** Fundamentals of robotics, fields of application, types of robotics. History and prospects of robotics. International robotics competitions. Intellectual robotic systems, technologies related to the development and use of robots. Management and work with computer systems of sensory feedback and information processing.	6						✓				
Module of Scientific research work and			Research Work of a Master Student,	Knowledge and understanding of the goals and objectives of research practice, conducting bibliographic work on the topic of the dissertation,	24										✓

Final Certificatio n			Including Passing an Internship and Completing a Master's Thesi	processing and analysis of the data. The ability to compare the results of their research with the data available in science, to provide a critical approach to the results of their research, to be ready for professional self-improvement and the development of creative potential and professional mastery.											
			Execution and Defense of Master`s Thesis	Knowledge and understanding of the final qualification work of graduates of the master's program as a document confirming the competency obtained in the learning process in accordance with the chosen specialty of training. The ability to defend a master's thesis at an open meeting of the SAC with the participation of the chairman of the commission and at least half of its composition. Knowledge and understanding of the order and regulation of the defense of the master's thesis.	8										✓

5 Summary table reflecting the volume of disbursed loans by EP modules

Course of training	Semester	Amount of the mastered modules	Amount of the studied disciplines			Amount of KZ credits					Totalhours	Totalcredits KZ	Amount	
			Compulsory component	University component	Optional component	Theoretical training	Physical education	Training practice	Production practice	Final attestation			exam	differentiatedcredit
1	1	4	-	5	2	29	-	-	1	-	900	30	7	1
	2	3	-	1	4	22	4	-	4	-	900	30	5	2
2	3	2	-	-	2	10	-	6	3	-	900	30	3	2
	4	3	-	-	3	16	-	-	4	12	900	30	-	1
total		12	-	6	11	78	4	6	12	12	3600	120	15	6

6 Strategies, teaching methods and artificial intelligence, monitoring and assessment

Learning strategies	Student–centered learning: The student is the center of teaching/learning and an active participant in the learning and decision-making process. Practice-oriented training: orientation to the development of practical skills.
Teaching methods	Conducting lectures, seminars, various types of practices with: • the use of innovative technologies: • problem-based learning; • case study; • work in a group and creative groups; • discussions and dialogues, intellectual games, olympiads, quizzes; • reflection methods, projects, benchmarking; • Bloom's taxonomies; • presentations; • * rational and creative use of information sources: • * multimedia training programs; • * electronic textbooks; • * digital resources. • * machine learning methods Organization of independent work of students, individual consultations.
Monitoring and evaluation of the achievability of learning outcomes	Current control on each topic of the discipline, control of knowledge in classroom and extracurricular classes (according to syllabus). Assessment forms: • survey in the classroom; • testing on the topics of the discipline; • control works; • protection of independent work;

	• discussions; • trainings; • colloquiums; • abstract, etc . Boundary control at least twice during one academic period within the framework of one academic discipline. Intermediate certification is carried out in accordance with the working curriculum, academic calendar. Forms of conducting: • exam in the form of testing; • oral examination; • written exam; • combined exam; • project protection; • protection of practice reports. Final state certification.

7 Educational and resource support for EP

Educational Information Center	The structure of the Educational Information Center includes 6 subscriptions, 16 reading rooms, 2 electronic resource centers (ERC). The basis of the network infrastructure of the Educational and Information Center is 180 computers with Internet access, 110 workstations, 6 interactive whiteboards, 2 video doubles, 1 video conferencing system, 3 A-4 format scanners, JIC software - 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: "Almamater", "Proceedings of SKSU scientists", "Electronic archive" have been created. Online access from any device 24/7 via the external link http://articles.ukgu.kz/ru/pps. Catalogs are processed electronically. EC consists of 9 databases: "Books", "Articles", "Periodicals", "Proceedings of the teaching staff of SKSU", "Rare Books", "Electronic Fund", "SKGU in Print", "Readers" and "SKU". The EIC provides its users with 3 options for accessing its own electronic information resources: from the “Electronic Catalog” terminals in the catalog hall and in the EIC subdivisions; through the information network of the university for faculties and departments; remotely on the library website http://lib.ukgu.kz/. Open access to international and republican resources: "SpringerLink", "Polpred", "Web of Science", "EBSCO", "Epigraph", to electronic versions of scientific journals in the public domain, "Zan", "RMEB", "Adebiet", Digital library "Aknurpress", "Smart-kitar", "Kitar.kz", etc. For people with special needs and disabilities, the library website has been adapted to the work of visually impaired users
Material and technical base	The material and technical base of the Department of Informatics includes the following classrooms and computer classes: - there are 3 computer classes for laboratory work, one of them with

	an interactive whiteboard; - lecture halls; - STEM center. Practice bases for undergraduates: 1. South Kazakhstan State Pedagogical University. 2. M.Utebayev Higher College of New Technologies 3.KazTilDamu LLP

AGREEMENT SHEET

by Education Program code 7M01530 - «Computer science»

Director of DAA _____ A.S. Naukenova

Director of the Department
of Academy of Science _____ U.B. Nazarbek

Appendix 1

REVIEW
on the educational program
«7M01530 - Computer Science»
developed in M. Auezov SKU, Shymkent

1. Brief description of the enterprise and its business profile

The general characteristics of the educational program are presented on the university's official website and include the following information: the graduate's qualification, the form and duration of study, a brief description of the field and activities of the graduates, a complete list of key and professional competencies that the graduate should possess as a result of completing the educational program, as well as the area of professional activity that the graduate is preparing for, and a list of professional tasks that the graduate should be able to perform in accordance with the types of professional activity.

2. The relevance and demand for EP

Training of specialists in the educational program «7M01530-Computer Science» is very relevant from the point of view of further development of the field of information and communication technologies within the framework of the program "Digital Kazakhstan". Applying theoretical knowledge in solving mathematical and computer applied problems and professional activities, competently solving professional problems using modern computer systems, successfully carrying out scientific and pedagogical activities using effective teaching methods. Conducts monitoring to improve knowledge in the field of applied mathematics, mathematical modeling and system programming, mathematical economics, mathematics, will conduct research on mathematical modeling and computer technology.

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

The learning outcomes and competencies embedded in the EP, the theoretical knowledge, practical skills and professional skills provided fully meet the modern qualification requirements for specialized specialists of the master's qualification.

4. Availability of components that develop practical skills

Academic disciplines of educational program of basic and specialized training provide the formation of the necessary practical skills of a specialist with fundamental knowledge in mathematics, possessing computer methods of collecting, storing and processing information used in his professional activities, able to assess the perspectivity of the methods used to solve tasks, competitive in the domestic and international labor markets.

5. The Contents: of the educational program (modules, disciplines)

The proposed educational program contains all the necessary elements for the effective organization of the educational process – regulates the goals, expected results, content, conditions and technologies for the implementation of the educational process, assessment of the quality of training a specialist with a master's degree. It includes a curriculum, work programs of training courses, modules and disciplines, related materials: programs of pedagogical, research practice, academic calendar, educational and methodological complexes of disciplines.

The content of the curriculum fully corresponds to the direction of training specialists, is thought out and competently equipped with content. The academic disciplines included in the plan cover the entire range of topical issues and problems in the field of training, are fully capable of forming the necessary specialized knowledge, skills and abilities in the field of information technology.

The distribution of disciplines by academic periods is rationally and logically verified. All types of educational activities are provided for the preparation of highly qualified specialists with the skills of research work - theoretical training, pedagogical and research practice, writing and defending a dissertation. 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 mandatory academic disciplines, as well as disciplines of the university component and an optional component. Compulsory disciplines provide the formation of general and professional competencies. The disciplines of the university component and the component of choice expand and deepen the training of students, contribute to obtaining additional competencies, knowledge and skills necessary to ensure the graduate's competitiveness with the requirements of the labor market.

6. The quality of filling information about the disciplines

The composition of educational modules covers all relevant areas of training specialists in the field of information technology. The Contents: of the table "Information about disciplines" of the educational program includes the following information: module name, cycle, type of discipline, name of the discipline and its brief description, number of credits, codes of learning outcomes, and also correspond to the adopted competence model of the graduate.

7. Conclusion on the EP

Based on the above, we can say that the goals and content of the proposed educational program meet the modern qualification requirements for the preparation of masters specializing in education under the educational program "7M01530-Computer Science".

Candidate of Pedagogical Sciences, Associate Professor
Department of «Informatics»
of the South Kazakhstan Pedagogical University
U.Zhanibekov University

Nurmukhambetova G.K.

Appendix 2

Expert conclusion

on the educational program
«7M01530- Computer Science»

1. The relevance of the EP

Currently, students in the field of teacher training in natural sciences apply mathematical knowledge and information literacy at all levels of education, in research institutes, state and non-state scientific and educational institutions. Because the effective use of modern software products, technical means and technologies in the professional sphere is a requirement of modernity. The student analyzes and applies information from various sources of information on issues arising in the course of his activities, carries out professional activities in compliance with the rules of information security, applies information and communication technologies in conducting mathematical research.

2. Compliance of EP with formulated objectives, consistent with the mission of the university, the needs of employers and students

The educational program "7M01530 -"Computer science" formulates the concept of the educational program, the goals and objectives of training specialists, requirements for the organization of the educational process and for applicants, the results of training in the OP, and also contains a description of the qualification characteristics of the graduate of the educational program, his key and professional competencies, information about disciplines. The list of academic subjects and their content meet the modern qualification requirements for specialists in the field of information technology and mathematics and computer science.

The requirements for the selection of academic disciplines, formed knowledge, practical skills and professional competencies are fully consistent with the mission of the university "aimed at the formation of new competencies, training of a leader who spreads research thinking and culture", meets the needs of employers and undergraduates.

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

The objectives and Contents: of the EP correspond to level 7 of the National Qualifications Framework of the Republic of Kazakhstan.

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

The OP is harmonized with the Dublin descriptors, the 2st cycle of the Qualifications Framework for the European Higher Education Area (A Framework for the European Higher Edication Area), and also the 7th level of the European Qualifications Framework for Lifelong Learning.

5. Compliance with the classification of training areas with higher education

The educational program corresponds to the direction 7M015 Training of teachers in natural science subjects of the classifier of training areas with higher education.

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

In accordance with the credit technology of education in the EP, a modular construction principle is laid. The curriculum includes disciplines of the university component and disciplines of the component of choice. The disciplines of the university component ensure the formation of general and professional competencies. Elective component disciplines broaden and deepen the training of students, contribute to obtaining additional competencies, knowledge and skills necessary to ensure the graduates' competitiveness with the requirements of the labor market.

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

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

The Contents: of the EP corresponds to the focus of training, thought out and well-equipped with meaningful Contents: . The included academic disciplines cover the whole range of topical issues and problems and problems according to the profile of training, are fully able to form the necessary specialized knowledge, skills and abilities of information technologies, suggest mastering Kazakh, Russian and English languages.

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

The distribution of disciplines by academic periods is rationally and logically verified. All types of educational activities are provided for the preparation of highly qualified specialists with the skills of research work - theoretical training, pedagogical and research practice, writing and defending a dissertation. The planned volume and time resource for academic disciplines and types of training meet the qualification requirements for the level of graduates.

The structural parts of the educational program are interrelated, continuous, aimed at achieving the planned comprehensive result and are disclosed in depth and in full.

Methodological equipment of the educational program contributes to the successful solution of tasks in key areas of training, education and development of undergraduates.

9. Reflection in the EP of the system of accounting of the academic load of students and teachers in loans, 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 accounting for the academic load of teachers and undergraduates in loans. 120 credits are provided.

10. Presence in programs of industrial practice for fixing the theoretical material expressed in the academic load in credits

The educational program provides for the following types of practices: pedagogical practice in the amount of 4 credits, research in the amount of 6 credits.

There are 24 credits for master's research work, including internship and dissertation, 8 credits for the design and defense of a master's thesis.

11. Qualifications obtained as a result of the mastering of EP

Upon mastering the EP, it is planned to assign the graduate the qualification of Master of Pedagogical Sciences according to the educational program "7M01530 Computer Science".

12. Recommendations

In accordance with the above, it seems possible to assert that the goals and content of the EP meet the modern requirements for the preparation of masters specializing in mathematics and computer science.

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

Chairman of the Expert Committee,
Dean of Natural Sciences Pedagogy Higher School of
M.Auezov South Kazakhstan University — Madiyarov N.K.

Members of the Expert Committee:

Isaev E.B.

Abdraimov R.T.