QAZAQSTAN
RESPUBLIKASY ǴYLYM
JÁNE JOǴARY BILIM
MINISTRLIGI

МИНИСТЕРСТВО НАУКИ И
ВЫСШЕГО ОБРАЗОВАНИЯ
РЕСПУБЛИКИ
КАЗАХСТАН

MINISTRY OF SCIENCE
AND HIGHER EDUCATION
OF THE REPUBLIC
KAZAKHSTAN

SOUTH KAZAKHSTAN STATE
PEDAGOGICAL UNIVERSITY
ОКМПУ

ОҢТҮСТІК ҚАЗАҚСТАН
МЕМЛЕКЕТТІК
ПЕДАГОГИКАЛЫҚ
УНИВЕРСИТЕТІ

ЮЖНО-КАЗАХСТАНСКИЙ
ГОСУДАРСТВЕННЫЙ
ПЕДАГОГИЧЕСКИЙ
УНИВЕРСИТЕТ
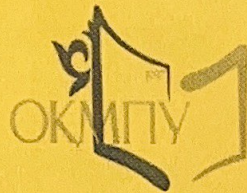
SOUTH KAZAKHSTAN
STATE PEDAGOGICAL
UNIVERSITY

Оңтүстік Қазақстан
мемлекеттік педагогикалық
университетінің Басқарма
төрағасы-Ректор

Председатель Правления-Ректор
Южно- Казахстанского
государственного
педагогического университета

Chairman of the Board-Rector
of the South Kazakhstan State
Pedagogical University

_____ Г.Д.Сугирбаева

Хаттама № 11 «26.04» 2023 ж.   Протокол № 11 «26.04» 2023г.   Protocol № 11 «26.04» 2023у.

БІЛІМ БЕРУ
БАҒДАРЛАМАСЫ

7M01503   ИНФОРМАТИКА
ПЕДАГОГІН ДАЯРЛАУ

ОБРАЗОВАТЕЛЬНАЯ
ПРОГРАММА

7M01503   ПОДГОТОВКА ПЕДАГОГА
ПО ИНФОРМАТИКЕ

EDUCATIONAL
PROGRAM

7M01503   TEACHER TRAINING OF
COMPUTER SCIENCE

Шымкент 2023

EDUCATIONAL PROGRAM
7M01503 TEACHER TRAINING OF COMPUTER SCIENCE

Code and Classification of the field of education: **7M01 Pedagogical Sciences**

Code and classification of training course: **7M015 Training of teachers in natural sciences**

Awarded degree: **Master of pedagogical Sciences in the educational program 7M01503-«Teacher training of Computer science»**

Type of program: **Magistracy, 7 level NQF/SQF/ISCE**

Total amount of credits: **120 Academic credits**

The educational program was considered at a meeting of the Council of the Faculty of Physics and Mathematics and recommended for approval by the Academic Council of the University .
Protocol№ 7 «16» 03 2023y.

The educational program was approved by the decision of the Academic Council of the University recommended for approval by the Board.
Protocol№ 11 «26» 04 2023 y.

The rducational program was approved by the decision of the Board and put into effect.
Protocol№ 12 «22» 05   2023y.
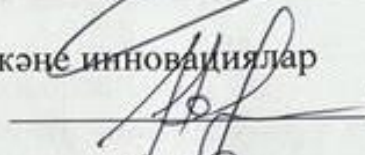
Келісілген:

Басқарма мүшесі - Академиялық мәселелер жөніндегі
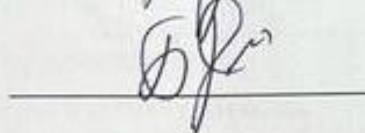проректор   Кудышева А.А.

Басқарма мүшесі - Ғылыми жұмыстар және инновациялар
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Түркістан облысы және Шымкент
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Абай атындағы Қазақ ұлттық педагогикалық университетінің
«Информатика және білімді ақпараттандыру»
кафедрасының меңгерушісі   Ошанова Н.Т.

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Abbreviations:

NQF	–	National Qualifications Framework
IQF	–	Industry Qualifications Framework
ISCE	–	International Standard Classification of Education
EP	–	Educational program
WC	–	Working curriculum
ISP	–	Individual study plan
CED	–	catalog of elective disciplines
CC	–	Core competencies
LO	–	Learning outcomes
ICT	–	Information and communication technology
CR	–	Current rating
LC	–	Landmark control
FG	–	final grade
GD	–	general disciplines
BD	–	Basic disciplines
SD	–	Specialized disciplines

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CONTENT

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INTRODUCTION

The educational program (here in after referred to as the EP) of the professional postgraduate education "7M01503- Teacher training of Computer science" is a normative document of a conceptual nature, based on the goals and values of the university education. It contains general information about the professional activity of the student; the goals and objectives of the EP; graduate's competency model; expected learning outcomes and their evaluation policies; methods and ways of organizing the educational process; content of modules and disciplines.

The educational program was developed on the basis of the request of employers in accordance with the Classifier of specialties of postgraduate education (magistracy), Teacher's Professional Standard, Dublin Descriptors Level 2, coordinated with the 2nd cycle of the Qualification Framework of the European Higher Education Area (A Framework for Qualifications of the European Higher Education Area), the 7th level of the European Qualifications Framework for Lifelong Learning (The European Qualifications Framework for Lifelong Learning) and the 7th level of the National Qualifications Framework of the Republic of Kazakhstan, taking into account the requirements regional labor market.

The main directions of the educational program:
- implementation of the educational policy of the university;
- high-quality training of highly qualified masters in demand on the international and national labor market;
- conducting fundamental scientific research in the field of informatics and computer technology;
- the introduction of a trilingual education at the university; expanding fluency in Russian and English to participate in international conferences, continuing education on academic mobility;
- the formation of the worldview of undergraduates, the development of their creativity, communication, critical thinking, research and information skills.

EP is the basis for the development of the following documents:
- catalog of elective disciplines;
- academic calendar of the educational process;
- the individual curriculum;
- working curriculum;
- working curriculum discipline (syllabus);
- educational and methodical complexes of disciplines;
- expected learning outcomes by the disciplines;
- criteria for evaluating the results of training by the disciplines;
- The organization of all kinds of professional practice, as well as other documents necessary for the organization of the educational process.

1. 1 PASSPORT OF THE EDUCATIONAL PROGRAM (EP)

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1.1 The scope of professional activity of the graduate

The graduate of the educational program "7M01503- Teacher training of Computer science" carries out his professional activities in the field of education and science.

1.2 Objects of graduate professional activity:
- the organization of technical and vocational education;
- organizations of higher and postgraduate education;
- pedagogical research institutions;
- Institutes of advanced training and retraining of education workers;
- governing bodies, authorized and local executive bodies, including education;
- state and non-state institutions related to the preparation of graduates of the scientific and pedagogical direction.

1.3 Types of professional activity of the graduate:
- training;
- research;
- organizational and managerial;
- educational;
- social and pedagogical.

1.4 Tasks of the graduate's professional activity
In the field of educational activity:
- development and deepening of theoretical and practical training of undergraduates, taking into account the updated educational programs;
- effective use of modern methodology of vocational training, design and management of the pedagogical process;
- diagnostics, correction and forecasting of the results of pedagogical activity, planning professional development;
- use of the latest educational IT-technologies;
- performing the functions of a teacher in organizations of technical, professional higher and postgraduate education.
In the field of research activities:
- study of the level of assimilation of the content of education, directions and prospects for the development of pedagogical science;
- study of the achievements of world and Kazakhstan science in the professional field, analysis and synthesis of advanced teaching experience in the field of science and education;
- implementation of methodological support of theoretical disciplines;
- integration of knowledge gained in the framework of mastering special disciplines for solving research problems in new conditions;
- development of students' research skills, motivating them for educational, cognitive and design and research activities;

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- conducting a pedagogical experiment, introducing its results into the educational process;

- generate their own new scientific ideas, transfer their knowledge and ideas to the scientific community, expanding the boundaries of scientific knowledge.

In the field of organizational and management activities:

- content planning and determination of methods for organizing and implementing the educational process at different levels;

- possession of the basics of strategic human resource management, innovation management, theories of leadership and team management;

- analysis, evaluation of the effectiveness of the educational process through the conduct of monitoring studies;

- the implementation of industrial relations with various organizations, including the bodies of state service;

- application in practice of the norms of the legislation of the Republic of Kazakhstan in the field of education and science.

In the field of educational activities:

- active in the organization of the educational process in a professional environment in accordance with the laws, laws, principles, educational mechanisms of the pedagogical process;

- solving specific educational tasks using various forms and means of organizing a developing environment at different levels of education;

- organization of educational work on the basis of Kazakhstan patriotism and civil responsibility;

- Creation of favorable conditions for the provision of pedagogical support and the development of full-fledged life activity, education of students.

In the field of social and educational activities:

- interaction with the professional community and all interested parties in education;

- the formation of a polycultural personality;

- observance of the pedagogical and scientific ethics of the research scientist;

- establishing relationships with student groups, partners, the scientific community based on the principles of respect, openness, mutual understanding.

2 FEATURES OF THE EDUCATIONAL PROGRAM

The program of postgraduate education "7M01503- Teacher training of Computer science" defines the purpose and objectives, expected results, conditions and technologies of the educational process, ways of implementation, assessment of the quality of graduate training in this area, the content of the working curriculum.

The implementation of the EP is provided by free access to international information networks, library collections and databases, computer technologies, scientific, educational and methodical manuals, developments on the modules

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taught and the implementation of a master's thesis.

3 PURPOSE AND VALUES OF THE EDUCATIONAL PROGRAM

3.1 Purpose and objectives of the educational program

The purpose of the educational program is to prepare competitive scientific and pedagogical personnel in the field of teaching computer science, possessing general cultural and professional competences in accordance with the requirements of the labor market.

Objectives of the educational program:

➢ the formation of key competencies necessary for the effective implementation of the professional activities of students;

➢ bringing the quality of postgraduate education in line with the requirements of national and international standards;

➢ provision of fundamental theoretical and methodical training of highly educated specialists;

➢ formation of professional knowledge and practical skills, taking into account the implementation of the objectives of the updated content of education;

➢ Motivation for professional development, promoting the development of independence, self-actualization of creative potential, active participation in the modernization of Kazakhstani society.

3.2 Values of the educational program

Values defined in the content of the postgraduate study EP:

❖ Kazakhstan patriotism and civil liability;

❖ respect for national values;

❖ universal and socio-personal qualities;

❖ Awareness of the social significance of the future profession;

❖ Motivation for personal, professional self-development;

❖ cooperation, openness, multiculturalism.

4 THE MODEL OF A GRADUATE

Model of the graduate of the educational program "7M01503- Teacher training of Computer science":

1. Subject knowledge: deep and complete understanding of the subject area, application of knowledge in professional activity.

2. Organizational and methodological skills: uses innovative technologies in planning, organizing and managing professional activities, shows critical thinking and creativity in solving complex problems.

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3. Research skills: conducts scientific and methodological research work, instills students in research work.

4. Leadership and entrepreneurial skills: the team can also work, be active in the renewal of society.

5. Cultural competence: has the ability to become a cultural and tolerant citizen of their country.

6. The ability to learn throughout life: coordinating their talents and interests with the needs of society.

7. Information skills: understands the essence of the information society, uses ICT in professional activities.

5 EXPECTED LEARNING RESULTS BY EDUCATIONAL PROGRAM

As a result of the successful completion of the educational program "7M01503- Teacher training of Computer science", a graduate must become a graduate specialist in demand in the modern labor market.

Learning outcomes for the educational program:

LO1-The ability to demonstrate knowledge and understanding, developing in the field of teaching computer science and IT, as well as the development of research methods in the development and application of ideas in the context of the study;

LO2-the ability to use their knowledge, ideas and creative abilities to solve professional and managerial problems in non-standard situations in a wider interdisciplinary context;

LO3 - demonstrate knowledge of information culture, digital technologies, foreign languages for the formation of their own opinion, taking into account social, ethical and scientific thought;

LO4-organization of a clear and thorough public communication of ideas, conclusions and problem solutions;

LO5-ability to integrate meta-subject knowledge to continue further education in the field of computer science teaching.

LO6- Adhering to the culture of academic honesty, gives a scientific and expert assessment of the text.

DUBLIN DESCRIPTORS SYSTEM
IN THE EDUCATIONAL PROGRAM

DUBLIN DESCRIPTORS (key words)	*Learning outcomes for the educational program:*	*Competences*
Knowledge and understanding	Ability to demonstrate knowledge and concepts developing in the field of computer science and IT education, as	Expansion of knowledge Increased

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	well as mastering research methods in the development and application of ideas in the context of research	knowledge
Application of knowledge and concepts	Ability to use their knowledge, insights and creativity to solve professional and managerial problems in non-standard situations in a wider interdisciplinary context	Tool (means)
Feedback expression	The ability to demonstrate knowledge of information culture, digital technologies, foreign languages for the formation of their own opinions, taking into account social, ethical and scientific thought	Systemic
Communication skills	To organize a clear and thorough public coverage of ideas, conclusions and problem solutions.	Communication
Learning Ability / Learning skills	Ability to integrate meta-subject knowledge to continue further education in the field of computer science teaching.	Systemic

6 POLICY ON EVALUATION OF ACADEMIC ACHIEVEMENTS

The program of the specialty "7M01503- Teacher training of Computer science" provides for a wide range of monitoring and evaluation of the expected learning outcomes: current and boundary control; intermediate certification (computer testing, exam, protection of practice reports); final state certification (comprehensive examination in the specialty, defense of a master's thesis).

Current control (survey in class, testing, tests, protection of research projects, portfolios, discussions, trainings, colloquiums, etc.) is considered as one of the means of managing the learning process. Verification of current learning outcomes is carried out on each topic of the discipline during classroom and extracurricular classes.

Boundary control is carried out during the academic period in the framework of this discipline twice.

The conformity of the learning outcomes and assessment methods

Learning outcome	evaluation method
ON 2, 3	Personal task
ON 4, 5	Portfolio

ON 1,2,3,4,5,6	accounting practices
ON 1,2,3,4,5,6	Boundary control
ON 1,2,3,4,5,6	Final certification

Current control - a systematic check of students' knowledge in accordance with the curriculum, conducted by the teacher in classroom and out-of-classroom classes during the academic period.

Midterm control – control of students' learning achievements at the end of a major section (module) of one academic discipline.

During one academic period there are two midterm controls.

The end-of-term control is posted in the electronic journal on a 100-point scale according to the academic calendar, on weeks 7 and 15.

Each discipline is taught during one academic period and ends with intermediate examination (control).

During the period of current control the teaching staff evaluates the students in practical, laboratory, seminar, studio, IWS (IWST/IWS, IWMT/IWM, IWDT/IWD), and other classes on a 100-point scale exhibiting in the electronic journal. The final score of the current control is calculated taking into account the weight share of points by types of classes. The weight share of points by types of classes is approved by the Academic Council of the University

Types of classes	Weight share
Lecture (L)	K_1
Practical (Seminar)　(P)	K_2
Laboratory (Z)	K_3
Studio (S)	K_4
IWS (B)	K_5

$$CC1(CC2) = K_1 \cdot L_{op} + K_2 \cdot P_{op} + K_3 \cdot Z_{op} + K_4 \cdot S_{op} + K_5 \cdot B_{op}$$

Average grades in L_{op}-lectures, in P_{op}-practical, по Z_{op}-laboratory classes, S_{op} – studio classes, in IWS$-B_{op}$

The final ranking score for weeks 7 and 15 is calculated as follows:
$$R1(P2) = 0{,}5 * CC1(CC2) + 0{,}5 * EC1(EC2)$$

R1 - the first rating, R2 - the second rating.

Calculation of the admission rating (AR) of the exam:
$$AR = \frac{R1 + R2}{2}$$

The exam admission rating must be **AR≥50**.

Current and midterm controls make up 60% of the student's final score, and the student gains the remaining 40% of the points in the exam.

The results of the intermediate examination are calculated using the formula given below:

Final assessment (FA) = 0,6 * AR+0,4 * E

Point-rating and alphabetic system for evaluating educational achievements students with their transfer to the traditional grading scale and ECTS

Evaluation of letter system	Digital equivalent	Points (% bonus content)	Evaluation of traditional system
A	4.0	95-100	Excellent
A-	3.67	90-94	
B+	3.33	85-89	Good
B	3.0	80-84	
B-	2.67	75-79	
C+	2.33	70-74	
C	2.0	65-69	satisfactorily
C-	1.67	60-64	
D+	1.33	55-59	
D-	1.0	50-54	
F+	0.5	25-49	unsatisfactorily
F	0	0-24	

7 METHODS AND WAYS OF ORGANIZING THE EDUCATIONAL PROCESS

The organization of the educational process is carried out according to the credit technology on the basis of the electiveness of the disciplines and the order of mastering the modules, carrying out the independent work of the undergraduate, teaching and research practice, preparation and defense of the master's thesis.

Tasks of the organization of the educational process:

- unification of knowledge;
- creation of conditions for maximum individualization of training;
- strengthening the role and effectiveness of independent work of students;
- identification of educational achievements of a student on the basis of an effective and transparent procedure for monitoring their scientific and educational activities.

Credit training opportunities:

- the introduction of a system of academic credits to assess the labor costs of students and teachers in each discipline;
- participation in the formation of an individual curriculum;
- the choice of a component of the module in the catalog of elective disciplines;
- Freedom of choice for a teacher;
- choice of educational trajectory with the help of an adviser;
- use of interactive teaching methods;
- academic freedom in the formation of educational programs;
- providing the learning process with the necessary EMCD;

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- The use of effective methods of monitoring student achievement;
- the use of a point-rating system for evaluating educational achievements in each discipline and other types of independent work.

Applied teaching methods and technologies

The development of EP is provided by pedagogical technologies:
- ➢ acmeological (technology to achieve success, high results);
- ➢ psychotechnology (development of skills for constructive creative actions based on critical, associative, abstract thinking);
- ➢ informational (implemented on the basis of the AIS "https://platonus.okmpu.kz/" when using training resources, presentations, conducting automated testing; AOR on the Bilim Media Group portal);
- ➢ interactive learning technologies.

The following methods are used as components of these technologies:
- ➢ reflexive;
- ➢ research (learning through discovery);
- ➢ training;
- ➢ design;
- ➢ Case study and others.

Types of used methods and technologies of training are chosen by the teacher independently.

The system of internal quality assurance of educational activities of a student is determined by:
- quality policy;
- development and approval of educational programs being implemented;
- student-centered learning, teaching and assessment;
- admission of students, performance, recognition and certification;
- teaching staff;
- learning resources and student support system;
- information management;
- public information;
- continuous monitoring and periodic evaluation of programs;
- periodic external quality assurance.

Professional practice

The compulsory component of EP "7M01503- Teacher training of Computer science" is the practical training of undergraduates providing for pedagogical (at least 5 credits) and research (at least 10 credits) practice, as well as professional (scientific) internship.

The purpose of pedagogical practice is the acquisition of practical skills of the professional and pedagogical activity, the strengthening of the motivation for pedagogical work in an educational institution (including higher education).

Requirements for pedagogical practice:

1) have an idea of the basic methods of psychological and pedagogical research; on the theoretical foundations of the design and conduct of psychological and pedagogical research;

2) know the basics of teaching activities in educational programs and apply, in consultation with more experienced colleagues; principles of organization of independent work and ways of organizing research activities;

3) to be able to make personal choice in specific professional situations; carry out teaching activities in educational programs, in consultation with experienced colleagues; determine educational objectives, types and types of classes, use various forms of organization of educational activities of students; diagnose, choose the type of control and evaluate the effectiveness of educational activities.

4) own the techniques and technologies of organizing and evaluating the results of research activities; skills in implementing educational programs; the basics of scientific, methodological, educational and methodical work: structuring skills and psychologically competent transformation of scientific knowledge into educational material, systematization of educational and educational tasks; methods and techniques for drawing up tasks, exercises, tests on various topics, oral and written presentation of the subject material, a variety of educational technologies.

Report on the results of teaching practice

Attestation on the basis of pedagogical practice is carried out on the basis of a written report, diary and review of internship prepared in accordance with the established requirements by the practice leader. In a review, the manager assesses the development of skills in pedagogical activity, attitudes towards work performed, and practice (degree of responsibility, independence, creativity, interest in work, etc.). The report on pedagogical practice should contain information on the specific work performed during the internship period.

The research practice of the undergraduate is conducted in order to study the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as consolidate practical skills, apply modern methods of scientific research, process and interpret experimental data in the dissertation research. The content of research practice is determined by the theme of the dissertation (project) research.

During the period of research practice the undergraduate must prepare independently 4-5 abstracts (each of not less than 50 pages) with their own conclusions and conclusion: on the latest theoretical achievements of domestic and foreign science; on the latest methodological achievements of domestic and foreign science; on technological (innovative) achievements of domestic and foreign science; on the application of modern methods of scientific research, processing and interpretation of experimental data using computer technology.

Competency requirements (research practice):

1) to have an idea about the possibilities of advanced scientific methods and their use at the level required in the study of pedagogical problems; about research, innovation activities in the field of vocational training;

2) know the wording of the initial prerequisites, the initial concept, the justification of the choice of the topic, purpose and main objectives of the study; methods of literary search, generalization and systematization of data published on

the subject under study, as well as their note-taking, summarization and discussion of the problem with the supervisor; the current state and prospects of development of educational processes, features of the activities of a vocational training institution; research methods of pedagogical processes; achievements of science and technology of education, advanced domestic and foreign experience in the field of vocational education.

3) to be able to formulate and solve problems arising in the course of research and educational activities and requiring in-depth professional knowledge; select the necessary research methods, modify existing and develop new methods, based on the objectives of a specific study; process the obtained experimental results, analyze and interpret them taking into account the available literature data; to conduct bibliographic work with the involvement of modern information technologies; present the results of the work done in the form of reports, abstracts, articles, designed in accordance with the existing requirements, with the involvement of modern editing and printing tools; to make educational and methodical complexes of disciplines; rationally organize the conduct of all types of training sessions;

4) have the skills to plan and conduct research; use of foreign languages in the amount necessary for the implementation of research activities;

5) to be competent in matters of organization, planning, conducting scientific activities.

Research Practice Report

Attestation on the basis of the practice is carried out on the basis of a written report, diary and review of the internship, drawn up in accordance with the established requirements, prepared by the supervisor. At the initial stage, the supervisor assesses the formation of research skills, attitudes towards work, practice (degree of responsibility, autonomy, creativity, interest in work, etc.), which he sets out in the recall.

Attestation on the basis of practice

According to the results of professional practices at the department (scientific seminar), reports are being protected with the participation of all undergraduates of one specialty or one direction.

The results of professional practices are evaluated by the results of protection. The head of the practice, on the basis of a review of its results and the report of the undergraduate, makes a conclusion about the quality of the undergraduate's practice and gives a mark in the form of a differentiated test. Evaluation of the practice is recorded in the examination sheet and IPK "Univer 2.0", is equal to the estimates of theoretical training and is taken into account when summing up the overall academic performance of undergraduates and assignment to a scholarship in the relevant semester.

Criteria for assessing the quality of the practice by the undergraduate trainee:

1. The overall assessment of the practice carried out is derived on the basis of the arithmetic average of the points for all assessment indicators applicable to the practice.

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2. Evaluation criteria (average score) for all positions:

3.5 - the practice does not meet the modern requirements of the organization of the educational process at the university;

3.6-3.9 - general conclusion: the practice carried out meets the modern requirements of the organization of the educational process at the university;

4.0-4.5 - a general conclusion: the practice carried out fully meets the modern requirements of the organization of the educational process at the university;

4.6-5.0 - general conclusion: the practice is qualifying and meets the modern requirements of the organization of the educational process at the university.

8 RESEARCH WORK OF THE MASTER STUDENT

The educational program "7M01503- Teacher training of Computer science" contains a research paper, including the implementation of a master's thesis, which should:

1) to comply with the main issues of the specialty, for which the master's thesis is defended;

2) be relevant, contain scientific novelty and practical significance;

3) to be based on modern theoretical, methodological and technological achievements of science and practice;

4) performed using modern research methods;

5) contain research (methodological, practical) sections on the main protected provisions;

6) based on international best practices in the relevant field of knowledge.

The results of research work at the end of each period of their passage are recorded by the undergraduate in the form of a report. According to the results of the research and development work carried out at the department (scientific seminar) reports are being protected with the participation of all undergraduates of one specialty or one direction.

Within the framework of the research and development work, the individual work plan of the undergraduate to get acquainted with innovative technologies and new types of production provides for mandatory scientific internships in scientific organizations and / or organizations of relevant industries or fields of activity.

The final result of the research work of the undergraduate is a master's thesis (master's project).

9 CONTENTS OF THE EDUCATIONAL PROGRAM
9.1 Compliance of the educational results with the educational program to the formed competencies

The learning outcomes defined in the EP form the competencies acquired by the master student after the completion of the program.

Matrix of correlation of learning outcomes for the educational program in general with formed competencies (FC)

EP	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6
FC 1			+	+		+
FC 2		+		+		
FC 3		+	+			+
FC 4	+		+	+		
FC 5	+	+			+	+
FC 6	+				+	

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9.2 Information about the modules

№	Module name	Module composition	Brief module description	Module learning outcomes	Cycles	Amount of credits	Expected learning outcomes
1	Professional and humanitarian disciplines (PHD01)	History and philosophy of science Foreign language (professional) Higher school pedagogy Psychology of management Pedagogical practice	The module is designed to form the worldview, civil, moral position of the future specialist, the formation of competitive communication programs in Kazakh, Russian and foreign languages based on the development of information and communication technologies, the development of professional skills in economics and law, the foundations of anti-corruption culture, ecology and security life, as well as the acquisition of professional skills, the formation of skills of perception of innovation.		BD	20	FC 1, 2, 3, 4, 5 LO 2,3,4,5

2	Scientific and methodical training (SMT02)	1. Organization and planning of scientific research on the theory and methodology of teaching computer science 2. Research methodology from the theory and methodology of teaching computer science	The module examines topical issues and the foundations of the methodology, the main stages of the development of pedagogical science, the concept of a holistic pedagogical process; methods, forms, means, forms and methods of educational work and pedagogy; organization and design of inclusive education, psychological and pedagogical support of children with disabilities in terms of inclusive education, ICT in inclusive education.	LO1-ability to choose the direction of scientific research, research methods from the theory and methodology of teaching computer science. LO2-ability to prepare scientific work from the theory and methodology of teaching computer science. LO3-ability to develop a scientific and methodical article. LO4-solution of professional problems with the study of the new education system. LO5-ability to express their opinions on the content and requirements of computer science textbooks. LO6-Be able to develop an elective course	BD	15	FC 1, 2, 3, 4, 5, 6 LO 1, 2, 3, 4, 5,6
		1. Scientific foundations of teaching computer science at the Higher School 2. Scientific foundations of teaching methods of informatics in educational institutions of technical and vocational education					
		1. Problems of textbooks on computer science in educational institutions of technical and vocational education 2. Designing elective courses in educational institutions of technical					

| 3 | Module of digital educational resources (MDER03) | Problems of informatization of education and training
1. Creation of mobile applications2. The use of mobile technologies in the educational process
1. Web-based e-learning
2. Digital educational resources in the educational process

1. Designing digital educational resources in the educational process
2. Development and use of educational electronic publications and Internet resources | and vocational education

This module forms an IT specialist who profiles the creation of digital educational resources (CRS).
The module is aimed at studying the e-learning method; tools and technologies for creating digital educational resources; principles of using educational portals; online competitions; distance learning; IT StartUp to promote innovative projects. | curriculum for secondary schools.

LO1-ability to integrate knowledge in the field of informatization and learning.
LO2-Knowledge of creating -Web-applications.
LO3-ability to create digital educational resources.
OP4-ability to develop and use Internet resources.
LO5-ability to work with models of cloud services.
OP6-The ability to work with technologies Big Data | PD | 22 | FC 1, 2, 3, 4, 5, 6
LO 1, 2, 3, 4, 5,6 |
| 4 | **Module of special disciplines of computer science** | Scientific research methods and academic writing
1. Introduction to the Internet of Things | Modular training is aimed at training a programming specialist to develop software applications. The module aims to develop forming students' | LO1 Startup IT Startup.
LO2-mastering machine learning algorithms.
LO3-skill to make a robot. | PD | 31 | FC 1, 2, 3, 4, 5, 6
LO 1, 2, 3, 4, 5,6 |

			writing culture, critical thinking skills and linguistic - pragmatic competencies; study of robotics, principles of machine learning, neural network, Internet of things, Blockchain technology; studying the basic principles of machine learning and the Internet of things; development and promotion of IT-StartUp projects.	LO4-Mastering technology modeling programs. LO5-the ability to develop applications for mobile devices. LO6-Ability to develop IT-StartUp projects.			
	(MSDCS04)	2. Introduction to Machine Learning					
		1. Fundamentals of robotics in education 2. Cloud technologies in education					
		1. STEM education 2. Smart technologies in education					
		Research practice					
5	**Scientific research work (SRW05)**	Research work of a master student, including an internship and a master's thesis (RWMS)	The directions, ways of research work and requirements for the preparation of a master's thesis are considered. It focuses on the formulation of a scientific goal, the choice of effective research methods, the processing and practical application of results, the integration of modern science methodology, developing knowledge and concepts in the field of informatics and IT. Organization with the help of digital technologies in the	LO 1-selects the direction, the topic of scientific research and formulates goals and objectives. LO2-selects and analyzes the scientific and methodological literature. LO3 - is conducting an experiment using scientific methods. LO4 - summarizes the results of the study and publishes in the form of articles.	SRW	24	

		public communication of the results of research.	LO5-generalizes, verifies research work, proves his point of view. LO6- publicly defended a master's thesis.		
	Registration and defense of a master's thesis (RDMT)			8	
	Total			**120**	

9.3 Information about the disciplines

№	Name of disciplines	Brief description of disciplines	Credit quantity	Formed LO (codes)					
				LO1	LO2	LO3	LO4	LO5	LO6
		Cycle of basic disciplines **Higher education component**							
1	History and philosophy of science	The subject studies the process of the formation of scientific achievements, the development of philosophical thoughts of various times of mankind. The article considers philosophical concepts, theories from ancient times to modern times, as well as their influence on modern science. The basis of the study of the subject of the history of philosophy and science is the full coverage of theories, research methods, as well as ontological and epistemological directions in philosophical science.	4		+		+		
2	Foreign language (professional)	A practical course in a foreign language is aimed at: the formation of the intercultural, communicative and functional competence of undergraduates; development of lexical and language features in English;	5			+		+	

№	Discipline	Description	Credits						
		development of argumentation skills in a foreign language and understanding of the cultural characteristics of English-speaking countries; bringing thoughts with the right choice of the appropriate language tools taking into account socio-cultural norms							
3	Higher school pedagogy	Discipline considers the directions, structure of the study of the pedagogy of higher education, the system of general epistemological teachings; new methods and an empirical basis for the development of pedagogy through the use of means of vocational and pedagogical dialogue; personality formation at the stages of ontogenesis	3		+		+		
4	Psychology of management	Discipline considers the basic concepts of management psychology, psychological support of management as a special type of social activity; directions and principles of modern psychological management, selection of effective strategies for cooperation with social partners; special patterns of pedagogical and psychological education.	3		+		+		
		Cycle of basic disciplines **Component of choice**							
5	Organization and planning of scientific research on the theory and methodology of teaching computer science	Choosing the direction and methodology of research in teaching computer science, identifying problems and research topics, mastering the initial stage of research, the basics of information retrieval theory, structural units of research, the process of research, empirical research methods, the use of creative approach in solving non-standard professional issues in an interdisciplinary context , public awareness skills on the results of the study.	5	+	+		+		+
6	Research methodology from the theory and methodology of teaching computer science	The discipline examines the methodology and methodology of scientific research; classification of teaching methods, pedagogical technologies, pedagogical activity; creative approach to solving problems; research; computer science teaching; private didactic methods of vocational training; taxonomy of learning tasks; diagnostics of computer science knowledge; criteria-based assessment; skills in public informing on	5	+	+		+		+

23

№	Name	Description							
		research results and ideas.							
7	Scientific foundations of teaching computer science at the Higher School	The discipline examines the scientific basis for the formation of a system-informational image of the world; fundamental concepts of computer science; programming language paradigms; architectural features of computer systems; principles of database construction; fundamentals of robotics and web programming in education. Involves mastering creative skills at the professional level to solve analytical and managerial problems of integrating interdisciplinary knowledge	5	+	+			+	+
8	Scientific foundations of teaching methods of informatics in educational institutions of technical and vocational education	Examines scientific approaches in teaching informatics and IT-fields, applying new forms and methods of teaching with the help of modern technologies on the basis of an updated program, developing knowledge and concepts, didactic training foundations, problems of project programming, studying the new education system. Communication is aimed at solving creative and professional problems, developing critical thinking.	5	+	+			+	+
9	Problems of computer science textbooks in educational institutions of technical and vocational education	Discipline examines trends in the education system; problems of the information society, globalization; requirements for the content, changing the nature and objectives of the textbook updated content; publication, introduction of textbooks; transition to electronic versions of textbooks; a system for analyzing and assessing the quality of textbooks in several languages is considered. Involves the ability to integrate knowledge in the formation of non-standard situations, creative abilities	5	+	+			+	+
10	Design of elective courses in educational institutions of secondary vocational education.	The subject examines training departments of entrepreneurship, economics, financial literacy, drawing up business plans, financial analysis. Teaches the ability to study the formation of their opinions and integrate knowledge in the design of problem-solving results, drawing up business plans, solving financial, econometric problems, the capabilities of computer technologies for solving professional and managerial problems in unusual situations.	5	+	+		+		+

<table>
<tr><td colspan="10" align="center">Cycle of Profiling discipline
Component of a higher education institution</td></tr>
<tr>
<td>11</td>
<td>Problems of informatization of education and training</td>
<td>The subject considers developing knowledge and concepts, research methods in the field of informatization of education. Owns the main directions and tasks of informatization of knowledge, technical means, factors affecting them, concepts, components, features of the information educational environment and space. Directed to the implementation of the integration of knowledge in the field of information and education.</td>
<td>6</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
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<tr>
<td>12</td>
<td>Scientific research methods and academic writing</td>
<td>Formation of students' skills in a structured presentation of their own ideas, mastering ways of working with various scientific and scientific information sources, taking into account the specifics of academic discourse. The discipline forms students' writing culture, critical thinking skills and linguistic - pragmatic competencies, improves written language culture through their language, gives an idea of the principles and culture of academic honesty.</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr><td colspan="10" align="center">Cycle of Profiling discipline
Component of choice</td></tr>
<tr>
<td>13</td>
<td>Creation of mobile applications</td>
<td>The discipline is aimed at mastering the theoretical foundations of the Scrum methodology, developing knowledge and concepts in the field of learning Android / IOS mobile applications, research methods. Developing a list of tasks for creating an information system, developing and implementing a project based on programming sprints, digital technologies, applying marketing marketing procedures on the Internet and integrating knowledge in the field of IT.</td>
<td>5</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>14</td>
<td>The use of mobile technology in the educational process</td>
<td>Discipline examines ways of operational access, processing, registration of reference, information and educational materials training in the field of IT. Training will be aimed at obtaining educational information through the educational portal of a training organization adapted to mobile</td>
<td>5</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
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</table>

№	Discipline	Description	Credits						
		devices, participation of discussions in on-line, off-line modes to form their own opinion of these resources, provides for the integration of the use of knowledge and technology in the development of projects.							
15	Web-based e-learning	Discipline examines the legal norms, principles, features, strategic aspects of the e-education system, material support, choice, evaluation of the effectiveness of e-learning tools on the Web-platform, policy and initiative basics of its implementation in higher education. Provides for the organization of a clear and thorough public communication of the findings and problem solutions using digital educational resources in the design work.	5	+	+		+		+
16	Digital educational resources in the educational process	The subject of digital educational resources in the educational process, as the interaction of subjects of the educational process with interactive distances, includes: the creation of a set of information and educational e-learning environment; preparation of didactic materials on electronic media; work with electronic resources, online analysis, multimedia kits. Preparation of design work, provides for the publication of ideas to the public.	5	+	+		+		+
17	Designing digital educational resources in the educational process	The discipline provides for the design, development of software applications for the CRA, maintenance, implementation in the educational process of software applications of the CRA, the conduct of experimental reflection work on the results of use. With proper design of the CRM, to be able to integrate metasubject knowledge, provides for the publication of an idea to the society when promoting IT Startup implementations.	6	+	+		+		+
18	Development and use of educational electronic publications and Internet resources	The discipline provides for the design, development of software applications for the CRA, maintenance, implementation in the educational process of software applications of the CRA, the conduct of experimental reflection work on the results of use. With proper design of the CRM, to be able to integrate metasubject knowledge, provides for the publication of an idea to the society when promoting IT Startup	6	+	+		+		+

№	Subject	Description	5						
		implementations.							
19	Introduction to the Internet Things.	The subject examines the basic concepts and knowledge, the tasks of the Internet subject, training in hardware, software and network software, designing an IoT system, developing basic functionalities, network connections, formats and types of transmitted data. Implements promotion and ways to implement integration using the selected tool in the project, using professional and creative abilities of IT Startup	5	+	+			+	
20	Introduction to machine learning	Discipline considers the development of general methods of machine learning - without a teacher and with a teacher, the basic algorithmic methods of teaching, research methods in an interdisciplinary context. Machine learning algorithms are aimed at studying computers in the input data, the use of statistical analysis to derive values, provides for the use of metasubject knowledge and creative ability to solve professional problems.	5	+	+			+	
21	Fundamentals of robotics in education	Discipline examines the implementation of practical tasks collected and programmed on the basis of LEGO, Arduino, diagnostic methods, reading data from sensors of assembled devices, data processing, receiving and transmitting them from smartphones, computers, the Internet. Development of components, schemes, writing a program, creating a project, its promotion of ideas is carried out using professional and creative abilities in IT Startup.	5	+	+		+		
22	Cloud technologies in education	Discipline examines integration of "Provision of cloud services" models: Amazon WebServices, Microsoft Azure Amazon, Oracle BI, Azure ML. It assumes mastering concept of cloud technologies, ability to use theoretical knowledge and creative abilities of	5	+	+		+		+

№										
		architecture cloud technologies, methods, features of designing cloud services, ability to organize idea for cloud platforms.								
23	STEM education	The discipline is aimed at studying modern trends in the development of education; an interdisciplinary approach to the organization of training; features of the implementation of STEM education in the Republic of Kazakhstan; the main conditions for the introduction of STEM technologies in school and types of STEM technologies; educational technologies for involving students in scientific and technical creativity; the basics of bototechnical design, programming and modeling of robots.	5	+	+		+		+
24	Smart technologies in education	The course includes the formation of students' necessary competencies in the field of new information, communication and interactive technologies, in the formation of skills to create their own interactive programs for visualizing educational material and improving the quality of teaching. The study of the features and main directions of the use of ICT as a means of teaching and managing the learning process at the teacher level. Interactive SMART technologies in education.	5	+	+		+		+