

EDUCATIONAL PROGRAM
6B01501 TEACHER TRAINING OF MATHEMATICS

Code and Classification of the field of education:	6B01 Pedagogical Sciences
Code and classification of training course:	6B015 Teacher training of in natural sciences subjects
Awarded degree:	Bachelor of Education in the educational program 6B01501 Teacher training of mathematics
Type of program:	Bachelor, the 6 th level NQF/ SQF / ISCE
Total amount of credits:	240 Academic credits / 240 ECTS

The educational program was reviewed at the Council of the Physics and Mathematics Faculty and recommended for approval by the Academic Council of the University.

Protocol No 09 « 26.04 » 2023

The educational program was reviewed by the Academic Council of the University and recommended for approval by the Board

Protocol No 11 « 26.04 » 2023

The educational program was approved by the decision of the Board and put into effect.

Protocol No 12 « 22.05 » 2023

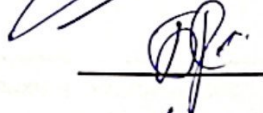
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Abbreviations:

- NQF - National Qualifications Framework*
- IQF - Industry Qualifications Framework*
- ISCE - International Standard Classification of Education*
- EP - Educational Program*
- WC - Working curriculum*
- PED - Product elective disciplines*
- KC - Key competencies*
- LO - Learning Outcomes*
- ICT - Information and communication technologies*
- LC - Landmark control*
- CC - Current control*
- FG - The final grade*
- GED - General educational disciplines*
- BD - Basic disciplines*
- SD - Specialized disciplines*

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INTRODUCTION TO EDUCATIONAL PROGRAM

This educational program (hereinafter - EP) is a normative document of a conceptual nature, based on the goals and values of university education, containing general information about the professional activities of graduates, aims and objectives of EP of competence graduate model, the expected learning outcomes and policies of their evaluation of methods and methods of organization of educational process on the content of the program.

The main directions of EP:

- implementation of the educational policy of the University;
- implementation of trilingual education through the organization of educational process in the Kazakh, Russian and English languages;
- improving the quality of the learning process on the basis of competence approach;
- the willingness of students to educate themselves throughout their lives;
- formation of the outlook of students, develop their creativity, communication, critical thinking, research and information capabilities.

EP is the basis for the development of the following documents:

- Catalog elective subjects (CES);
- Academic calendar of the educational process;
- Individual educational plan (IEP);
- Working curriculum (WC);
- Working curriculum subjects (SYLLABUS);
- Teaching materials disciplines (TMD);
- expected results in the disciplines of learning;
- criteria for assessing the results of training in the disciplines;
- organizing all kinds of professional practice, as well as other documents necessary for the educational process.

1 PASSPORT OF THE EDUCATIONAL PROGRAM

1.1 Scope of professional activity of graduates

Bachelor of Education OP "6B01501- «Training of mathematics teacher» carries out his professional activities in the field of education.

1.2 The objects of professional activity of graduates:

- basic and specialized schools;
- specialized schools;
- the organization of technical and vocational post-secondary education.

1.3 Types of professional activity of graduates:

- training;
- educative;
- methodical;
- research;
- social and communicative.

1.4 Objectives of professional activity of graduates

Training:

- training and development of students;
- the organization of educational process in professional activities;
- design and management of the pedagogical process;
- diagnosis, correction and prediction of the results of educational activities.

Educative:

- the involvement of students in the system of social values;
- implementation of educational work in accordance with the laws, the laws, the principles of the educational process, educational mechanisms;
- planning extracurricular educational work;
- addressing specific educational objectives;
- the use of various forms and methods of training and education of students in extracurricular activities;
- liaising with groups of students, subject teachers and parents.

Methodical:

- implementation of methodological support of the educational process;
- planning the content of education at different levels;
- identification of methods for the organization and implementation of the educational process;
- the use of new educational technologies in the learning process.

Research:

- the study of the level of assimilation of the content of education, the study of the educational environment;
- the development of scientific and methodical literature;
- analysis and generalization of the advanced pedagogical experience in the field of education;
- conducting of pedagogical experiment, the introduction of its results in the educational process.

Social and communicative:

- the implementation of cooperation with the professional community and all interested education stakeholders;
- the formation of a multicultural identity;
- creation of favorable conditions for education and development of students and provide them with educational support.

2 FEATURES OF THE EDUCATIONAL PROGRAM

Subdivision of higher education "6B01501- «Training of mathematics teacher» was developed in accordance with the European Qualifications Framework, National Qualifications Framework, the Dublin descriptors, Industry frame of qualifications, professional teacher standards to meet the requirements of the regional labor market and employers.

OP determines goals, expected results, conditions and techniques of the educational process, the realization of quality assessment preparation graduate in this area, the contents of the working curriculum.

Features of OP:

- Presentation of the graduate's competence model taking into account the competence approach based on the modern educational paradigm. The competence model corresponds to three main goals defined in accordance with the strategic development plan and the mission of the University. As a result of the development of the educational program aimed at the formation of General cultural, professional and special competencies of the graduate, the expected results of training are determined. In the content of the OP, on the basis of the updated educational program, the share of methodical disciplines is increased.
- Development of educational programs such as "Major-minor" with the main and additional sections of training, allowing to maximize the competitiveness of the institution and the student, as well as to employ graduates. Advantages of "Minor": expansion of interdisciplinary communication and competence. For this reason, two modules "Mathematician-analyst" and "Mathematician-tutor" have been introduced, which form additional competencies of students in demand in the labor market.

3 PURPOSE AND VALUES EDUCATION PROGRAM

3.1 The purpose and objectives of the educational program

The main objective of OP is defined in accordance with the objectives of the Strategic Plan and the development of the University's mission.

Purpose of the Educational Program: Preparation of the teacher of mathematics in accordance with the requirements of the labor market and the National qualification system.

Tasks of the educational program:

- formation of core competencies needed for effective implementation of the professional activities of students;
- the formation of social responsibility training based on interpersonal values and professional ethics;
- bringing the level of quality of education in line with the requirements of national and international standards on the basis of motivation of training to professional development, self-realization;
- the formation of students' professional knowledge and practical skills based on the updated content of education;
- providing training of highly educated professionals who are actively involved in the modernization of society on the basis of language trinity, functional literacy, healthy lifestyle.

3.2 Values of the Educational Program

The core values defined in the contents of EP:

- ❖ Kazakhstan patriotism and civic responsibility;
- ❖ honesty
- ❖ respect;
- ❖ cooperation;
- ❖ openness.

4 GRADUATE MODEL

1. **Subject knowledge:** wide and deep understanding of their subject area, applies the knowledge in their professional activities.
2. **Organizational and methodological skills:** uses innovative technologies in planning, organization and management of professional activities, shows critical thinking and creativity in solving complex problems.
3. **Research skills:** conducts scientific and methodological work, attracts students to research work.
4. **Leadership and entrepreneurial skills:** able to work in a team, is active in the renewal of society
5. **Cultural competence:** has the ability to be a cultural and tolerant citizen of his country.
6. **The ability to learn throughout life:** coordinating their talents and interests in accordance with the needs of society.
7. **Information skills:** understands the essence of the information society, uses ICT in professional activities.

5 EXPECTED RESULTS TRAINING ON EDUCATIONAL PROGRAMS

Learning outcomes of OP: Upon successful completion of this OP student must:

- **LO1** - demonstrates knowledge and concepts in basic and specialized subjects mathematics;
- **LO2** - applies knowledge in practice in proofs and reasoning of mathematical statements, based on a critical approach to problem solving and systems thinking;
- **LO3** - анализирует пути решения проблем на основе применения моделирования в познавательных, профессиональных и научных исследованиях;
- **LO4** - argues for the place and role of discipline in real life, in the system of sciences;
- **LO5** - uses ICT in the organization of the educational process in the personal interests of the student and teaching mathematics;
- **LO6** - применяет инновационные технологии в соответствии с целями и задачами обучения и индивидуальными особенностями учащихся;
- **LO7** - uses technologies of criteria assessment, diagnostics, drawing up a short-term lesson plan;
- **LO8** - демонстрирует коммуникативность, навыки работы в команде и информационную культуру в межличностном общении;
- **LO9** - integrates subject and interdisciplinary knowledge in the formation of the student's personality quality, in lifelong learning;
- **LO10** - оценивает креативность решений проблем, возникающих в спорных ситуациях, в практике использования технологий и инклюзивного образования;

6 POLICY ASSESSMENT OF EDUCATIONAL ACHIEVEMENT

In order to verify the learning achievements of students, the university provides for the following types of knowledge assessment control (formation of expected learning outcomes):

- current control;
- midterm control;
- intermediate examination;
- final examination.

For all types of control of students' learning achievements (current control, midterm control, interim and final examination) the technology of criterion evaluation is used. Assessment is carried out according to the table on the letter-rating system.

Assessment of students' learning achievements on the traditional scale and point-rating letter system (ECTS)

Letter grade	Digital equivalent of points	Points (% content)	Traditional assessment 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	satisfactory
C-	1,67	60-64	
D+	1,33	55-59	
D-	1,0	50-54	
FX	0,5	25-49	unsatisfactory
F	0	0-24	

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, in 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:

$$R1(P2) = 0,6 * CC1(CC2) + 0,4 * EC1(EC2)$$

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 $AR \geq 50$.

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:

$$\text{Final assessment (FA)} = 0,6 * AR + 0,4 * E$$

Appropriateness of learning outcomes and assessment methods

Learning outcomes	Assessment methods
LO 1,2,3, 5,6,7,8,10	Activity in classroom training
LO 2,3, 7, 10	Essay
LO 2,3,4, 8	Group presentations
LO 2, 3, 6,7, 8	Project preparation (group work)
LO 1, 3, 5	Individual assignment
LO 6, 7, 10	Flipped Classroom Technology
LO 1,4,7,10	Case study
LO 1, 2, 3, 4	Scientific research
LO 8,10	Gamification
LO 2,5	Portfolio
LO 5, 6,7,9, 10	Practice report
LO 1-10	Final intermediate control
LO 1-10	Final examination

7 METHODS AND TECHNIQUES FOR THE IMPLEMENTATION OF THE ORGANIZATION OF EDUCATIONAL PROCESS

Organization of educational process is carried out on credit technology based on the choice of studying the discipline, order the development of disciplines and modules.

Tasks of the organization of educational process:

- unification of knowledge;
- creation of conditions for maximum individualization of instruction;
- strengthening the role and effectiveness of independent work of students;
- Identification of educational achievements of students on the basis of an efficient and transparent procedures for their control.

Training opportunities on credit technology:

- the introduction of academic credits system to assess the labor costs of students and teachers in each discipline;
- participate in the formation of the individual curriculum;
- the choice of subjects and modules in the catalog of elective courses;
- the freedom to choose teacher training;
- the choice of an educational path with the help of student advisors;
- the use of interactive teaching methods;
- academic freedom in the formation of educational programs;
- providing of training necessary teaching and learning materials;
- the use of effective methods of control of educational achievements of students;
- the use of score-rating system of evaluation of educational achievements of each discipline, and other forms of self-study.

The methods and technologies of training:

- ❖ reflexive techniques considered as a central object of study;
- ❖ competence-based approach to learning;
- ❖ role-playing games;
- ❖ educational discussions;
- ❖ Case Study;
- ❖ Gamification;
- ❖ design methods.

Types of methods and technologies of training to choose the teachers themselves.

Integrated learning makes it possible to conduct classes with a wide use of interdisciplinary connections. An integrated approach in teaching chemistry is necessary for the formation of a holistic worldview and worldview, the unification and mutual influence of students' educational and research practices.

Research practice is aimed at expanding and consolidating the theoretical and practical knowledge gained by students in the learning process, acquiring and improving practical skills.

Tasks for the development of research skills of students:

- ability to see problems
- ability to put forward hypotheses
- the ability to ask questions
- the ability to define concepts
- ability to classify

Adaptive technologies used for students with special educational needs (SEN).

For students with special educational needs (SEN), the following forms of organization of the educational process and knowledge control are provided:

for the visually impaired there is an opportunity:

- the use of training and handouts printed in large print;
- the use of reference notes for recording lectures;

Opportunities for the deaf and hard of hearing:

- to take a comfortable place in the audience;
- the use of visual reference diagrams in lectures to facilitate understanding of the material;
- preferential performance of educational tasks in writing;
- increasing the time for the analysis of educational material.

The main form of organization of the educational process in groups with SEN is integrated learning, i.e. all students study in mixed groups for adaptation in society. For students with special educational needs, it is planned to provide educational and methodological aids in printed and electronic forms in agreement with the lecturer conducting the classes.

For students in groups with special educational needs are given the opportunity of distance learning, in case of deterioration of their health status, which has the conclusion of a medical advisory commission.

Methods for achieving learning outcomes	Learning outcomes									
	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10
Lecture	+		+	+		+			+	
Practical method	+	+	+		+	+			+	
Seminar				+				+		+
Laboratory method		+			+	+		+	+	
Interactive lecture	+		+		+					
Project method			+	+	+			+	+	+
Case study	+	+	+					+	+	
Educational discussions			+	+		+		+	+	
Group work					+	+	+	+	+	+
Problem-based learning	+	+	+							
Reflexive learning	+	+				+			+	+
Dialog learning		+						+	+	
Critical learning					+			+	+	+
Gamification	+		+			+			+	

internal quality assurance system educational activities aimed at improving the quality of educational services is determined by:

- policy in the field of quality assurance;
- development and approval of ongoing educational programs;
- student-oriented learning, teaching and assessment;
- admission of students, academic performance, recognition and certification;
- teaching staff;
- training resources and support training systems;
- information management;
- informing the public;
- continuous monitoring and periodic program evaluation;
- periodic external quality assurance.

Professional practice

Professional practice is a required component of study the student.

In accordance with the specific OP organizes the following practices:

- training;

- teaching;
- Production; Elements
the model of a graduate
- pre-diploma.

The purpose of the training practice - the acquisition of primary professional competences, including the consolidation and deepening of theoretical knowledge acquired during the training, laying the foundations of research, paperwork and working with business correspondence, acquisition of practical skills and work skills.

Teaching practice is organized for all students, is conducted in accordance with the characteristics and direction of the OP, is considered at a meeting of the department and is reflected in the program of practice.

The purpose of language practice is the formation of students' skills of interpretation and translation, business communication skills and networking, including native speakers.

Language practice is conducted for students engaged in training with knowledge of languages, in English and of multilingual groups.

The purpose of teaching practice - consolidation and deepening of knowledge of general scientific, cultural, psychological and pedagogical, methodical and special disciplines, as well as the formation on the basis of theoretical knowledge of pedagogical skills and competences.

Internship held in institutions, organizations and enterprises, relevant profile training of students.

Undergraduate practice carried out on senior year for students who perform graduate work. Manual pre-diploma practical exercises supervisor of the thesis

8 CONTENT OF THE EDUCATIONAL PROGRAM

8.1 Correspondence of the results of training in the educational program of the graduate model

The learning outcomes of the educational program are determined in accordance with the graduate model.

Correlation matrix of learning outcomes for EP as a whole generated competencies

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10
1	+	+	+	+	+	+	+			
2			+		+	+	+	+		+
3			+	+		+		+	+	
4								+	+	
5			+					+	+	+
6	+	+	+	+				+	+	+
7		+			+			+		

8.2 Information about the modules

№	Name module	learning Outcomes	Constituents of module	Short description module	Cycle	Number of loans	Expected learning outcomes (codes)
1	General education disciplines	<p>ROM1 - assesses the environmental reality on the basis of philosophical principles. ROM2 - shows citizenship. ROM3 - Use methods of scientific knowledge. ROM4- assesses the situation of social and professional interpersonal communication. ROM5 - solves the problems that arise in professional communication. ROM6 - interpret using language means their thoughts in speech and writing ROM7 - use of ICT in their professional activities. • ROM8 - apply the methods and means of physical culture as the foundation of a healthy lifestyle.</p>	<p>History of Kazakhstan Philosophy Socio-political knowledge (Sociology, Political Science, Cultural Studies, Psychology) Legal, economic and ecological knowledge (Fundamentals of law and anti-corruption culture, economics and business, Ecology and Safety) Kazakh (Russian) language Foreign Language Information and communication technologies (in English. Language) Physical education</p>	<p>The module is aimed at the formation of the ideological, civil and moral position of the future expert; increase its competitiveness on the basis of mastering of information and communication technologies; development of the ability to communicate in the state, Russian and foreign languages; promotion of healthy lifestyles, self-improvement and professional success. Describes the analysis of solutions to problems in society, the rationale for the role and place of the object in a particular life, the integration of multi-disciplinary knowledge, the development of information culture.</p>	GED	56	4,5, 6,7

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2	Pedagogical, psychological training	<p>ROM1 - selects pedagogical analysis methodology. ROM2 - summarizes the results of the study. ROM3 - uses psychological and pedagogical knowledge in new conditions. ROM4 - to use national and international experience of educational work ROM5 - Use professional communicative and teamwork skills ROM6 - solves the problems associated with age-related disabilities enrolled ROM7 - apply in practice methods of training and education of children with special educational needs.</p>	<p>The physiological and psychological development of pupils</p> <p>Pedagogy and methodology of educational work</p> <p>Special educational technology in inclusive education (design and organization of inclusive education, psychological and pedagogical support of children with special educational needs in inclusive education, ICT in inclusive education)</p>	<p>The module examines the essence of the anatomical and physiological, psychological characteristics of children and adolescents, aspects of identity formation through the preservation and promotion of health; actual problems of methodology, stages of development of pedagogical science, the concept of a holistic pedagogical process. Describes methods, forms and means of educational work in modern pedagogy, the specifics of the organization and design of inclusive education.</p>	17	2, 3,4,6
3	Final mathematics training	<ul style="list-style-type: none"> • LOM1 - demonstrates knowledge and understanding in mathematics, based on the interdisciplinary ideas in this area; • LOM2 -applies knowledge in 	<p>Psychology of adolescence</p> <p>Elementary mathematics</p> <p>Algebra and number theory</p> <p>Analytic and projective geometry</p>	<p>The module is aimed at the formation of the future specialist fundamental knowledge of mathematics based on the analysis of the content of elementary</p>	37	1,3,6,7

		<p>practice in solving problems, in conclusions and proofs of mathematical statements;</p> <ul style="list-style-type: none"> • LOM3 –analyzes ways of solving problems in cognitive-scientific research; • LOM4 - argues the role and place of the subject in the system of sciences; • LOM5 – is able to integrate subject and interdisciplinary knowledge in the formation of personal qualities of the student, in learning throughout life. 	<p>Fundamentals of Geometry and Differential Geometry</p> <p>Physics</p> <p>Workshop on solving mathematical problems (algebra)</p> <p>Workshop on solving mathematical problems (geometry)</p>	<p>mathematics from the point of view of higher mathematics, mastering the basics of algebra and geometry, the principles of the theory of mathematical structures, elements of mathematical and functional analysis, elements of mathematical logic and discrete mathematics, elements of probability theory and combinatorial analysis, the history of mathematics.</p>		
4	Fundamental preparation 2	<ul style="list-style-type: none"> • LOM1 – demonstrates knowledge and understanding in mathematics, based on the interdisciplinary ideas in this area; • LOM2 -applies knowledge in practice in solving problems, in conclusions and proofs of mathematical statements; • LOM3 –analyzes ways of solving problems in cognitive-scientific research; • LOM4 - argues the role and place of the subject in the system of sciences; • LOM5 – is able to integrate subject and interdisciplinary knowledge in the formation of personal qualities of the student, in learning throughout life. 	<p>Mathematical analysis 1</p> <p>Mathematical analysis 2</p> <p>Multiple integrals and field theory</p> <p>Differential Equations / Ordinary Differential Equations and Partial Differential Equations</p> <p>Elements of functional and complex analysis / Introduction to the theory of entire functions and operators</p>	<p>The module is aimed at the formation of the future specialist fundamental knowledge of mathematics based on the analysis of the content of elementary mathematics from the point of view of higher mathematics, mastering the basics of algebra and geometry, the principles of the theory of mathematical structures, elements of mathematical and functional analysis, elements of mathematical logic and discrete mathematics, elements of probability theory and combinatorial analysis, the history of mathematics.</p> <p>In the subjects included in the</p>	41	1,3,6,7

5	Methodical training	<ul style="list-style-type: none"> • LOM1 – demonstrates methodological training on the subject; • LOM2 – uses of ICT in teaching mathematics; • LOM3 – applies innovative technology in accordance with the purposes and objectives of the study; • LOM4 – able to use the technology of criteria-based assessment, diagnosis, development of short-term 	<p>Mathematical logic and discrete mathematics / Discrete mathematics and theory of algorithms</p> <p>Probability theory and mathematical statistics / Combinatorics and probability theory</p> <p>History of mathematics / History of mathematics at school</p>	<p>module, the basic concepts, theorems and conclusions, proofs and methods of solving problems are considered. The role and place of the subject in solving applied problems associated with problems arising in such fields of science as physics, chemistry, biology, mechanics, problem analysis based on the use of modeling, ways of integrating interdisciplinary knowledge are described.</p>		
			<p>Methods of teaching mathematics</p> <p>Private methodology for teaching mathematics</p> <p>Innovative learning technologies at school</p> <p>Modern assessment technologies</p> <p>Educational practice</p>	<p>The module is aimed at the formation of the future specialist's readiness for future professional activity on the basis of the development of the components of the system of teaching mathematics at school, the links between them, methods of teaching mathematics and innovative learning technologies. The ways of solving standard and non-standard problems of school mathematics, their use in the</p>	<p>11 14</p> <p>PD BP</p>	<p>1,2,3,6,7</p>

		<p>curricula;</p> <ul style="list-style-type: none"> • LOM5 – demonstrates communication in interpersonal communication, teamwork skills and information culture; • LOM6 – able to integrate subject and interdisciplinary knowledge in the formation of personal qualities of the student; • LOM7 – is able to evaluate the creativity of solving problems arising in the practice of technology and inclusive education; 	<p>Psychological and pedagogical practice</p>	<p>process of teaching mathematics as didactic materials and teaching students the ability to solve problems, to use in teaching DSP, to organize the educational process on the basis of ICT, to show communication in the implementation of project work, information culture and the integration of interdisciplinary knowledge are described.</p>		
6	Mathematician-analyst	<ul style="list-style-type: none"> • LOM1 - applies knowledge based on systems thinking and modeling in practice; • LOM2 - analyzes ways of solving problems in scientific research; • LOM3 - uses ICT in organizing the educational process in accordance with the personal interests of students; • LOM4 - demonstrates communication, information culture in interpersonal communication, teamwork; • LOM5 - able to integrate subject and interdisciplinary knowledge during lifelong 	<p>Application packages in teaching mathematics</p> <p>Development of digital educational resources in mathematics</p> <p>Fundamentals of mathematical modeling</p> <p>Integration of PISA tasks into the educational process</p> <p>Project activities of students in mathematics</p> <p>Methodology for the development of elective disciplines</p> <p>Text problems in mathematics and their application</p>	<p>The module is aimed at independent implementation of the educational process by the future specialist. To study the properties and characteristics of any process or systems of the object the ways to build and analyze their models, methods of forecasting, diagnosis, analysis, sorting of large data collected in the organization and management of the educational process in educational institutions through ICT, design methods in training, algorithms for the development of individual, group projects in mathematics, ways to demonstrate information culture,</p>	<p>18</p> <p>18</p> <p>PD</p> <p>PD</p>	<p>6, 7</p> <p>2,6,7</p>

8.3 Information about the disciplines

№	Name of the discipline	Brief description of the items (30-50 words)	Number of credits	Learning outcomes of the educational program (codes)													
				LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10				
CYCLE OF GENERAL EDUCATION DISCIPLINES																	
Higher Education Institution Component / Elective Component																	
1	Methods of scientific research	The study allows you to gain knowledge on the basic theoretical rules, technologies, operations, practical methods and methods of conducting scientific research based on modern achievements of domestic and foreign scientists and master scientific research choosing the topic of scientific research, scientific search, analysis, experiment, data processing, obtaining informed decisions using information technology.	5										+				
2	Fundamentals of law and anti-corruption culture	The basic concepts and connections between them concerning the legal system and the legislation of the Republic of Kazakhstan, state-legal and constitutional development, the foundations of anti-corruption culture, the principles of academic integrity are considered.	5											+			+
3	Fundamentals of Economics and	The basic concepts related to the branches of economy and business	5														+

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		subject knowledge in the implementation of projects, communication skills, cognitive abilities.																	
14	Elementary mathematics	The basic concepts of mathematics in the sections of numbers, expressions, functions, equations and inequalities and their systems, elements of mathematical analysis are analyzed from the highest mathematical point of view, methods and techniques for solving problems, their application in practice, as well as criteria for evaluating problem solving are considered. The methods and techniques of analysis and use of theoretical and practical literature, ways of integrating subject knowledge into mastering problem solving skills are described.	3	+	+	+													
15	Algebra and number theory	The basic concepts of mathematics, theorems, statements and proofs of classical algebra contained in the headings of matrices, determinants, vector algebra, linear systems of equations, linear operators, sections of the theory of polynomials, the theory of divisibility of numbers, numerical functions, comparisons and their properties, indices and primary roots are considered. The ways of analyzing the problems of task preparation, substantiating the	5	+	+	+													

	concerning light, the laws of refraction, reflection of light, models of atomic economy class and the theory of elementary particles. Fundamentals of physical laws, analysis of problem solving, ways of using digital educational resources in professional activities, demonstration of information culture, description of interdisciplinary knowledge.																			
19	Workshop on solving mathematical problems (algebra)	Solving simple and composite types of problems, modeling in the form of a drawing, a drawing, a short record, documenting the reference scheme when solving a problem, solving problems in various ways, arithmetic, Cadster Sh. it is focused on the application of mathematical knowledge in practice, the integration of disciplines, the development of critical, positive thinking, the organization of the educational process using ICT.	6	+	+															
20	Workshop on solving mathematical problems (geometry)	Solving simple and composite types of problems, modeling in the form of a drawing, a drawing, a short record, documenting the reference scheme when solving a problem, solving problems in various ways, arithmetic, Cadster Sh. it is focused on the application of mathematical knowledge in practice, the	5	+	+															

		interdisciplinary knowledge is characterized.																	
23	Multiple integrals and field theory	The basic concepts, theorems and conclusions, methods and techniques of proving and solving problems contained in the sections of the theory of multiple integrals, curved integrals, stereometry, mechanics, surface integrals in physics, elements of the field theory of the classical field of mathematical analysis are considered. It describes the place and role of discipline in science, analysis of problems based on the use of modeling, ways of integrating subject knowledge.	6	+	+	+	+	+	+										
24	Differential equations	The logical formulation of problems in solving simple linear differential equations and systems of equations and known methods of solving them, the application of practice are considered. Characterizes the place in solving complex problems in the field of numerical methods, optimal weapons, calculus of variations, analysis of problems based on the use of modeling, ways of integrating subject knowledge.	5	+	+	+	+	+	+										
25	Elements of functional and complex analysis	The concepts, concepts and conclusions related to the main elements of functional and complex analysis, methods and techniques of	5	+	+	+	+	+	+										

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	integrating subject knowledge are described.																			
28	History of mathematics	The stages of the development of mathematics, the emergence and improvement of mathematical symbols, the life history and activities of scientists who contributed to the formation of mathematical theories are considered. the application of historical data in practice in teaching mathematics, the place and role of mathematics in science and the ways of manifestation of communication, information culture when performing project work on them.	4																	
THE CYCLE OF PROFESSIONAL DISCIPLINE																				
optionally component																				
29	Packages of applied programs in teaching mathematics	The possibilities of package programs such as Maple, MatLAB, Mathematica, MathCAD and problems of solving problems using them are considered. The methods and techniques of using applied programs in teaching mathematics, ways of demonstrating information culture and integrating interdisciplinary knowledge in working with them are described.	6																	
30	Development of digital educational resources in mathematics	The content of the discipline discusses explanations of concepts related to ICT and digital educational resources, types of educational resources, methods of	6																	

		with the life of text tasks; formation of functional literacy the ways of mastering techniques, revealing interdisciplinary connections are considered for students.																
36	Geometric drawings on the plane and in space	Providing mastery of the theoretical foundations and methods of solving problems of geometric construction on the plane and in space. To pave the way to understanding the didactic possibilities and methodological features of teaching constructive geometry at school.	6	+	+	+	+	+										
37	Solving Olympiad problems in mathematics	The practical application of theoretical data and methods for solving complex and non-standard problems in school mathematics is considered. The development of logical thinking, the ability to exit students is characterized by the technology of professional dialing and approaches to the development of elective courses that teach gifted students to solve Olympiad problems, communication skills in teamwork, demonstration of information culture and ways of integrating interdisciplinary knowledge.	6	+	+	+	+	+										

Summary table on the volume of the educational program

Training course	Semester	Number of modules to be mastered	Number of subjects studied			Number of credits KZ				Total hours	Number	
			MC	US	OC	Theoretical training	Professional practice	Final attestation	Total		Examination	Diffests
1	1		4		3	30			30	900	5	1
	2		4		2	28	2		30	900	5	1
2	3		3		4	30			30	900	6	1
	4		2		4	28	2		30	900	5	1
3	5	1		4	24	6			30	900	4	
	6	2	1	3	30				30	900	5	
4	7	4		6	30	5			37	1110	6	
	8							8	23	690		
Total		7	13	1	26	200	15	8	240	7200	36	4