CATALOG OF ELECTIVE DISCIPLINES

7M01 - Pedagogical sciences
(Code and classification of the field of education)

7M015 - Teacher training in natural science subjects
(Code and classification of the direction of training)

0114
(Code in the International Standard Classification of Education)

M010 - Mathematics teacher training
(Code and classification of the educational program group)

7M01501 - Mathematics
(Code and name of the educational program)

Master
(Level of preparation)

set of 2023

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By the Academic Committee of the EP
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Natural and Mathematical of the faculty
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Chairman of the Commission Zheldybaeva B.

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Chairman of the Academic Council Oralkanova I.A.

Mathematical methods of processing the results of a pedagogical experiment

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course examines the basic concepts and methods of processing and evaluating information by using mathematical methods to obtain certain conclusions, patterns of various processes and phenomena. There are various successful methods of qualitative processing of the results of a pedagogical experiment, for example, the method of scaling, ranking, registration and modeling, each of which is based on identifying distinctive features, deviations from the norm, quantity or quality of the studied objects.

Purpose of studying of the discipline

Learning Outcomes

ON2 To summarize the results of experimental research and analytical work in the form of a masters thesis, an article, a report, an analytical note, etc.

ON6 To identify the scientific essence of problems in the field of fundamental disciplines in the specialty for solving theoretical and scientific-practical mathematical problems.

Learning outcomes by discipline

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Final examination

Methodology of pedagogical research

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The purpose of the discipline is to teach undergraduates scientific work, to make a description of them and to defend a dissertation on the work performed. Processing and accumulation of scientific information. Strengthening motivation to study the discipline and developing skills in modern technical means and technologies of perception and processing of information. To develop the abilities and skills to choose interactive forms and methods of teaching that can be successfully used in the study of mathematics at the University.

Purpose of studying of the discipline

Learning Outcomes

ON2 To summarize the results of experimental research and analytical work in the form of a masters thesis, an article, a report, an analytical note, etc.

Learning outcomes by discipline

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

The research work of a student, including an internship and the implementation of a masters thesis III

Statistical modeling and analysis

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course studies: paradigm and mathematical modeling. The main tasks of statistics, methods of constructing mathematical models, variance and factor analysis, criteria for the agreement of mathematical and stochastic, ergodic models, the use of the least squares method in the processing of experimental problems, elements of correlation and regression analysis in the processing of mathematical models and problems, to create a supportive environment, the foundation of which is world-class research.

Purpose of studying of the discipline

To acquire profound knowledge in the field of statistical modeling and the analysis

Learning Outcomes

ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.

Learning outcomes by discipline

Competencies: Demonstrates basic knowledge of probability theory, mathematical statistics and stochastic processes

Prerequisites

Bachelor

Postrequisites

Pedagogical practice

Commutative algebra

Discipline cycle	Basic disciplines
Course	1

Credits count	5
Knowledge control form	Examination

Short description of discipline
This course studies commutative algebra, which has become one of the fundamental tools of algebraic geometry. The central place is occupied by the concept of a prime ideal and a commutative ring. It serves at the same time as an abstraction of prime numbers in arithmetic and points in algebraic geometry. The method adopted in geometry to analyze a condition in the vicinity of a certain point also has an algebraic analogue: this is an important process of localization of a ring with respect to a prime ideal.

Purpose of studying of the discipline
Mastering the basic provisions of classical sections of mathematical science, basic ideas and methods of mathematics, a system of basic mathematical structures and an axiomatic method based on the formed system of knowledge, skills and abilities in the field of commutative algebra.

Learning Outcomes
ON3 Defend your point of view, demonstrating analytical and logical thinking skills, relying on facts, theories and scientific results of mathematics, analyze the effectiveness of their functioning of applied tasks.

Learning outcomes by discipline
Defend your point of view, demonstrating analytical and logical thinking skills, relying on facts, theories and scientific results of mathematics, analyze the effectiveness of their functioning of applied tasks.
Demonstrates basic knowledge;
Uses systematized theoretical and practical knowledge;
To form the experience of mathematical activity.

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
Pedagogical practice

Methods of teaching algebra and the theory

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
To develop undergraduates – within the framework of algebraic education – a number of relevant general skills for employment in the field of mathematics and in other fields. To provide all undergraduates with extensive education in fundamental aspects of algebra and number theory and a high level of knowledge and understanding of the subjects they have chosen for their final year of study. Skills and assessments of interpretation by generalization of information on algebra and number theory.

Purpose of studying of the discipline

Learning Outcomes
ON3 Defend your point of view, demonstrating analytical and logical thinking skills, relying on facts, theories and scientific results of mathematics, analyze the effectiveness of their functioning of applied tasks.

Learning outcomes by discipline

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
Pedagogical practice

Modern problems of algebra

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
This discipline studies the discussion of new results and the formulation of tasks for further research, involvement in the development of both traditional and new areas of scientific and applied research in algebra and number theory, and increasing the level of scientific information exchange. The purpose of the discipline is to attract masters to participate in scientific research, and the desire to provide young scientists with an opportunity to discuss their current research.

Purpose of studying of the discipline

Learning Outcomes
ON3 Defend your point of view, demonstrating analytical and logical thinking skills, relying on facts, theories and scientific results of mathematics, analyze the effectiveness of their functioning of applied tasks.

Learning outcomes by discipline

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

External evaluation of educational achievement of pupils in mathematics (PISA, SAT,SET, UNT)

Discipline cycle	Basic disciplines
Course	1
Credits count	5

Knowledge control form	Examination

Short description of discipline
The evaluation of the results of educational achievements in mathematics performs several important functions: the feedback function, which helps to obtain an objective picture of the data, in order to manage the quality of education; the orientation function of the educational process for planning further results through the content of concrete examples and internal evaluation criteria. In this course, we consider different types of external assessments and solve specific tasks.

Purpose of studying of the discipline
To create a system of different forms of evaluation of educational achievements.

Learning Outcomes
ON6 To identify the scientific essence of problems in the field of fundamental disciplines in the specialty for solving theoretical and scientific-practical mathematical problems.

Learning outcomes by discipline
To identify the scientific essence of problems in the field of fundamental disciplines in the specialty for solving theoretical and scientific-practical mathematical problems.
Demonstrates basic knowledge in the area of assessment of educational achievements.

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
Pedagogical practice

Methods of teaching updated content in secondary education

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The updated content of education improves the pedagogical skills of teachers in an effort to give new knowledge and practical application. The main task is to involve each student in the process of cognition, to direct individual qualities in the right direction and to give direction in the independent extraction of new knowledge, to give a foundation for critical thinking, versatile development and functional literacy.

Purpose of studying of the discipline
To ensure the formation of professional competence of mathematics teachers in the updated content of education

Learning Outcomes
ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.
ON7 Possess advanced experience of mathematics teachers in the organization of educational, research activities of schoolchildren and students.

Learning outcomes by discipline
the ability to demonstrate general scientific knowledge of the natural sciences, mathematics. The ability to understand and apply a modern mathematical apparatus in research and applied activities.

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
Pedagogical practice

Effective methods of solving tasks UNT

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The experience of implementing the unified national testing has demonstrated that training should be effective. In the course, we will consider specific tasks of the unified national testing and ways to quickly and effectively solve them. The method of solving UNT problems may radically differ from the traditional solutions recommended in mathematics textbooks, this is due to the fact that it is necessary to save time spent on each example.

Purpose of studying of the discipline

Learning Outcomes
ON2 To summarize the results of experimental research and analytical work in the form of a masters thesis, an article, a report, an analytical note, etc.
ON6 To identify the scientific essence of problems in the field of fundamental disciplines in the specialty for solving theoretical and scientific-practical mathematical problems.
ON7 Possess advanced experience of mathematics teachers in the organization of educational, research activities of schoolchildren and students.

Learning outcomes by discipline
Demonstrates basic knowledge in the field of efficient methods for solving tasks UNT.

Prerequisites
School course Bachelor

Postrequisites
Pedagogical practice

Building tasks in the geometry course

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The construction tasks are an illustration of a geometric object constructed using a ruler and a compass. The ability to solve such problems demonstrates the level of knowledge in geometry and the depth of mastering the educational material. In the course of learning the construction method, logical and spatial thinking, geometric intuition are developed. Special attention is paid to research and analysis, which contributes to the development of drawing skills among undergraduates.

Purpose of studying of the discipline

Learning Outcomes

ON2 To summarize the results of experimental research and analytical work in the form of a masters thesis, an article, a report, an analytical note, etc.
ON6 To identify the scientific essence of problems in the field of fundamental disciplines in the specialty for solving theoretical and scientific-practical mathematical problems.

Learning outcomes by discipline

Prerequisites

School course

Postrequisites

Practice research

The development methodology of elective courses in mathematics in specialised schools

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

Elective courses in mathematics in schools promote in-depth and purposeful study. A feature of the course development is compliance with the latest trends in the development of mathematics based on an external assessment of students` knowledge, to determine the direction of further specialty. Elective courses play an important role in the system of specialized education not only at the senior level of school, but also in the middle classes.

Purpose of studying of the discipline

Learning Outcomes

ON2 To summarize the results of experimental research and analytical work in the form of a masters thesis, an article, a report, an analytical note, etc.
ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.
ON6 To identify the scientific essence of problems in the field of fundamental disciplines in the specialty for solving theoretical and scientific-practical mathematical problems.

Learning outcomes by discipline

Prerequisites

Basic and profile disciplines of the EP Bachelor

Postrequisites

Final examination Pedagogical practice

Current trends update content and technology education

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The updated content of education modernizes the pedagogical art of teachers in an effort to give modern knowledge and practical application. The main task is to involve each student in the process of cognition, to direct individual qualities in the right direction and to give direction in the independent extraction of new knowledge, to give a foundation for critical thinking, versatile development and functional literacy.

Purpose of studying of the discipline

Learning Outcomes

ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.
ON7 Possess advanced experience of mathematics teachers in the organization of educational, research activities of schoolchildren and students.

Learning outcomes by discipline

Prerequisites

Bachelor

Postrequisites

Final examination

Current problems in the teaching of mathematical analysis at the University

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The purpose of the course is to apply in-depth practical knowledge of mathematical analysis, to obtain results on the stability of orthorecursive and orthogonal decompositions by convergence of functional series. They consider such issues as the application of integral calculus to geometry, mechanics, physics; infinite series with constant terms; triple and multiple integrals; types of limits encountered in mathematical analysis; summation of Fourier series by the Cesaro-Feyer method; auxiliary proposals on generalized derivatives.

Purpose of studying of the discipline

Learning Outcomes

ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.

Learning outcomes by discipline

Prerequisites

Bachelor

Postrequisites

Practice research

Additional chapters of mathematical analysis at the University

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

One of the important stages of the study of mathematical analysis is the continuous deepening of knowledge. Mastering this discipline is necessary for the subsequent study of the algebraic system, metric spaces, the basics of universal algebra, the theory of the function of a real variable, numerical systems, the theory of the function of a complex variable, the theory of matrices. This will allow us to formulate a theoretical basis for further application in the educational process and in research activities.

Purpose of studying of the discipline

Learning Outcomes

ON6 To identify the scientific essence of problems in the field of fundamental disciplines in the specialty for solving theoretical and scientific-practical mathematical problems.

Learning outcomes by discipline

Prerequisites

Bachelor

Postrequisites

Final examination

Methods of teaching mathematical analysis at the University

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

In the system of mathematical education, mathematical analysis is the basis, since the methods of this course are used to solve and study many problems of higher mathematics. In this discipline, we will consider the methodology of teaching mathematical analysis, introduce the role of mathematical analysis in modern production, give a complete picture of the definitions and basic theorems. Certain chapters of mathematical analysis are also studied in depth.

Purpose of studying of the discipline

Learning Outcomes

ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.
ON6 To identify the scientific essence of problems in the field of fundamental disciplines in the specialty for solving theoretical and scientific-practical mathematical problems.

Learning outcomes by discipline

Prerequisites

Bachelor

Postrequisites

Pedagogical practice

Analytical functions

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

With the help of the theory of analytical functions, some problems of mathematical analysis can be studied in detail, explained easily and easily and solved in full. In addition, the natural connection between elementary functions, the role of complex numbers in mathematics and their practical significance are also considered in the theory of analytic functions with complex arguments.

Purpose of studying of the discipline

Learning Outcomes

ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.

Learning outcomes by discipline

Prerequisites

Bachelor

Postrequisites

Final examination

Computer modeling of mathematical problems

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

This discipline makes it possible, based on the use of modern technologies, to simulate complex mathematical problems on a computer. To reveal the essence of the applied aspect of mathematical methods and to form skills to solve problems of the applied nature of mathematical methods. To form undergraduates of mathematical culture necessary for the successful solution of professional and social tasks in the future, general knowledge and skills in the field of applied mathematics, mathematical modeling and motivation for self-education.

Purpose of studying of the discipline

Learning Outcomes

ON8 Apply digital educational resources and computer technologies in teaching mathematics, theoretical analysis of the results of observations and experiments

Learning outcomes by discipline

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Final examination

Application of ICT in teaching mathematics

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The use of ICT makes it possible to arouse students` interest in the subject by encouraging creativity and non-standard presentation of the task itself. Therefore, it is necessary to continuously update the types of ICT in order to increase motivation in accordance with the trends and interests of students. The use of ICT provides opportunities that sometimes a textbook cannot provide, for example, modeling and overview of geometric shapes in space.

Purpose of studying of the discipline

Learning Outcomes

ON8 Apply digital educational resources and computer technologies in teaching mathematics, theoretical analysis of the results of observations and experiments

Learning outcomes by discipline

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Final examination

Culture and Ethics of Academic writingy

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The purpose of the discipline is to study the principles of academic integrity, scientific argumentation. To teach undergraduates to create an academic text taking into account modern norms of written communication, to work with sources using modern processing methods and to justify their point of view. Operate with systems of criteria for evaluating academic written work, compose texts taking into account the requirements of competent writing of professional documents, articles and texts.

Purpose of studying of the discipline

Learning Outcomes

ON3 Defend your point of view, demonstrating analytical and logical thinking skills, relying on facts, theories and scientific results of mathematics, analyze the effectiveness of their functioning of applied tasks.

Learning outcomes by discipline

Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Final examination

Methodology for creating variable courses in mathematics

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The purpose of the discipline is to increase professional competence in the school mathematics course, creative activity and the creation of appropriate elective courses, to increase competence in working with gifted children (individualization and differentiation, activity approach, formation of children`s desire for innovation and creativity). To form the quality of thinking characteristic of mathematical activity and necessary for a person to live in modern society.
Purpose of studying of the discipline
Learning Outcomes
ON3 Defend your point of view, demonstrating analytical and logical thinking skills, relying on facts, theories and scientific results of mathematics, analyze the effectiveness of their functioning of applied tasks.
Learning outcomes by discipline
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Final examination

Features of multilingual learning math

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
An active native speaker of several languages is a communicative person. The development of multilingualism provides for professional growth, expanding horizons and new opportunities in the search for a methodology for teaching mathematics. The goal of the multilingual education program is to build a new model of education that promotes the formation of a competitive generation that speaks at least three languages. Technology, methodology and theory of teaching disciplines in different languages in schools, secondary and higher educational institutions are an important factor for progress.
Purpose of studying of the discipline
Learning Outcomes
ON4 To argue their position in Kazakh, Russian and foreign languages, to use a professional foreign language when discussing topical topics of mathematics, in writing scientific articles.
Learning outcomes by discipline
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Final examination

Laws of probability and methods of statistical data processing

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline provides an opportunity to demonstrate their knowledge of variation series and their characteristics for statistical data processing. The program studies statistical hypotheses and their principles of practical confidence, analysis of variance, correlation ratio and correlation index, evaluation of the relationship of variables and checking the significance of the multiple regression equation, time series and forecasting, analytical alignment of the time series (selection of a non-random component).
Purpose of studying of the discipline
Learning Outcomes
ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.
Learning outcomes by discipline
Prerequisites
Bachelor
Postrequisites
Final examination

Methodology for teaching probability theory and mathematical statistics

Discipline cycle	Profiling discipline

Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
In order to increase the quality of education, it is necessary to revise the methodology of teaching probability theory and mathematical statistics through the introduction of new and interactive principles of work, the development of statistical and logical thinking. The discipline consistently reveals the relevance of teaching probability theory, application and applications in various fields of activity of this section of mathematics, special attention is paid to the development of skills of a wide range.

Purpose of studying of the discipline

Learning Outcomes
ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.

Learning outcomes by discipline

Prerequisites
Bachelor

Postrequisites
Final examination

New learning technologies in mathematics

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
In the field of education, there is a need to teach a person the art of filtering knowledge in the flow of information, extracting and assimilating the necessary information. The most relevant learning technologies considered during the course are: project technology, information and communication technology, critical thinking development technology, developmental learning technology, game technologies, problem-based learning technology, modular technology, case technology, pedagogical cooperation, integrated learning technology, level differentiation technology, traditional technologies, group technologies.

Purpose of studying of the discipline

Learning Outcomes
ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.

Learning outcomes by discipline

Prerequisites
School course Basic and profile disciplines of the EP

Postrequisites
Final examination

Organization of project activities in mathematics

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
In mathematics, the project activity is intended for the formation of mathematical literacy and culture, impact assessment, organization of work and project management. In particular, the good side of the research activity of undergraduates in the study of mathematics is analyzed. The project method is considered in some alternative classroom clock system, prize projects are analyzed during the lesson.

Purpose of studying of the discipline

Learning Outcomes
ON6 To identify the scientific essence of problems in the field of fundamental disciplines in the specialty for solving theoretical and scientific-practical mathematical problems.

Learning outcomes by discipline

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
Final examination

Teaching mathematics in small schools

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
Forms an understanding of mathematical problems that intersect with related disciplines. Provides an opportunity to gain knowledge of a wide range of fundamental mathematics and methods of applying mathematics in related sciences. Forms a mathematical dictionary of a specialist. The ability to master scientific concepts and the connection of these concepts with phenomena in subjects that are studied using mathematical techniques. Ensure comprehensive and balanced development of research skills.

Purpose of studying of the discipline
Learning Outcomes
ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.
Learning outcomes by discipline
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Pedagogical practice

Development and use of electronic educational publications and Internet resources for math

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
To date, the need for the use of Internet resources is being actualized in training. Traditionally, the list of Internet resources includes electronic textbooks, educational databases and websites, electronic reference books, online laboratories, video lectures, simulators and graphic editors. The purpose of the course is to develop and use such resources, which contain the bulk of information on mathematics and its various areas, and will be useful to anyone who studies and is interested in mathematics.
Purpose of studying of the discipline
Learning Outcomes
ON2 To summarize the results of experimental research and analytical work in the form of a masters thesis, an article, a report, an analytical note, etc.
ON5 To investigate problems in various fields of mathematics, to apply information technologies for the analysis of comprehension, processing and presentation of the results of their own research.
ON8 Apply digital educational resources and computer technologies in teaching mathematics, theoretical analysis of the results of observations and experiments
Learning outcomes by discipline
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Final examination