№	Discipline name	Short content of the course with objectives	Main chapters	Number of credits	Semester	Prerequisites	Post requisites	Expected learning outcomes (the knowledge, abilities, skills and competences gained by students)
1	Students' math knowledge quality assessment in conditions of international comparative study	**The objective of the discipline** is familiarization with quality assessment of students' math knowledge in conditions of international comparative study and application of the knowledge gained to practice.	Features of international comparative study. TIMSS is an international comparative study. Conceptual model of study. Choosing students for participation in study. The level of students' math knowledge. Analysis of tasks. Mathematics programs. Results. Analysis of the results. PISA is an international comparative study. Conceptual model of study. Choosing students for participation in study. Math literacy. Math literacy of students all over the World. Other international comparative studies.	2	1	Elementary Mathematics, Pedagogy, Methods of Teaching Mathematics	Elective disciplines of the methodological cycle	**On completing the course Master Degree students should:** - master the general information of the international comparative study, in particular, TIMSS, PISA; - be able to analyze results of international comparative study; - be able to compile tasks for international comparative study; - have skills of conducting presentations about the results of an international comparative study.
2	History of Methods of teaching Mathematics	**The objective of the discipline** is to give a Master Degree student – a future scientist – an idea of the development of methodological-mathematical science and to demonstrate that the knowledge of this experience will contribute to realization of his/her professional duties. The main task of the discipline is	«The history of Methods of teaching Mathematics» as a subject in the Master Degree program. Sources of the methodological-mathematical science. First textbooks on arithmetic and algebra. Methodological-mathematical ideas of central-asian and Kazakhstani scientists. Propagation of advanced methodological-mathematical ideas of the Russian and Western Pedagogy. First steps in creation of Methods of teaching	3	1	Elementary Mathematics, Pedagogy, Methods of Teaching Mathe	Elective disciplines of the methodological cycle	**On completing the course Master Degree students should:** - Have an idea of how main methodological ideas appeared and developed, how particular theories of teaching Mathematics developed historically; - Be able to determine the role and place of Methods of

		deepening and advancing the knowledge of the appearance and historical development of methods of teaching Mathematics, and familiarization with scientific-methodological ideas of representatives of the past and current methodological-mathematical science	Mathematics. Development of the content of math education for Kazakh primary schools. Development of the content of math education for Kazakh secondary schools. First textbooks on Algebra and Geometry. Development of the content of math education for secondary specialized institutions. Development of the content of math education for higher education institutions. Development of the methodological-mathematical science in 1940-1990. Tendencies and features of the development of the methodological-mathematical science since 90-th years of the XX century. The modern condition and searching for ways of the further development of the methodological-mathematical science.			matics		teaching Mathematics in the history of the development of civilization; Have skills of working at literature, of bibliographic search, learn to cite correctly and quote the material used.
3	Fundamental problems of Algebra, Geometry and Logic	**The objective of the discipline** is introduction of well-known information of Algebra, Geometry and Logic, including development of students' skills of applying them to the study process.	The concept of a set. The set of real numbers. The function. The limit and the derivative of a function. Investigating functions using derivatives and plotting the graph of a function. The n-th root of a real number and its properties. Solving irrational equations and system of equations. Differentiation of exponential and logarithmic functions. Higher-order derivatives. Partial derivatives of functions. The anti-derivative and indefinite integral. The area of a curvilinear trapezium. Newton and Leibniz formula. Application of the definite integral to solving geometrical and physical problems. The derivative and integral of an exponential function with a real power. General methods of solving inequalities and their systems. Solving equations and inequalities containing variables under the modulus	2	2	Algebra and Number Theory, Analytic geometry, Math analysis, discrete Mathematics and Math Logic, Differential geomet	Elective disciplines of the methodological cycle	**On completing the course Master Degree students should:** Know basic concepts of Algebra, Geometry and Logic; Be able to apply modern methods of Algebra, Geometry and Logic to the process of scientific research.

			sign. Equations and inequalities with parameters. Geometry axioms applied to constructing cross-sections. The structure and kinds of theorem proofs. Metric problems on constructing cross-sections of polyhedrons. Basic theoretical statements of constructive geometry. Random quantity and elements of the sampling method. Basic concepts of Math Logic.			ry		
4	Fundamental problems of Math analysis	**The objective of the discipline** is introduction of well-known information of math, real and complex analyses, and development of students' skills of applying them to practice and to the process of scientific research.	Sets and operations over sets. Theory of real numbers. Theory of limits. Numerical sequences and their properties. Functions and methods of defining them. Continuity of functions. The derivative of a function, its geometrical and physical meaning. Indefinite, definite integrals and their properties. Improper integrals with infinite limits of integration. Convergence of improper integrals. Number series and their convergence and divergence. Functional series. Functions of two and several variables. Extremes of functions of several variables. Double integrals. Line integrals. Integrals depending on a parameter. Euler integrals. Surface integrals. Ostrogradskiy's formula. Stokes's formula.	3	2	Math analysis, real analysis, complex analysis, functional analysis within Bachelor's program	Elective disciplines of the methodological cycle	**On completing the course Master Degree students should:** - Know basic concepts of fundamental analysis, math analysis, real analysis, complex analysis and functional analysis. Be able to apply modern methods of fundamental analysis to the process of scientific research.
5	Theoretical fundamentals of organizing teaching to solve math problems	**The objective of the discipline** is task-oriented development and acquirement of systematized knowledge and skills of future Mathematics teachers to solve problems of the school course required for training qualified pedagogical personnel on Mathematics.	Real numbers. Prime and composite numbers. GCD and LCM. Criterions for divisibility. Operations over approximated numbers. The coordinates of a point in the plane. Powers and roots. Natural powers. Whole powers. Roots. Rational powers. The algorithm of computing a square root. Complex numbers. Rational operations over complex numbers. Argand diagram of	3	2	Elementary Mathematics, Methods of teaching Mathematics,	Elective disciplines of the methodological cycle	**On completing the course Master Degree students should:** - Know the specifics of the secondary education; - Be able to apply the knowledge of theoretical fundamentals and technologies of teaching Mathematics; - Be able to apply the

			complex numbers. Operations over complex numbers in the trigonometric form. Taking roots of complex numbers. Identical transformations. Identical transformations of rational expressions. Identical transformations of irrational expressions. Functions and graphs. Integer and fractional rational functions. Logarithms. Equations. Irrational, exponential and logarithmic equations. Systems of equations. Inequalities. Systems and combinations of inequalities.			scientific fundamentals of school Mathematics		knowledge of theoretical, fundamental and applied mathematics; - Have skills of applying physical-mathematical apparatus, modern computer technologies to solving practical problems.
6	Problems of school Mathematics textbook	**The objective of the discipline is to** Contribute to enhancing basic and professional competences of Mathematics teachers providing for ability of teaching Mathematics to school students efficiently in conditions of standard realization.	Realization of the standard on Mathematics in the 5-6 forms. Realization of the standard on Mathematics in the 7-9 forms. Methodological and substantial aspects of realization of the standard at Algebra lessons in the 7-9 forms: identical transformations of expressions. Methodological and substantial aspects of realization of the standard at Algebra lessons in the 7-9 forms: algebra and graphics of modulus. Methodological and substantial aspects of realization of the standard at Algebra lessons in the 7-9 forms: equations and inequalities with a parameter. Methodological and substantial aspects of realization of the standard at Algebra lessons in the 7-9 forms: teaching to solve plane-geometrical problems on the basis of theoretical maps. Technologies of teaching at Mathematics lessons providing for realization of the standard.	3	2	Elementary Mathematics, Analytic Geometry, Math analysis, Methods of teaching Mathematics	Elective disciplines of the methodological cycle	**On completing the course Master Degree students should:** -Know how to systematize knowledge of mathematics and methods of teaching it in conditions of realization of the standard; - Be able to encourage to overcome the difficulties arising in professional activities, connected with the switch to the new standard.
7	Scientific fundamentals of teaching methodological	**The objective of the discipline is** Development of the general cultural level in the sphere of	The language of math characters and introduction to math logic. The concept of structure in modern mathematics.	3	2	Elementary Mathematics,	Elective disciplines of	**On completing the course Master Degree students should**: know:

| disciplines at universities | mathematics, of ability to solve problems connected with Mathematics course, familiarization with methods of solving them, development of primary methodological regulations for teaching students to solve problems. | Generalization, specialization and analogy in school course of mathematics. Theorems of existence, insolvability and impossibility. Theorems with constructive proofs and their importance in math education.
Basic mathematical principles: the principle of excluded middle, the principle of mathematical induction, the equivalence principle, the principle of inclusion and exclusion, the principle of duality, the continuity principle.
Approximation techniques, their role and place in development of students' math culture.
Math modeling and math experiment.
The use of math packages when carrying out numerical, graphic and experimental work in the educational process;
Mathematics and the real world. Development of students' ideology in the process of teaching mathematics.
Determinism and randomness. The role and place of Probability theory and Math Statistics in the process of teaching Mathematics at a university. | | | Scientific fundamentals of school course of Mathematics, Math analysis, Methods of teaching Mathematics | the methodological cycle | -Basic concepts and methods of Elementary Mathematics and Mathematics at a university;
-Modern lines of development of Mathematics and its applications;
Be able to:
-Apply theoretical material to solving applied problems;
Be familiar with:
- the most important methods of calculus mathematics and be able to apply them to proving theorems and solving problems. |