CATALOGUE OF ELECTIVE DISCIPLINES

BACHELOR LEVEL

6B01501 – Training of teachers in natural science (mathematics)

Cycle of disciplines	Name of disciplines and their main sections	Trudeau-tank total loans (ECTS)
GED 1	**CYCLE GENERAL EDUCATION DISCIPLINES (GED)**	**5**
1.	**Basis of the economy and business**	5
	Social production. The essence, forms, structure of capital. Production cost. Income production in a market economy. The concept of business. Types of business activity. Theory of property, social forms of management. Goods, money. Socio-economic system. The emergence of the market. Financial system. The role of the state in business development. Macroeconomics. Resource saving. Cyclical economic development. Inflation and unemployment. Kazakhstan in the system of world economic relations.	
2.	**Bases of the law and anti-corruption culture**	5
	Basic provisions of the Constitution, current legislation of the RK; the system of state management bodies, the terms of reference, objectives, methods of state regulation of the economy, the role of the public sector in the economy; financial law and Finance, the mechanism of interaction of substantive and procedural law; the essence of corruption, the causes of its origin; the extent of moral and legal responsibility for corruption offences; the legislation in the field of combating corruption	
3.	**Health and safety of the person**	5
	Life safety, its main provisions. Dangers, emergencies. Risk analysis, risk management. Security of the person. Destabilizing factors of our time. Social dangers, protection from them: dangers in the spiritual sphere, politics, protection from them: dangers in the economic sphere, dangers in everyday life. The system of life safety bodies, and legal regulation of their activities	
4.	**Ecology and sustainable development**	5
	Basic laws of functioning of living organisms, ecosystems of different levels of organization, biosphere as a whole, their stability; interaction of components of biosphere and ecological consequences of economic activity of the person, especially in the conditions of intensification of nature management; modern representations about concepts, strategies and practical tasks of sustainable development in various countries and RK; problems of ecology, environmental protection, sustainable development	
CD 2	**CYCLE OF CORE DISCIPLINES(CD)**	**52**
1.	**Management in education *and electronic documentation***	5
	Scientific and methodological foundations of pedagogical management. School management. Regularities and principles of management in school. Functions and methods of pedagogical management. Information technologies in management. Leadership style. Ethics and culture of management. Marketing. Competitive ability of the organization of education. Electronic logbook of classes, automatic	

	distribution of classes, completed documents and reports control of visits of teachers and students, etc.		
2.	**Inclusive education**		5
	The role of inclusive education in social and educational policy. Legal support, models, forms, types of inclusive education. Psychological and pedagogical problems of education and upbringing of children with disabilities in inclusive education. Psychological and pedagogical technologies of work with children with disabilities and their families. Interaction with teachers and psychologists in the organization of inclusive education		
3.	**Pedagogical measurements**		5
	Modern means of evaluation of learning outcomes. The problem of evaluation activity. Model of technology of criterion estimation. The principles of assessment. Assessment stages and tools. Criteria table – the subject heading. Formative assessment and summative (internal and external) assessment. Moderation of summative evaluation results. Age criteria for evaluation of educational results. Self-evaluation and mutual evaluation with peers. Pedagogical objectives the portfolio. Functions and composition of the portfolio.		
5.	**Mathematical Analysis-1**		5
	Elements of set theory. Set of real numbers. Numerical sequence. Limit of numerical sequence. Monotonous sequence. Real functions of a real variable. Limit, continuity, uniform continuity of function. Fundamentals of differential calculus of a function of one variable. L'hopital's Rule. Taylor's Formula. Basic theorems of differential calculus. The study of a function by means of a derivative. Plotting a function		
6.	**Mathematical Analysis-2**		6
	Indefinite integral. Integration of rational expressions. Integration of irrational expressions. Riemann integral and its properties. Applications of a definite integral: curve length, area, volume. Improper integral. Metric, linear normalized space. The Space Rn. Functions of many variables. Differentiability of a function of several variables. Extremum of a function of several variables. Implicit function. Conditional extremum of a function of several variables.		
7.	**Mathematical Analysis-3**		5
	Numerical series. A necessary condition for the convergence of the series. Signs of convergence of sign-positive series. The alternating rows. Signs Of Dirichlet, Abel. Functional sequences and series. Power series. Expansion of the function into power series. Double and triple integrals. Geometric and physical applications of multiple integrals.		
8.	**Algebra and number's theory**		5
	Elements of set theory. Complex number. Representations of complex numbers. Actions on complex numbers. Polynomials of one variable. Matrix algebra. Determinants. Linear equation system. Kramer rule, Gauss method, matrix method for solving systems of linear equations. Homogeneous system of linear equations. Fundamental system of solutions.		
9.	**Analytic geometry**		5
	Elements of vector algebra. Scalar, vector and mixed product of vectors and their applications. The method of coordinates on the plane. Plane transformations. Application of plane transformations to solving problems of elementary geometry. Lines on the plane. Second order curves on the plane. Equations of surface and line		

		in space. Second order surfaces and their canonical equations.	
10.		**History of Mathematics**	6
		General description of the history of mathematics.Stages of development of the history of mathematics. Mathematical legacies of al-Farabi, Alam al-DIN al-Jauhari, Ahmet Farabi, al-Turkestan, al-Biruni, Ibn Sina, Nasyreddin al-Tusi, Omar khayyama, etc. mathematical legacies of Herbert, pisansky, Nemorarius, OREM, vidman, Pacioli, Shuke, Rize, Muller, etc. Newton And his theory of infinitesimals. Representatives of the mathematical school of Leibniz (Bernoulli dynasty, etc.)	
11.		**Physics**	5
		Mechanics, molecular physics and thermodynamics, electromagnetism, optics, atomic and nuclear physics. Kinematics. Dynamics. Work and energy. Solid mechanics. Fluid mechanics. Molecular kinetic theory. ideal gas. Thermodynamics. Real gas. Solid. Electrostatics. DC. Magnetism. Electromagnetic induction. Geometric and wave optics. Quantum nature of radiation. Atomic physics. Nuclear physics.	
MD 3		**CYCLE OF MAJOR DISCIPLINES (MD)**	**35**
1.		**Programming**	5
		This discipline studies the methodology of modern programming languages, basic programming skills, technology of object-oriented design, the basics of syntax and semantics of programming languages.	
2.		**Methodical bases of solve mathematical tasks**	5
		In the course of methods of teaching mathematical problems studied methods of solving problems and methodological foundations of mathematical disciplines with the course of theory and methods of teaching mathematics. This course is designed to prepare students of pedagogical higher educational institutions for professional activities in secondary schools of other secondary special institutions, and fully contains the program material included in the course of school mathematics.	
3.		**A modern lesson of mathematics**	5
		This course is aimed at preparing students for pedagogical practice in school, to draw their attention not only to the development of specific topics presented during pedagogical practice, but also to highlight the "subtle moments" of these topics. As a result of studying the discipline, students should have an idea about the organizational forms of teaching mathematics in high school.	
4.		**Theory of Probability and Mathematical Statistics**	5
		Basic concepts of probability theory. Conditional probability and independence. Random variable. Characteristics of discrete and continuous random variables. Limit theorems and their applications. Elements of mathematical statistics. Methods of parameter estimation. Elements of correlation theory. Statistical hypothesis testing.	
5.		**Discrete mathematics and mathematical logic**	5
		Propositional logic. Predicate logic. Sets and mappings. Binary relation. Classical combinatorial objects. Boolean function. Duality principle. Disjunctive normal form. Columns. Eulerian graphs. Algorithmic model. Turing machines and Turing-computable functions.	

6.	**Differential geometry**	5
	Theory of curves. Basic definition. Curves on a plane. Curves in three-dimensional space. The group of orthogonal transformations as a smooth sub-manifold of Euclidean space. Theory of surfaces. Regular surfaces and the first quadratic form. The second quadratic form and curvatures of normal sections. Gaussian curvature. Derivational equations and bonnet's theorem. gauss theorem. Covariant differentiation and geodesics. Euler-Lagrange equations and extreme properties of geodesics. The geodesic curvature and the formula. Gauss-Bonnet. Minimal surface.	
7.	**Differential equations**	5
	Problems leading to differential equations. Differential equations of the first order. Theorem of existence and uniqueness of the solution of the initial problem. General theory of systems of differential equations. General theory of linear ordinary differential equations. General theory of systems of linear ordinary differential equations. Linear differential equations and systems with constant coefficients.	