

CATALOGUE OF ELECTIVE DISCIPLINES

BACHELOR LEVEL

6B01502 – Training of teachers in natural science subjects (Mathematics and physics)

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	
БД 2	CYCLE OF CORE DISCIPLINES(CD)	52
1.	Management in education <i>and electronic documentation</i>	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'hospital'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 R^n . 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.	Methods of teaching physics	5
	The purpose of discipline "Methods of teaching physics" is the study of scientific and psycho-pedagogical bases of the structure and content of the physics course of secondary and higher educational institutions, the study of the principles, methods and means of teaching physics, formation of sequence of logical thinking operations, the ability to analyze physical situations. The task of teaching methods of physics-to acquaint students with modern means of teaching physics and learning to work with them	
MD 3	CYCLE OF MAJOR DISCIPLINES (MD)	36
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.	Mechanics	5
	The purpose of this discipline is to study the general laws of motion and balance of material bodies, reflecting the interaction between these bodies. As a result of mastering the discipline, the student should know: basic concepts and theorems of mechanics; the laws of equilibrium and the laws of motion of a material point, a solid and a mechanical system; material point, be able to: apply this knowledge to solve typical problems of mechanics; compose and solve equations of equilibrium and motion of a material point, a solid body and a mechanical system; own: methods of studying the equilibrium and movement of a material point, a solid body and a mechanical system; methods and principles of solving problems of mechanics	
3.	Molecular physics	5
	Formation of theoretical knowledge and practical skills to study the structure and properties of nature at the molecular and statistical level of its organization. The main objectives of the discipline are: to inform the student of the basic principles and laws of molecular physics of their mathematical expression; to acquaint with the methods of observation and experimental research, with the main methods of accurate measurement of physical quantities, the simplest methods of processing the results of the experiment and the basic physical devices	
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.	<p style="text-align: center;">Discrete mathematics and mathematical logic</p> <p>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..</p>	5
6.	<p style="text-align: center;">Optics</p> <p>The objectives of the discipline - the formation of theoretical knowledge and practical skills in the use of optical laws to solve a wide range of problems in various fields of science and technology, as well as in the representation of the physics of optical phenomena as a generalization of observations, practical experience and experiment. To give the basic principles and laws of optics and their mathematical expression; to acquaint him with the basic optical phenomena, methods of their observation and experimental research, with the main methods of accurate measurement of physical quantities.</p>	3
7.	<p style="text-align: center;">Electricity and magnetism</p> <p>The aim of the course is to study electromagnetic interactions as one of the fundamental interactions in nature, the basic experimental laws underlying the theory of electromagnetism, the General laws of electromagnetism, the connection of electromagnetic theory with modern technology. Objectives of the discipline: the formation of students' knowledge and skills to apply the laws of static fields and electromagnetic fields to solve practical problems; evaluate the main parameters in the interaction of substances with different fields.</p>	4
8.	<p style="text-align: center;">Physics of atom, atomic nucleus and solid state</p> <p>Representation of the physical theory of the atom as a generalization of observation, practical experience and experiment, set out at the appropriate mathematical level, as a relationship between physical phenomena and quantities. Formation of students' ideas in the field of nuclear physics, necessary for the production, research and project activities of the specialist. As a result of the development of the discipline, the student must know: the basic laws and phenomena of the microcosm; the basic methods of nuclear physics research; types of nuclear reactions and their laws; the laws of the passage of radiation through matter; sources and detectors of nuclear radiation. Application of the acquired knowledge in practical activities carrying out evaluation calculations of nuclear transformations</p>	4