AGREED
Director "RM Company LTD" LLP "
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I approve "Transport and construction"
Director of the Institute Abdreshov Sh.A .
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CATALOG OF DISCIPLINES OF THE COMPONENT BY CHOICE
EDUCATIONAL PROGRAM 6B07347 Digital construction and BIM technologies
Education level: Bachelor's degree Duration of study: 3 years Admission year: 2025

Cycle	Component	Name of the discipline	Total labor intensity		Term	Learning outcomes academic hours	Brief description of the discipline	Prerequisites	Post-requirements academic hours
			academic hours	academic hours					
1	2	3	4	5	6	7	8	9	10
GED	KV	Environmentally sustainable technologies	150	5	5	LO 5	The formation of knowledge about environmentally sustainable technologies includes the study and development of solutions aimed at the sustainable development of society with minimal impact on the environment. These technologies play a key role in reducing pollution, managing natural resources, reducing greenhouse gas emissions, and preserving ecosystems. Education in environmentally sustainable technologies contributes to the formation of competencies that are necessary for the creation and implementation of innovative solutions aimed at a sustainable future.	History of Kazakhstan. Kazakh (Russian) language, Professionally oriented foreign language, Professionally oriented foreign language, Cultural studies, Political Science, Psychology	Final certification
		Green economy and sustainable entrepreneurship				LO 5	Formation of knowledge about concepts aimed at developing economic models that promote environmental sustainability, social progress and economic growth, while not depleting natural resources. This includes studying the principles of the green economy and sustainable	History of Kazakhstan. Kazakh (Russian) language, Professionally oriented foreign language, Professionally oriented	Final certification

							entrepreneurship, which are focused on creating innovative solutions for the conservation of ecosystems, the efficient use of resources and the promotion of sustainable development in various sectors of the economy..	foreign language, Cultural studies, Political Science, Psychology	
		Fundamentals of financial literacy				LO6	The formation of knowledge about the principles of managing personal and family finances includes the development of skills for making informed financial decisions. This important skill helps you effectively plan your budget, manage income and expenses, invest, and properly plan your retirement savings and manage your debts. Knowledge of financial literacy contributes to the development of the ability to make informed decisions that ensure financial stability and well-being	History of Kazakhstan. Kazakh (Russian) language, Professionally oriented foreign language, Professionally oriented foreign language, Cultural studies, Political Science, Psychology	Final certification
		Digital inclusion				LO 11	The formation of knowledge about the process of ensuring equal access to digital technologies and Internet resources is aimed at eliminating digital inequality and creating conditions for the full participation of every person in the digital society, regardless of their age, social status, education, physical condition or place of residence. The goal of digital inclusion is to ensure equal opportunities for everyone in the use of modern technologies, which contributes to the integration of various population groups into the digital environment and to improving the quality of life.	History of Kazakhstan. Kazakh (Russian) language, Professionally oriented foreign language, Professionally oriented foreign language, Cultural studies, Political Science, Psychology	Final certification
		Fundamentals of law and anti-corruption culture				LO 5	The formation of knowledge about the fundamentals of law and anti-corruption culture is the development of important concepts aimed at developing legal awareness and shaping public behavior focused on upholding the rule of law and combating corruption. This helps to foster responsibility, respect for the law and an active civic position. Training in the basics of law (for example, the Constitution, laws, regulations), so that participants understand their rights and obligations, as well as be aware of the possible consequences of violations.	History of Kazakhstan. Kazakh (Russian) language, Professionally oriented foreign language, Professionally oriented foreign language, Cultural studies, Political Science, Psychology	Final certification
BD	KV	Theoretical					Formation of logical thinking and scientific	Engineering	Resistance of materials,

		mechanics	120	4	1	LO 1	foundation of engineering education. He studies the basic concepts, axioms, laws and theorems that make it possible to formulate equations describing the behavior of systems, a specific phenomenon in mathematical form, mathematical models of the behavior of material bodies, the basic methods of classical mechanics in the study of motion and equilibrium of mechanical systems in the study of professional disciplines. It allows you to delve into Newton's laws, the laws of conservation (energy, momentum, etc.), as well as their application to a wide range of mechanical systems.	mathematics 1, Construction Physics, Building materials, Computer and engineering modeling.	Construction mechanics, Building materials, Architectural design of buildings and structures, Building structures
		Fundamentals of classical mechanics					It provides the development of scientific knowledge in the theoretical branch of physics — classical mechanics, mastering theoretical methods for solving physical problems and the formation of a modern physical picture of the world. In the process of studying mechanical phenomena, an understanding of the physical nature of electrical and magnetic processes is achieved, which contributes to a holistic perception of physical laws. The use of Newton's laws makes it possible to predict the movement of bodies under the influence of forces, from simple cases such as falling objects to complex systems, including the movement of planets and spacecraft.	Engineering Mathematics 1, Structural Physics, Engineering Graphics and computer modeling.	Resistance of materials, Construction mechanics, Building materials, Architectural design of buildings and structures, Building structures
		Resistance of materials	150	5	2	LO 2	Formation of knowledge about the strength, rigidity and stability of rods and rod systems, study of the basics of designing rod structures operating under tension, compression, shear, shear, torsion and bending. He studies methods and practical techniques for calculating rods, flat and volumetric structures under various force, deformation and temperature influences using classical and modern methods of structural calculation and mechanical testing.	Engineering Mathematics 1, Structural Physics, Theoretical Mechanics	Architectural design of buildings and structures, Construction mechanics, Foundations and foundations, Building structures
		Applied mechanics					Formation of a theoretical basis for understanding calculation methods for strength, rigidity and stability of machine and equipment elements, ensuring its reliability and efficiency.	Engineering Mathematics 1, Structural Physics, Theoretical Mechanics	Fundamentals of financial literacy, Critical thinking, Managerial economics, Time management.

BD	KV						It studies the deformations and strength conditions of bodies and provides the general principles necessary to ensure the reliability of structures of any purpose, the correct calculation of the dimensions of structural elements and parts. The subject helps to find effective solutions for the design, operation and optimization of various mechanisms, machines and structures.		
BD	KV	Construction mechanics	150	5	3	LO 2	Formation of skills in designing standard structures related to the choice of a design scheme, determining the most loaded structural elements and calculating internal forces and stresses. Studies methods for calculating forces in statically definable and indefinable rod systems under constant and temporary loads, determining displacement in rod systems to ensure the strength and reliability of structures combined with high efficiency.	Engineering Mathematics 1, Structural Physics, Theoretical Mechanics, Resistance of materials	Architectural design of buildings and structures, Foundations and foundations, Building structures, Reconstruction of buildings and structures
		Mechanics of structural strength					Formation of skills in the field of work analysis and calculation of structures made of various materials under various influences using modern computing equipment. He studies the features of the laws of stress and strain distribution in structural elements under various conditions of external load, principles and methods of static and dynamic calculation of engineering structures for strength, rigidity, stability. The search for the most effective solutions that provide the necessary strength with minimal cost of materials and resources.	Engineering Mathematics 1, Structural Physics, Theoretical Mechanics, Resistance of materials	Architectural design of buildings and structures, Foundations and foundations, Building structures, Reconstruction of buildings and structures
BD	KV	Geology and mechanics of soils	150	5	4	LO 2,3	The formation of skills in the field of geology and mechanics of soils is aimed at studying the structure, composition, properties and behavior of soils (land masses), as well as their interaction with engineering structures and structures. These disciplines form the basis for the design and construction of infrastructure facilities such as buildings, bridges, roads, and other structures. The training includes the development of methods for analyzing and evaluating ground conditions, which contributes to the effective design and safety of	Construction Physics, Construction Chemistry, Building Materials, Theoretical Mechanics	Foundations and foundations, Electrical engineering and fundamentals of electronics, Building structures, Technology of construction production 1,2,3, Engineering systems and networks of buildings and structures.

							construction facilities.		
		Geoinformation systems in geology					The formation of skills in the field of geographic information systems (GIS) includes the development of technologies and tools that allow you to collect, analyze, visualize and manage geographical and geological data to solve various problems in geological research and development. This helps to effectively use GIS to create geological maps, model processes, assess natural resources, and analyze geological phenomena, which contributes to improving the quality of research and informed decision-making.	Construction Physics, Construction Chemistry, Building Materials, Theoretical Mechanics	Construction Foundations and foundations, Electrical engineering and fundamentals of electronics, Building structures, Technology of construction production 1,2,3, Engineering systems and networks of buildings and structures
BD	KV	Foundations and foundations	150	5	5	LO 3	Formation of knowledge about the basic laws of soil behavior under load, the theory of stress-strain state and their interaction with structures. He studies the basic methods for determining the sedimentation of foundations, the stability of slopes and slopes, as well as the morphology, dynamics and regional features of the upper horizons of the Earth's crust (lithosphere) and their relationship with engineering structures. One of the main tasks is to create foundations that will ensure the stability of the entire building or structure under any external influences.	Theoretical Mechanics, Fundamentals of Classical Mechanics, Resistance of materials, Applied Mechanics, Engineering Geology, Hydrogeology and soil mechanics,	Design and calculation of reinforced concrete structures, Design and calculation of metal structures, Design and calculation of special structures, Technology of construction production 1,2,3, Reconstruction of buildings and structures
		Geotechnics in foundation engineering					Formation of knowledge about the basic laws of soil behavior under load, the theory of stress-strain state and their interaction with structures. He studies the basic methods for determining the sedimentation of foundations, the stability of slopes and slopes, as well as the morphology, dynamics and regional features of the upper horizons of the Earth's crust (lithosphere) and their relationship with engineering structures. It is important to correctly determine the physical, mechanical, and hydrological properties of the soils at the construction site (density, strength, subsidence, groundwater level, seismic activity, and other characteristics).	Theoretical Mechanics, Fundamentals of Classical Mechanics, Resistance of materials, Applied Mechanics, Engineering Geology, Hydrogeology and soil mechanics,	Design and calculation of reinforced concrete structures, Design and calculation of metal structures, Design and calculation of special structures, Technology of construction production 1,2,3, Reconstruction of buildings and structures

		Electrical engineering and the basics of electronics	120	4	7	LO 1	Formation of basic knowledge and skills in the field of electrical engineering and the basics of electronics. The laws of electrical circuits, principles of operation of electrical machines and apparatuses, as well as elements and circuits of analog and digital electronics are studied. The basics of measuring electrical quantities, safety when working with electrical installations, and the use of electrical equipment in construction and other industries are considered.	Construction physics, Building materials, Architectural design of buildings and structures, Engineering graphics and computer modeling,	Occupational safety and health, Reconstruction of buildings and structures, Regulatory and technical documentation in construction.
		Hydraulic engineering calculations and measurements					Formation of knowledge and skills in performing electrical calculations of construction facilities. The methods of calculating electrical loads, the choice of cable lines, protection devices and grounding systems are being studied. Power supply schemes, calculation of short-circuit currents, ensuring electrical safety and reliability of power supply are considered. Special attention is paid to the application of regulatory documents and software tools in the design of power grids of buildings and structures.	Construction physics, Building materials, Architectural design of buildings and structures, Engineering graphics and computer modeling,	Occupational safety and health, Reconstruction of buildings and structures, Regulatory and technical documentation in construction.
BD	KV	Managerial economics	90	3	6	LO 7	Formation of the conceptual framework and development of economic analysis skills using modern models and patterns of economics, consideration of economic problems and tasks facing the head of the company. Studying this discipline will allow students to acquire and develop knowledge in the field of analytical research of economic, technological and technical parameters of an enterprise, as well as to master the skills of applying special methods of economic justification of management decisions and assessing their consequences.	Environmental sustainable technologies, Fundamentals of financial literacy,	Construction production technology 3, Technical operation of buildings and structures, Engineering systems and networks of buildings and structures, Organization of construction production
BD	KV	Time management					The discipline studies a system of methods, tools and approaches that are aimed at effective	Environmental sustainable	Construction production technology 3, Technical

							time management in order to achieve the tasks set. The course is designed to improve the skills of organizing and optimizing the use of working time, increase work productivity, reduce stress, planning, delegation, use of tools and technologies, as well as to know your time and energy rhythms in order to use your time effectively.	technologies, Fundamentals of financial literacy,	operation of buildings and structures, Engineering systems and networks of buildings and structures, Organization of construction production
BD	KV	Automated design of oil and gas facilities	120	4	8	LO 4. 9	Develops skills in the use of computer technology and specialized software for the development, modeling and optimization of design solutions in the field of civil and industrial buildings. The use of such software products minimizes errors related to the human factor and ensures high accuracy of calculations and design decisions. Automated systems make it possible to integrate data from various design stages (geophysics, hydrodynamics, mechanics, etc.) and promptly update all related elements of the project.	Digital inclusion, Information and communication technologies, Engineering graphics and computer modeling	Minor program 3 Final assessment.
		Automated design systems for oil and gas facilities					Develops skills in working with specialized software designed to automate the design and development of civil and industrial facilities. The use of such systems increases the accuracy and speed of design, improves coordination between different departments, and contributes to effective data and documentation management. The main purpose of computer—aided design (CAD) systems is to automate routine and time-consuming steps, including creating drawings, calculating structures, modeling engineering systems, and preparing design documentation. This significantly reduces the design time and improves the accuracy of calculations.	Digital inclusion, Information and communication technologies, Engineering graphics and computer modeling	Minor program 3 Final assessment.
BD	KV	BIM technologies in the design of engineering systems and networks of buildings and structures	120	4	7	LO 10	Builds knowledge and skills of using BIM technologies in the design of engineering systems and networks of buildings and structures. It includes modeling of water supply, heating, ventilation, electricity and communication systems using information models. Special attention is paid to the coordination of design decisions between	Engineering Mathematics 1,2, Construction Physics, Construction Chemistry, Building materials, Architectural design of buildings and structures, Technology	Occupational safety and health, Technical operation of buildings and structures

							different engineering departments, collision avoidance, optimization of equipment placement and network tracing. Mastering the methods of teamwork in the BIM environment makes it possible to increase the accuracy of design, reduce the time required for the development of project documentation and ensure effective interaction between all participants in the construction project.	of construction production 1	
		BIM technologies in water supply, sanitation, heat and gas supply and ventilation systems					BIM technologies provide integrated design, modeling and coordination of water supply, sanitation, heat and gas supply and ventilation systems. They allow you to accurately calculate the parameters of engineering networks, identify possible collisions at the design stage, optimize costs and increase the energy efficiency of facilities. The use of BIM helps to improve the quality of design solutions and accelerate construction processes.	Engineering Mathematics 1,2, Construction Physics, Construction Chemistry, Building materials, Architectural design of buildings and structures, Technology of construction production 1	Occupational safety and health, Technical operation of buildings and structures
BD	KV	Construction machinery and equipment	120	4	4	LO 8	Studies the general devices of construction machinery, lifting and transport machinery, machinery for excavation and preparatory work, machinery for crushing and sorting stone materials, machinery and equipment for the preparation of concrete mixtures and mortars and their transportation, machinery and equipment for the distribution and compaction of concrete mixtures, mechanized tools. The discipline uses discussion	Engineering Mathematics 1,2, Building Physics, Building Chemistry, Building Materials, Engineering Geodesy,	Technology of construction production 1, 2,3, Foundations and foundations, Electrical engineering and fundamentals of electronics, Reconstruction of buildings and structures, Technology of construction of high-rise buildings, Organization of construction production
		Machines and mechanisms in pipeline construction					Forms a systematic understanding of the mechanization of construction processes and the variety of construction machinery. It covers issues related to drives and running gear, lifting and transport equipment, machines for excavation, drilling and piling operations, equipment for the preparation, transportation and compaction of concrete and mortars, as well as equipment for finishing work. The course uses a computational and analytical method to study the technical characteristics and operating	Engineering Mathematics 1,2, Building Physics, Building Chemistry, Building Materials, Engineering Geodesy,	Technology of construction production 1, 2,3, Foundations and foundations, Electrical engineering and fundamentals of electronics, Reconstruction of buildings and structures, Technology of construction of high-rise buildings, Organization of construction production

							principles of construction machinery.		
BD	KV	Technology of construction of high-rise buildings	180	6	7	LO 7	Formation of knowledge and practical skills in the field of technology for the construction of high-rise buildings. The features of construction processes at different stages, methods of organizing work in cramped conditions, the use of special equipment, modern building materials and technologies are studied. The issues of ensuring safety, quality, stability of structures and compliance with regulatory requirements during the construction of high-rise buildings are considered.	Engineering geodesy, Building materials, Architectural design of buildings and structures, Geology and mechanics of soils, Foundations and foundations, Construction machinery and equipment, Building structures, Technology of construction production 1, 2,	Occupational safety and health, Reconstruction of buildings and structures, Organization of construction production, Technical operation of buildings and structures,
		Technological processes of construction of high-rise buildings					Formation of knowledge and skills in the field of technological processes for the construction of high-rise buildings. The stages of construction, methods of performing excavation, foundation, monolithic and installation works, as well as the use of modern construction machinery and equipment are studied. Special attention is paid to the organization of work in limited areas, ensuring safety, quality control and compliance with regulatory requirements for the construction of high-rise buildings.	Engineering geodesy, Building materials, Architectural design of buildings and structures, Geology and mechanics of soils, Foundations and foundations, Construction machinery and equipment, Building structures, Technology of construction production 1, 2,	Occupational safety and health, Reconstruction of buildings and structures, Organization of construction production, Technical operation of buildings and structures,
BD	KV	Organization and planning of construction of buildings and structures	150	5	8	LO 8	Develops knowledge and skills necessary for effective management of civil and industrial facilities construction processes. It includes planning, coordination and control of all stages of project implementation — from the development of project documentation to the commissioning of facilities. Special attention is paid to meeting deadlines, budgets and safety standards, as well as minimizing risks and rational use of resources.	Engineering geodesy, Building materials, Architectural design of buildings and structures, Foundations and foundations, Construction machinery and equipment, Building structures, Technology of construction production 1, 2, 3	Technical operation of buildings and structures, Industrial practice 2/ Pre-graduate practice, Final certification
		Organization of					It forms the knowledge and skills necessary for effective management of construction	Engineering geodesy, Building materials,	Technical operation of buildings and structures,

		construction production					processes. It covers the planning, organization, coordination and control of all stages of construction production, as well as the management of resources, personnel and time parameters of the project. The main objective is to ensure high-quality, safe and timely execution of construction works while optimizing costs and minimizing risks arising during the implementation of the project.	Architectural design of buildings and structures, Foundations and foundations, Construction machinery and equipment, Building structures, Technology of construction production 1, 2, 3	Industrial practice 2/ Pre-graduate practice, Final certification
BD	KV	Diagnostics of buildings and structures using BIM technologies	150	5	9	LO 7	The use of BIM technologies in the diagnosis of buildings and structures makes it possible to effectively identify defects, analyze the technical condition of structures, predict the remaining service life and develop reasonable repair and restoration measures. Information modeling facilitates the processing of survey data, improves the accuracy of estimates, and optimizes engineering decision-making at all stages of the facility's life cycle.	Engineering geodesy, Building materials, Architectural design of buildings and structures, Foundations and foundations, Construction machinery and equipment, Building structures, Technology of construction production 1, 2, 3	Pre-graduate practice, Final certification
		Inspection and testing of buildings and structures using BIM technologies					The use of BIM technologies in the inspection and testing of buildings and structures allows you to create accurate digital models of objects, fix defects and damages, and analyze changes in the state of structures over time. The use of information modeling increases the accuracy of diagnostics, optimizes the planning of repairs and upgrades, reduces costs and increases the service life of buildings.	Engineering geodesy, Building materials, Architectural design of buildings and structures, Foundations and foundations, Construction machinery and equipment, Building structures, Technology of construction production 1, 2, 3	Pre-graduate practice, Final certification
BD	KV	Information modeling technology in architecture and construction	90	3	7	LO 4	Develops knowledge and skills based on the use of digital models for planning, designing, building and operating buildings and infrastructure facilities. It includes mastering the BIM (Building Information Modeling) methodology, which integrates all stages of an object's life cycle — from conceptual design to operation and dismantling. Ensures a high degree of efficiency, accuracy and coordination	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural studies, Political Science, Psychology	Occupational safety, Maintenance and repair of oil and gas pipelines, Pipeline transportation of oil and gas, Production practice 2

							at all stages of the project implementation.		
		Minor program 1					The first of the three disciplines, which allows you to form additional professional competencies in various subject areas. The program allows you to study disciplines in another field of knowledge that complements their main specialization (major). This helps to develop interdisciplinary thinking and provides an opportunity to gain additional skills and knowledge that may be useful in the future. In general, the aim is to provide students with the opportunity to expand their professional training, improve interdisciplinary skills and increase their competitiveness in the labor market.	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural studies, Political Science, Psychology	Occupational safety, Maintenance and repair of oil and gas pipelines, Pipeline transportation of oil and gas, Production practice 2
		Regulatory and technical documentation in construction	90	3	8	LO 9	Develops the knowledge and skills necessary to understand and apply the regulatory and technical documentation governing the design, construction, operation and safety of civil and industrial facilities. It includes the study of standards, technical regulations, norms and rules, as well as mastering the skills of working with various types of documentation that ensure compliance with legal requirements, industrial safety and quality at all stages of the life cycle of oil and gas industry facilities. Special attention is paid to preparing for the correct interpretation and implementation of regulatory requirements to ensure safe, efficient and environmentally sustainable activities in the industry.	Building materials, Architectural design of buildings and structures	Technical operation of buildings and structures, Industrial practice 2/ Pre-graduate practice, Diagnostics of buildings and structures, Estimated pricing in architecture and construction, Final certification
		Minor program 2					The second of the three disciplines, which allows you to form additional professional competencies in various subject areas. The program helps to develop skills that are useful in various professions, such as analytical skills, information processing, critical thinking and creativity. This makes students more flexible and ready to solve complex problems in different fields and at that time.	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural studies, Political Science, Psychology	Technical operation of buildings and structures, Industrial practice 2/ Pre-graduate practice, Diagnostics of buildings and structures, Estimated pricing in architecture and construction, Final certification
		Estimated pricing in	90	3	9	LO 7	The discipline studies the formation of knowledge and skills related to the process of	Fundamentals of financial literacy,	Final certification

BD	KV	architecture and construction					determining the cost of construction, repair and reconstruction of facilities based on the calculation of all costs associated with the performance of work and the use of materials. Estimated pricing includes the development of estimates that help to accurately plan costs, assess the financial needs of the project and effectively manage resources at all stages of construction.	Building materials, Architectural design of buildings and structures, Managerial economics, Construction production technology 1,2,3, Reconstruction of buildings and structures, Construction machinery and equipment	
		Minor program 3					The third of the three disciplines, which allows you to form additional professional competencies in various subject areas. Provides an opportunity to master an additional field of knowledge that complements the basic professional training. Promotes the formation of a holistic and multidisciplinary education by integrating knowledge from related disciplines with the main specialization in the oil and gas industry.	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural studies, Political Science, Psychology	Final certification
BD	KV	Service to society	30	1	1	LO 7	Формирует знания и навыки, необходимые для активного участия в жизни общества. Особое внимание уделяется служению обществу — добровольной деятельности, направленной на благо других людей и социума в целом. Это может проявляться в помощи нуждающимся, участии в благотворительных и волонтёрских инициативах, защите окружающей среды, а также в деятельности в сферах образования, здравоохранения и культуры. Подобные формы социальной активности способствуют развитию ответственности, гуманности и гражданской позиции.		
		Business communications					It forms the knowledge and skills necessary for successful interaction in a professional environment. Special attention is paid to the exchange of information in the business sphere in order to achieve common goals. Business communications include both oral and written		

							communication that takes place both within an organization (internal communications) and outside it (external communications). Effective mastery of these skills contributes to productive work, mutual understanding and the development of business relationships.		

Head of the Department of Architectural and Construction Engineering, _____ K.S. Kulmanov.