AGREED
Director "RM Company LTD" LLP "
Bugybayev R.

I approve "Transport and construction"
Director of the Institute Abdreshov Sh.A .
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CATALOG OF DISCIPLINES OF THE UNIVERSITY COMPONENT

EDUCATIONAL PROGRAM 6B07329 Construction of industrial and civil buildings and structures

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
BD	VK	Engineering mathematics 1	150	5	1	LO 1	Mastering the mathematical apparatus for solving theoretical and applied problems of a specific profile, getting an idea of mathematical modeling and interpretation of the solutions obtained. The course sections include elements of linear algebra and analytical geometry, an introduction to mathematical analysis, and differential calculus of functions of one and several variables. provide students with the necessary mathematical tools to solve problems related to the design, analysis and optimization of engineering systems.	Basic school knowledge in mathematics	Engineering Mathematics 2, Construction Chemistry, Engineering Geodesy
BD	VK	Engineering mathematics 2	150	5	2	LO 1	Formation of mathematical knowledge and skills necessary for the study of related natural sciences, disciplines of the professional cycle and skills of mathematical modeling and research in professional activities. The course sections include integral	Engineering mathematics 1	Architectural design of buildings and structures, Educational practice (geodetic

							calculus of functions of one and several variables, ordinary differential equations, and series theory. Special attention is paid to the application of mathematical methods to solve engineering problems.		
BD	VK	Construction Physics	150	5	1	LO 1	Formation of knowledge, skills and competencies necessary for the development, design and operation of energy-efficient, comfortable and durable buildings and structures. He studies the physical processes and phenomena occurring in building structures and buildings, as well as their interaction with the environment, the basics of construction and architectural acoustics, building climatology, lighting engineering, thermal engineering. The course helps to learn how to minimize the negative impact of external and internal physical factors on buildings.	Basic school knowledge in physics	Engineering Mathematics 2, Construction Chemistry, Engineering Geodesy, Educational practice (geodetic)
BD	VK	Construction chemicals	120	4	2	LO 3	The formation of knowledge in the field of building chemistry is associated with the development of science and technology aimed at improving building materials and their application processes. Construction chemistry studies and develops chemical materials, additives and substances that affect the properties of building structures, ensuring their strength, durability, resistance to external influences and energy efficiency. An important part of the course is studying the environmental impact of building chemicals.	Engineering Mathematics 1, Construction Physics	Building materials, Construction mechanics
BD	VK	Engineering geodesy	180	6	3	LO 4	Forms professional competencies necessary for the application of basic knowledge in the field of geodesy. It provides geodetic measurements for solving typical construction tasks, detailed breakdown of structures, control of the geometry of structures under construction, carrying out executive surveys at various stages of construction and installation work, as well as mastering the skills of working with basic geodetic instruments in production conditions.	Engineering Mathematics 1,2, Building Physics, Building Materials.	Architectural design of buildings and structures, Building structures, Fundamentals of water supply and sanitation, heat and gas supply and ventilation, Technology of construction production
BD	VK	Building materials	180	6	2	LO 3	The formation of knowledge about building materials consists in obtaining in-depth knowledge about various types of materials, their characteristics and methods of application. This knowledge is necessary in order to choose the	Engineering Mathematics 1, Construction Physics	Engineering geodesy, Building structures, Technology of construction production 1

							materials for construction competently, thereby ensuring the durability, safety, economic efficiency and functionality of the facilities. The course is aimed at familiarizing students with various types of building materials, such as concrete, brick, metal, wood, glass, insulation and finishing materials. An important task is to study their physical and mechanical properties.		
BD	VK	Architectural design of buildings and structures	150	5	4	LO9	Formation of professional skills in the field of building design for various purposes, taking into account functional, constructive, aesthetic and regulatory requirements. In the course of training, they master the principles of spatial planning solutions, work with architectural graphics, layout design and modern software modeling tools. Special attention is paid to the harmonious combination of architectural form, engineering solutions and urban context.	Engineering Mathematics 1,2, Building Physics, Building Materials.	Environmentally sustainable technologies, Foundations and foundations, Geotechnics in foundation engineering, Building structures, Technology of construction production 1, 2,3
BD	VK	Occupational safety and health	150	5	8	LO 6	Formation of knowledge and skills that ensure human safety in professional and daily activities. The course covers the prevention of occupational injuries, minimization of occupational risks, as well as the basics of ensuring the sustainability of systems in emergency situations. Special attention is paid to legislation in the field of occupational safety, occupational hygiene and ergonomics, as well as means of individual and collective protection.	Building materials, Engineering geodesy, Technology of construction production 1, 2.3	Technical operation of buildings and structures, Production practice 2, Diagnostics of buildings and structures, Inspection and testing of buildings and structures, Minor program 3.
BD	VK	Engineering graphics and computer modeling	150	5	1	LO 4	Formation of basic skills in the field of technical drawing, project documentation and creation of three-dimensional models using modern software tools. The methods of graphical representation of technical objects, reading and executing drawings, as well as the basics of 2D and 3D modeling are studied. The course lays the foundation for subsequent engineering design and preparation of design documentation.	Basic school knowledge in computer science	Fundamentals of Python programming, Engineering Mathematics 2, Engineering Geodesy, Architectural design of buildings and structures.
BD	VK	Basics of Python Programming	90	3	2	LO 4	It forms the basic knowledge and skills necessary for the effective use of Python in solving various programming tasks. It includes mastering the syntax and basic constructions of the language, developing logical thinking and the ability to solve	Engineering Mathematics 1, Engineering Graphics and Computer Modeling	Architectural design of buildings and structures, Building structures

							practical problems using programming. It covers the key elements of Python: variables, operators, data structures (lists, tuples, sets, dictionaries), conditional operators, loops, functions, and classes.		
BD	VK	Professionally oriented foreign language	90	3	6	LO 9	It takes into account the needs for learning a foreign language, determined by the specifics of the future profession or specialty. It involves a combination of mastering a professionally oriented foreign language with the development of personal qualities, knowledge of the culture of the country of the language being studied and the formation of special skills based on professional and linguistic knowledge. Provides the mastery of specialized vocabulary and phraseology used in a specific professional field.	Computer and engineering modeling, The basics of artificial intelligence, , Engineering mathematics 1.2, Construction Physics.	Computer-aided design of buildings and structures, Information modeling technology in architecture and construction, Regulatory and technical documentation in construction
BD	VK	Educational practice (geodetic)	60	2	3	LO 4	It provides familiarization with the fields of professional activity and training profiles, as well as with the skills of performing geodetic surveys of the area, forward and reverse movement, leveling, reference to reference points, taking out points and elevation marks from the map. It includes solving typical engineering and geodetic tasks and mastering the correct use of various types of geodetic equipment for accurate measurements and surveys. It provides for setting up and calibrating instruments, as well as working with software for processing the received data.	Engineering Mathematics 1-2, Construction Physics. Engineering geodesy, Building materials,	Architectural design of buildings and structures, Occupational safety and life safety, Geology and mechanics of soils, Foundations and foundations, Technology of construction production 1, Technology of construction production 2
BD	VK	Design and calculation of reinforced concrete structures	150	5	6	LO 2,9	Formation of knowledge and practical skills in the design and calculation of reinforced concrete structures, taking into account current regulatory documents and requirements. The issues of strength, stability, crack resistance, reinforcement and construction of elements are studied. Special attention is paid to design schemes, selection of materials and ensuring the reliability of building structures in various operating conditions.	Engineering Mathematics 1-2, Structural Physics, Building materials, Architectural design of buildings and structures, Building structures	Design and calculation of special structures, Reconstruction of buildings and structures, Technology of construction production 3, Technology of construction of high-rise buildings
BD	VK	Design and calculation of metal structures	150	5	7	LO 2,9	Formation of knowledge and skills in the design and calculation of metal structures, taking into account current standards and safety requirements. The strength characteristics of metals, calculation of stability, reliability of joints, as well as methods for increasing the durability of structures are	Engineering Mathematics 1-2, Structural Physics, Building materials, Architectural design of buildings and	Design and calculation of special structures, Reconstruction of buildings and structures

							studied. Special attention is paid to the calculation of the elements of the frames of buildings, structures and bridges in various operating conditions.	structures, Building structures	
BD	VK	Reconstructio n of buildings and structures	150	5	8	LO 7,10	Formation of knowledge and skills in the field of building inspection and inspection, followed by the preparation of a technical report. The methods of repair, reinforcement and replacement of structures, redevelopment of premises, modernization of stairway and elevator units, as well as the construction of superstructures, extensions and built-in rooms are considered. The methods of increasing heat and waterproofing, modernization of engineering networks, and the procedure for developing design estimates for reconstruction are being studied.	Engineering Mathematics 1-2, Construction physics, Building materials, Architectural design of buildings and structures, Building structures, Design and calculation of reinforced concrete structures, Design and calculation of metal structures, Technology of construction production 1,2,3	Technical operation of buildings and structures, Diagnostics of buildings and structures, Inspection and testing of buildings and structures
BD	VK	Building structures	150	5	5	LO 2,9	Forms the basic knowledge of shaping, calculation and construction of load-bearing structures, the ability to choose the right materials, cross-section shape, design scheme, based on the purpose and purpose of operation, develop design solutions for buildings and structures under construction, master the skills of calculating structural elements according to limiting conditions, ensuring compliance with the required indicators of reliability, efficiency, efficiency. The main purpose of the course is to teach the principles of building structure design. This includes knowledge of the requirements for strength, safety, stability, and cost-effectiveness of design solutions.	Engineering Mathematics 1-2, Structural Physics, Building materials, Architectural design of buildings and structures	Design and calculation of reinforced concrete structures, Design and calculation of metal structures, Design and calculation of special structures, Reconstruction of buildings and structures, Technology of construction production 2, 3, Technology of construction of high-rise buildings, Reconstruction of buildings and structures.
BD	VK	Design and calculation of special structures	150	5	8	LO 2,3	Formation of knowledge and skills in the field of design and calculation of special structures for various purposes. The features of design solutions, design schemes, and methods for ensuring strength, stability, and reliability in difficult operating	Engineering Mathematics 1-2, Structural Physics, Building materials, Architectural design	Technical operation of buildings and structures, Diagnostics of buildings and structures, Inspection

							conditions are studied. The issues of the choice of materials, construction technologies and compliance with regulatory requirements for the creation of facilities of increased responsibility and special purpose are considered.	of buildings and structures, Building structures	and testing of buildings and structures
BD	VK	Construction production technology 1	150	5	5	LO 7	Formation of knowledge and skills in the field of organization and technology of construction production. The main construction processes, methods of construction of buildings and structures, technologies of excavation, concrete, installation and finishing works are studied. Special attention is paid to the rational use of machinery, labor organization, labor protection and safety, as well as ensuring the quality of construction products at all stages of production.	Engineering Mathematics 1-2, Structural Physics, Engineering Geodesy, Building Materials, Geology and Mechanics of soils, Architectural design of buildings and structures	Технология строительного производства 2,3, Технология возведения высотных зданий, Реконструкция зданий и сооружений, Техническая эксплуатация зданий и сооружений, Организация строительного производства, Охрана труда и безопасность жизнедеятельности
BD	VK	Construction production technology 2	150	5	6	LO 7,8	Formation of in-depth knowledge and skills in the field of technology for the construction of buildings and structures from prefabricated structures. Advanced methods of organizing construction processes, modern building materials and technologies, as well as mechanization and automation of construction work are studied. The features of the construction of large and complex facilities, construction management, as well as issues of quality, safety and ecology at all stages of the construction process are considered.	Engineering Mathematics 1-2, Construction physics, Engineering Geodesy, Building materials, Architectural design of buildings and structures, Foundations and foundations, Technology of construction production 1	Technology of construction production 3, Technology of construction of high-rise buildings, Reconstruction of buildings and structures, Technical operation of buildings and structures, Organization of construction production, Labor protection and life safety

BD	VK	Construction production technology 3	150	5	7	LO 7,8	Formation of in-depth knowledge and skills in the field of organization and technology of construction of buildings and structures from monolithic structures. Innovative methods and technologies used in modern monolithic concrete and reinforced concrete construction processes, including automation, mechanization and the use of highly efficient materials, are considered. The issues of construction project management, quality assurance, safety and ecology, as well as cost and time optimization at all stages of construction are being studied.	Engineering Mathematics 1-2, Construction physics, Engineering Geodesy, Building materials, Architectural design of buildings and structures, Foundations and foundations, Technology of construction production 1,2	Reconstruction of buildings and structures, Technical operation of buildings and structures, Organization of construction production, Labor protection and life safety
BD	VK	Technical operation of buildings and structures	150	5	9	LO 8	Formation of knowledge and skills in the field of technical operation of buildings and structures. The basic principles of maintenance, repair and operation of various engineering systems and structures are studied. The issues of monitoring the condition of buildings, emergency prevention, maintenance planning, as well as efficient use of resources and increasing energy efficiency during operation are considered.	Инженерная математика1-2, Строительная физика, Строительные материалы, Архитектурное проектирование зданий и сооружений, Основания и фундаменты, Технология строительного производства 1,2,3	FINAL CERTIFICATION
		Production practice 1	150	5	6	LO 8	The main objectives of industrial practice are: consolidation of theoretical knowledge and practical skills in the chosen educational program in an industrial environment, acquisition of organizational work experience, obtaining a working specialty, formation of practical skills and competencies in the process of mastering the bachelor's program. Students have the opportunity to work with the technologies and methods that have been studied in theory, which allows them to strengthen their understanding and see how this knowledge is applied in practice.	Educational practice (geodetic), Technology of construction production 1	Production practice 2

BD	VK	Production practice 2/ Pre-graduate practice	150	5	9	LO 8	It forms the knowledge and skills necessary for successful preparation for professional activity. At this stage of training, the opportunity is provided to apply the theoretical knowledge gained during the educational process in a real-world production environment. Pre-graduate practice includes preparation for writing a thesis focused on solving real problems and challenges that arise in the company.	Educational practice (geodetic), Industrial practice 1, Technology of construction production 1,2,3, Organization of construction production, Labor protection and life safety	FINAL CERTIFICATION

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