Institute of Architecture and Construction named after T.K. Basenov
Department of Building and Building Materials

EDUCATIONAL PROGRAM
6B07302 «Civil Engineering»

Code and name of educational program

Code and classification of the field of education: **6B07 Engineering, Manufacturing and Civil engineering**
Code and classification of training directions: **6B073 Architecture and Civil engineering**
Group of educational programs: **B074 Urban planning, construction work and Civil engineering**
Level based on NQF: **6**
Level based on IQF: **6**
Study period: **4 years**
Amount of credits: **240**

Almaty 2023

NCJS «KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY
named after K.I.SATBAYEV»

Educational program 6B07302 «Civil Engineering»
code and name of educational program
was approved at the meeting of K.I. Satbayev KazNRTU Academic Council

Minutes # 5 dated «24» November 2023.

was reviewed and recommended for approval at the meeting of K.I. Satbayev KazNRTU Educational and Methodological Council

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Educational program 6B07302 «Civil Engineering»
code and name of educational program
was developed by Academic committee based on direction « Architecture and Civil engineering»

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List of abbreviations and designations

NJSC KazNRTU named after K.I.Satbayev - NJSC "Kazakh National Research Technical University named after K.I.Satbayev";
SOSE - State obligatory standard of education of the Republic of Kazakhstan;
EP - educational program;
SIS - student independent study (student, undergraduate, doctoral student);
TSIS – independent study of a student with a teacher (independent work of a student (undergraduate, doctoral student) with a teacher);
WC- working curriculum**;**
CED - catalog of elective disciplines**;**
UC– university component;
CC –component of choice;
NQF – national qualifications framework;
SQF – sectoral qualifications framework;
LO – learning outcomes.

1. Description of educational program

The educational program "Construction Engineering" is aimed at training specialists in the field of construction engineering, design, installation, reconstruction and operation of buildings and structures, production of building materials and products, as well as energy efficient design.

Construction engineering (engineering in the construction industry) covers all phases of the implementation of investment and construction projects: design, selection and production of materials, construction, operation of facilities.

Students gain knowledge in the field of designing reinforced concrete and metal buildings and structures, technologies for construction and installation works, technologies for the production of building materials and structures.

The sphere of professional activity is both the technical support of construction and work at enterprises producing building materials. The sphere of professional activity can be the following industries: construction, mechanical engineering, chemical, mining, oil, gas, industry, forestry.

The objects of professional activity are: construction and installation departments and organizations, design organizations, factories for the production of building products, public utilities, enterprises for the operation and repair of construction machinery and equipment, joint-stock construction associations, companies conducting energy audits of buildings and enterprises, laboratories for quality control and certification of building materials and construction.

Subjects of professional activity: organization and conduct of construction and installation works, organization and conduct of work on the operation of buildings and technical equipment, work in research organizations under the guidance of leading experts, design of energy-efficient buildings, calculation, design and production of building materials, products and structures.

The educational program has been updated and teaches, according to the Atlas of new professions and competencies of the Republic of Kazakhstan, for the following new professions:

- *Civil Engineer ⇒ Civil Engineer 2.0* owns the principles of calculation, design and construction production technologies, new digital technologies used on the construction site, such as Autodesk BIM 360, BIM 360 Build; has sufficient competencies to work in design, research, calculation and production construction organizations.

- *Construction renovation specialist* is professionally versed in technological innovations in construction, architecture, urbanism. He studies the possibility and recommends specific new technologies and materials to be used for the modernization/reconstruction of existing buildings (residential, administrative and industrial buildings, social facilities).

- *The sustainability specialist* is professionally versed in assessment tools and standards that help evaluate a building's environmental performance (eg LEED, BREEAM, DGNB certification systems). Assists construction teams in implementing the project in accordance with environmental standards. The main goal of the specialist’s work is the design and construction of energy and resource-

saving buildings, taking into account the goals of the client, as well as the needs and well-being of residents, paying special attention to minimizing their impact on the environment and the environment: developing and implementing environmentally friendly solutions for energy supply, water supply, waste disposal, resource saving, selection of environmentally friendly materials, etc. For existing buildings, the specialist conducts an energy audit and recommends necessary improvements before the building is recommissioned.

- *The "Smart Home" designer* designs, installs and configures an individual life support system for a house / apartment for the specific needs of a person and his budget, with a single control center through a mobile application that can combine household appliances, a security system, lighting, climate control, audio system, energy and water supply, etc.

- *Engineer of energy-saving technologies* identifies and fixes opportunities for improving energy efficiency in buildings being designed and under construction, as well as opportunities for using renewable energy sources; develops recommendations for improving the energy efficiency of buildings, develops recommendations for the possible use of renewable energy sources.

Types of professional activity. Bachelors in the specialty 6B07302 "Civil Engineering" can perform the following types of professional activities:

- production and management - to manage teams that carry out construction and installation work on the construction, operation and reconstruction of buildings, structures, engineering systems and equipment; for the operation and repair of construction machines, mechanical, electrical equipment and automation equipment; for conducting energy audits, technological lines for the production of building materials, products and structures;

- design and development - to carry out design and development work on the construction and reconstruction of buildings and structures, engineering systems, mechanical and electrical equipment, and mechanization, including energy efficient ones; selection of building materials;

- organizational and technological — to organize the work of construction, municipal, industrial organizations and enterprises;

- scientific and pedagogical — to participate in the performance of scientific research and conduct scientific and pedagogical activities in general educational organizations.

Areas of professional activity: design, construction and operation of civil, industrial, transport, utility facilities and production of building materials, products and structures.

The content of professional activity: to make calculations of elements of buildings and structures, draw up technical solutions, participate in the development of technical specifications for construction and reconstruction, taking into account the requirements of energy efficiency, ecology and life safety, perform construction and installation works, select the composition and production lines for the production of building materials and structures.

Graduates work as engineers in construction organizations, in leading organizations in the field of design, production and operation of construction

industry facilities and are in high demand due to the increased pace of construction.

Fundamental training in the natural sciences and general engineering disciplines allows you to continue your education in engineering master's programs.

2. Purpose and objectives of educational program

Purpose of EP: training of highly qualified specialists with the necessary knowledge and skills to successfully work in the construction industry in various areas, including calculation, design, installation and operation of construction projects, as well as renovation, energy-efficient design and production of building materials.

Tasks of EP:

- The development of students' personal qualities, as well as the formation of general cultural and professional competencies.
- Studying the cycle of general education disciplines to provide social and humanitarian education based on the laws of socio-economic development of society, history, modern information technologies, the state language, foreign and Russian languages;
- The study of the cycle of basic disciplines to provide knowledge of natural sciences, general technical and economic disciplines, as the foundation of vocational education;
- Studying a cycle of major disciplines for the formation of theoretical knowledge, practical skills and abilities in the field of civil engineering.

3. Requirements for evaluating the educational program learning outcomes

The results of the bachelor's OOP training are determined by the competencies acquired by the graduate, i.e. his ability to apply knowledge, skills and personal qualities in accordance with the tasks of professional activity

Description of mandatory standard requirements for graduation from a university and the award of an academic degree of a bachelor of engineering and technology: mastering at least 240 academic credits of theoretical training and a final thesis.

4. Passport of educational program

4.1. General information

№	Field name	Comments
1	Code and classification of the field of education	6B07 Engineering, Manufacturing and Civil engineering

2	Code and classification of training directions	6B073 Architecture and Civil engineering
3	Educational program group	B074 Urban planning, construction work and Civil engineering
4	Educational program name	6B07302 «Civil Engineering»
5	Short description of educational program	The educational program "Construction Engineering" is aimed at training specialists in the field of construction engineering, design, installation, reconstruction and operation of buildings and structures, production of building materials and products, as well as energy efficient design. Construction engineering (engineering in the construction industry) covers all phases of the implementation of investment and construction projects: design, selection and production of materials, construction, operation of facilities. Students gain knowledge in the field of designing reinforced concrete and metal buildings and structures, technologies for construction and installation works, technologies for the production of building materials and structures. The sphere of professional activity is both the technical support of construction and work at enterprises producing building materials.
6	Purpose of EP	Training of highly qualified specialists with the necessary knowledge and skills to successfully work in the construction industry in various areas, including calculation, design, installation and operation of construction projects, as well as renovation, energy-efficient design and production of building materials.
7	Type of EP	new
8	The level based on NQF	6
9	The level based on IQF	6
10	Distinctive features of EP	No
11	List of competencies of educational program	- the ability to use the basic laws of natural science disciplines in professional activity, apply methods of mathematical analysis and mathematical (computer) modeling, theoretical and experimental research; - knowledge of the basic laws of geometric formation, construction and mutual intersection of plane and space models necessary for the execution and reading of drawings of buildings, structures, structures, drafting design documentation and details; - ability to use regulatory legal documents in professional activities; - knowledge of the regulatory framework in the field of engineering surveys, principles of designing buildings, structures, engineering systems and equipment, planning and development of populated areas, principles of energy efficient design; - knowledge of the methods of engineering surveys, the technology of designing parts and structures in accordance with the terms of reference using universal and specialized software computing complexes and computer-aided design systems; - ability to participate in the design and survey of objects of

		professional activity; - knowledge of the requirements of labor protection, life safety and environmental protection when performing construction and installation, repair and reconstruction works of construction facilities; - knowledge of the organizational and legal foundations of management and business activities in the field of construction.
12	Learning outcomes of educational program	ON1. Demonstrate basic knowledge in the field of natural sciences, social, humanitarian, economic disciplines that contribute to the formation of a highly educated personality with a broad outlook and a culture of thinking. Own the norms of international law on corruption. ON2. Own the methods and tools of physical and mathematical (including computer) modeling using universal and specialized software and computer systems, computer-aided design systems, standard research automation packages. ON3. To know modern trends in the development of computer graphics, to understand its significance and role in engineering systems and construction projects. Own methods of creating flat projection models of three-dimensional space. ON4. Be proficient in modern methods of building materials production, including the latest energy-saving technologies and production methods, as well as knowledge of the latest developments in the field of building technology, including innovative energy-efficient methods and processes. ON5. Possess knowledge of the regulatory framework in the field of production of building materials, engineering surveys, principles of designing buildings and structures, planning and development of settlements, including international energy standards. ON6. Have knowledge of the requirements and procedures associated with the installation, commissioning, testing and commissioning of construction projects. ON7. Have knowledge of the concepts, provisions and methods of installation processes, labor organization, quality assurance of work and compliance with safety regulations, as well as procedures for accepting samples of manufactured products. ON8. Have the ability to apply a system of fundamental knowledge (mathematical, natural sciences, engineering and economics) to identify, formulate and solve engineering problems. ON9. To be able to rationally choose the construction and structural systems of buildings in accordance with the purpose of the object, its space-planning decision, economic feasibility, energy efficiency and environmental safety. ON10. To be able to calculate the composition of raw materials for the production of building materials and products, as well as calculations of the performance of technological equipment ON11. Possess design skills, calculation and design of the main elements of construction projects. Have the ability to

		make judgments, evaluate ideas and formulate conclusions on specific professional issues. ON12. Have the ability to prepare documentation for the quality management of technological processes in the field of construction production, organization of workplaces, their technical equipment, placement of technological equipment. ON13. Have the ability to prepare documentation for the quality management of technological processes in the field of construction production, organization of workplaces, their technical equipment, placement of technological equipment.
13	Education form	full - time
14	Period of training	4 years
15	Amount of credits	240
16	Languages of instruction	Rus., kaz., eng.
17	Academic degree awarded	Bachelor
18	Developer(s) and authors	Department of Building and Building Materials

4.2. Relationship between the achievability of the formed learning outcomes based on educational program and academic disciplines

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)												
				ON1	ON2	ON3	ON4	ON5	ON6	ON7	ON8	ON9	ON10	ON11	ON12	ON13
Cycle of general education disciplines Required component																
1	English	English is a compulsary subject. According to the results of placement test or IELTS score, students are placed into groups and disciplines. The name of the discipline corresponds to the level of English. When passing from level to level, prerequisites and postrequisites are respected.	10	٧												
2	Kazakh (Russian) language	Kazakh (Russian) language In this course author considers socio-political, socio-cultural spheres of communication and functional styles of the modern kazakh (russian) language. The course covers the specifics of the scientific style to develop and activate professional communication skills and abilities of students. Also it allows students to leavn the basics of scientific style practically and develop the ability of production structural and semantic text analysis.	10	٧												
3	Physical education	The purpose of the discipline is the practical use of the skills of performing the main elements of the technique of athletics, sports games, gymnastics and a set of standards for general physical training, including professional and applied physical training or one of the sports, methods of conducting	8	٧												

		independent physical exercises.														
4	Information and Communication technology (на английском языке)	The aim of the course is to gain theoretical knowledge in information processing, the latest information technologies, local and global networks, the methods of information protection; Getting the right use of text editor editors and tabulators; creation of base and different categories of applications.	5	٧												
5	History of Kazakhstan	The course studies historical events, phenomena, facts, processes that took place on the territory of Kazakhstan from ancient times to the present day. The discipline sections include: introduction to the history of Kazakhstan; the steppe empire of the Turks; early feudal states on the territory of Kazakhstan; Kazakhstan during the Mongol conquest (XIII century); medieval states in the XIV-XV centuries. The main stages of the formation of Kazakh statehood are also considered: the era of the Kazakh Khanate of the XV-XVIII centuries. Kazakhstan within the Russian Empire; Kazakhstan in the period of civil confrontation and in the conditions of a totalitarian system; Kazakhstan during the Great Patriotic War; Kazakhstan during the formation of independence and at the present stage.	5	٧												
6	Philosophy	Philosophy forms and develops critical and creative thinking, worldview and culture, provides knowledge about the most common and fundamental problems of life and gives them a methodology for solving various theoretical and practical issues. Philosophy expands the horizon of vision of the modern world, forms citizenship and patriotism, promotes self-esteem, awareness of the value of human	5	٧												

		existence. It teaches to think and act correctly, develops skills of practical and cognitive activity, helps to look for and find ways and ways of life in harmony with yourself, society, with the world around you.														
7	Module of socio-political knowledge (sociology, political science)	The discipline is designed to improve the quality of both general humanitarian and professional training of students. Knowledge in the field of sociology and political science is the key to effective professional activity of a future specialist, as well as for understanding political processes, for the formation of political culture, developing a personal position and a clearer understanding of the measure of their responsibility.	3	٧												
8	Module of socio-political knowledge (cultural studies, psychology)	Module of socio-political knowledge (cultural studies, psychology) is designed to familiarize students with the cultural achievements of mankind, on their understanding and assimilation of the basic forms and universal laws of the formation and development of culture, on the development of their aspirations and skills to independently comprehend the entire wealth of values of world culture for self-improvement and professional growth. During the course of cultural studies, the student will consider the general problems of the theory of culture, leading cultural concepts, universal patterns and mechanisms of the formation and development of culture, the main historical stages of the formation and development of Kazakhstani culture, its most important achievements. In the course of studying the course, students acquire theoretical knowledge, practical skills and abilities, forming their professional orientation from the	5	٧												

		standpoint of psychological aspects.														
Cycle of general education disciplines Component of choice																
9	Fundamentals of anti-corruption culture and law	The course introduces students to the improvement of socio-economic relations of Kazakhstan society, psychological features of corrupt behavior. Special attention is paid to the formation of an anti-corruption culture, legal responsibility for acts of corruption in various spheres. The purpose of studying the discipline «Fundamentals of anti-corruption culture and law» is to increase public and individual legal awareness and legal culture of students, as well as the formation of a knowledge system and a civic position on combating corruption as an antisocial phenomenon. Expected results: to realize the values of moral consciousness and follow moral norms in everyday practice; to work on improving the level of moral and legal culture; to use spiritual and moral mechanisms to prevent corruption.	5	٧												
10	Fundamentals of economics and entrepreneurship	Discipline studies the foundations of economics and entrepreneurial activity from the point of view of science and law; features, problematic aspects and development prospects; the theory and practice of entrepreneurship as a system of economic and organizational relations of business structures; The readiness of entrepreneurs for innovative susceptibility. The discipline reveals the content of entrepreneurial activity, the stages of career, qualities, competencies and responsibility of the entrepreneur, theoretical and practical business planning and economic examination of business ideas, as well as the analysis of the risks of innovative development, the	5	٧											٧	

		introduction of new technologies and technological solutions.														
	Fundamentals of scientific research methods	The purpose of studying the discipline is, on the basis of theoretical and practical knowledge, to ensure the adoption of evidence-based decisions in the performance of professional tasks. In the process of achieving the goal, tasks such as the formation of a scientific way of thinking, the acquisition of a complex of knowledge about the methodology of scientific knowledge and creativity, familiarization with the fundamental principles of planning and organizing scientific work in relevant areas.	5	٧	٧											
11	Ecology and life safety	The discipline studies theoretical and practical skills to create safe, harmless and environmentally friendly living conditions. The impact of natural and man-made hazards on the human body and their monitoring; culture of life safety; industrial sanitation; the impact of harmful substances and sources of pollution on the human body and their maximum permissible concentrations in the air of the working area; natural and man-made emergencies. 523	5							٧		٧				
Cycle of basic disciplines University component																
12	Architecture and building structures	The discipline studies the basic provisions of the design of buildings and structures, considers their classification, main parts and elements, structural systems and schemes, basic information about building structures, including the principles of their design, as well as methods for calculating building structures. The main provisions of the calculation of structures for limiting states.	5					٧				٧		٧		

	Geotechnics I	This discipline studies soil mechanics and engineering geology to prepare students for professional activities in the field of construction. Within its framework, students learn to evaluate the engineering and geological conditions of construction sites, determine the physical and mechanical properties of foundation soils, calculate foundation settlements and improve the properties of soils and artificial foundations. New normative documents and methods of assessment of grounds harmonized with Eurocodes are also considered.	5									√	√		√	
	Reinforced concrete structures I	The discipline studies the process of calculating compressed, tensile and bending reinforced concrete structures of civil buildings, including taking into account the structural features of buildings, calculations for the formation, opening of cracks, strength and crack resistance.	5		√							√		√		
13	Engineering and computer graphics	The discipline is aimed at the study of methods for the image of objects and the general rules of drawing, using computer graphics; the study of the basic principles and geometric modeling approach and methodology for developing applications with a graphical interface; the formation of skills in the use of graphic systems for the development of drawings, using 2D and 3D modeling methods	5	√					√						√	
	Engineering systems of buildings and structures	Acquisition by future specialists of the basics of theoretical knowledge and practical skills in the field of water supply, sewerage, gas supply, and heat supply of human settlements	5	√					√						√	
14	Mathematics I	The course is devoted to the study of the basic concepts of higher mathematics and its applications. The main provisions of the discipline are	5	√	√											

		applied in the teaching of all general education engineering and special disciplines taught by graduate departments. The course sections include elements of linear algebra and analytical geometry, an introduction to analysis, differential calculation of functions of one and several variables. Methods for solving systems of equations, problems of using vector calculations in solving problems of geometry, mechanics, and physics are considered. Analytical geometry on a plane and space, differential calculation of functions of one variable, derivatives and differentials, study of the behavior of functions, derivative and gradient in direction, extremum of a function of several variables.														
15	Mathematics II	The discipline is a continuation of Mathematics I. sections of the course include integral calculus of a function of one variable and several variables, series theory. Indefinite integrals, their properties and methods of their calculation. Certain integrals and their application. Incorrect integrals. Numerical series theory, functional series theory, Taylor and Macloren Series, application of series to approximate calculations.	5	٧							٧					
16	Building Mechanics 1	The discipline studies the behavior of various materials under the influence of force and temperature factors, methods for calculating the most common elements of machines and structures for strength, rigidity and stability, determining stresses and deformations in parts with rational satisfaction of reliability and cost-effectiveness requirements.	5	٧							٧					

	Building Mechanics 2	The discipline studies the stress -strain state of rods and rod systems under the influence of various loads, principles and methods of calculating structures for strength, rigidity and stability in order to ensure the reliability of structures with the least consumption of materials.	5									٧		٧		
17	Building materials	The course "Building materials" considers materials as elements of the material-construction system that ensure the functioning of structures with a given reliability and safety, studies methods for creating materials with the required service properties, including the appropriate choice of raw materials, waste disposal, methods of processing and assessing their quality, technological methods of formation structure, studies the system of indicators of the quality of building materials and regulatory methods for their determination and evaluation using modern research equipment.	4				٧						٧			
	Technology of building manufacture I	The discipline studies the basic provisions of the construction industry, the most advanced methods of building processes; the main technologies for the erection of buildings and structures and the development of directive organizational and technological documentation on this informative basis.	5						٧	٧						
18	Physics	The course studies the basic physical phenomena and laws of classical and modern physics; methods of physical research; the influence of physics as a science on the development of technology; the relationship of physics with other sciences and its role in solving scientific and technical problems of the specialty. The course covers the following sections: mechanics, mechanical harmonic waves, fundamentals of	5	٧							٧					

		molecular kinetic theory and thermodynamics, electrostatics, direct current, electromagnetism, geometric optics, wave properties of light, laws of thermal radiation, photoelectric effect.															
19	BIM of technology in building	The discipline develops students' skills in using software systems (ArchiCAD, Revit) aimed at information modeling of buildings and structures (BIM), which allow organizing the process of collective creation and use of information about buildings and structures, which forms the basis of all decisions throughout the life cycle of an object (from planning to design, release working documentation, construction, operation and demolition), on the basis of which the work of the investor, customer, general designer, general contractor and operating organization is organized.	5		٧	٧											
20	Training Practice	Practice in obtaining primary professional skills. It consists in the practical training of a future specialist and consolidates the theoretical knowledge gained. The purpose of the training practice is to acquire primary professional experience.	2					٧			٧						
Cycle of basic disciplines Component of choice																	
	Automation and equipment for energy-efficient buildings	The purpose of the discipline is to study the classification and characteristics of the elements of automation systems: transmitters, switching and actuators, as well as methods for analyzing automatic control systems. The main task is to familiarize students with the basic methods of building automatic control systems and the means necessary for their implementation, the characteristics and parameters of automation elements and measuring systems; typical links and	5		٧											٧	

		functional diagrams of the automatic control system; fundamentals of analysis and synthesis of an automatic system; the operation of semiconductor devices in a pulsed mode.														
	Alternative energy sources in civil engineering	The study of this discipline will allow students to get a complete picture of non-traditional renewable energy sources, the possibilities of their use in solving problems of energy supply and energy saving, studying the possibilities of using non-traditional and renewable energy sources in power supply systems for civil buildings and industrial enterprises; systems for converting solar radiation into electrical and thermal energy, using wind energy, sea currents and a thermal temperature gradient to produce electrical energy; the possibilities of using biomass and municipal solid waste for the production of electrical and thermal energy.	4	٧													٧
21	Architectural physics	The purpose of the discipline: formation of knowledge of the basic concepts and laws of architectural climatology, thermal engineering of architectural lightology, color science, architectural acoustics. Brief description: light environment and its characteristics. Physical fundamentals of photometry. Characteristics of the eye as a visual analyzer. The organic relationship of light and architectural form. Insolation and light protection. Fundamentals of architectural lighting engineering. Light climate. Features of the light climate, questions about the unity and interaction of utilitarian, aesthetic and hygienic functions of light. Designing light architecture taking into account the interaction of light with space, shape, plastic and color.	5	٧							٧					

	Architectural design of energy efficient buildings	The study of this discipline allows you to master the architectural and structural methods for designing buildings, taking into account modern trends and energy efficiency requirements. At the end of the course, the student receives a basic set of knowledge in the field of architecture, space-planning solutions for buildings, structures, structures and their complexes, in accordance with the forms, styles, flows in modern architecture; masters the most important methods of engineering analysis in the field of building design; owns methods for determining the quantitative and qualitative indicators of energy efficient buildings.	5					٧				٧		٧		
22	Binders	The discipline studies binders, their properties and compositions. The main attention in the study of the discipline is given to binders. inorganic origin, the study of their properties, features of production and areas of application. The discipline is focused on the knowledge of the physical and chemical processes of hydration and hardening of mineral binders, the study of the possibilities of regulating and intensifying these processes; use of waste from various industries.	5				٧						٧			
23	Geotechnics in construction	The purpose of studying the discipline is to determine the role of geodesy in construction; obtaining a modern understanding of the shape and size of the Earth; concepts of geoid, ellipsoid; coordinate systems used in geodesy; coordinate systems at construction sites; orientation of lines on the ground. Objectives of the discipline to gain knowledge for the use of maps and plans, the use of information about state geodetic networks; on the methods of	5					٧			٧					

		creating survey networks; application of geometric leveling and basic types of topographic surveys.														
26	Fillers of concrete	The discipline studies the aggregates used for the production of concrete, their classification, properties and production technology, the influence of the properties of the aggregate on the quality of the concrete mixture and concrete, depending on the origin (aggregates from dense natural materials, artificial aggregates, aggregates from production waste, special types of aggregates) , as well as the effectiveness of the use of aggregates in construction.	5				٧						٧			
28	Buildings and structures testing	Discipline "Buildings and structures testing" provides a functional link with the underlying disciplines and has as its goal the teaching of theoretical basics and practical skills in technology survey and testing of buildings and structures. Examines the methods and means of experimental research and the status of various construction sites and evaluate the properties and conditions of building materials, structures, and buildings.	4									٧				٧
29	Computer graphics in construction drawing	This discipline is aimed at the formation of the basic principles of working with computer-aided design systems, including drawings in AutoCAD, three-dimensional surfaces and solids, perspectives and shadows in orthogonal and axonometric projections, as well as the study of graphic primitives, stamps and their modification. It is designed to teach students professional skills in working with computer-aided design systems, which are an important part of modern engineering education.	5		٧	٧						٧				
31	Design and calculation of structural elements	This discipline reflects the current state of the theory and practice of calculating	5		٧							٧		٧		

		reinforced concrete, steel and wooden structures, as well as methods for determining internal forces, methods for calculating the strength and crack resistance of reinforced concrete structures; it also contains information about the physical and mechanical properties of structural materials, about the connections of elements of metal and wooden structures and their calculation.														
32	Materials for reinforcing concrete	The discipline considers the issues and roles of reinforcement, classification of materials for reinforcing concrete, reinforcing steel, reinforcing products, types of fibers and their effective application in concrete production technology. The objectives of the discipline: explanation of the features of production and application in the design and construction of new types of rebar.	5				٧						٧			
34	Metal constructions 1	This discipline is aimed at studying the calculation and design of metal structures of civil buildings, including the study of the properties of metals that affect the strength and stiffness characteristics, the calculation of beams, beam structures, centrally compressed columns, welded, bolted and riveted joints of metal structures.	5		٧							٧		٧		
35	Methodological foundations of scientific work	The purpose of the study: to give students the knowledge necessary for further production activities about the nature and methodology of scientific research. The discipline studies the problems of organizing and staging research work, choosing a topic for scientific work, stages and content of research work, principles for selecting information on the topic of scientific research, planning and setting up an experiment, requirements for publication materials, registration of	5		٧							٧				

		patent documentation, presentation of scientific results and a research report. Acquaintance with the biography of scientists of Kazakhstan and the CIS, the role of scientific research in the formation and development of the enrichment industry.														
36	Mechanization of construction processes	The purpose of the discipline is to train highly qualified specialists with the necessary information about the technical indicators and technological capabilities of the means of mechanization of construction processes, in order to operate them with the highest efficiency in the conditions of construction production.	5					٧	٧							
37	Reliability of building designs	The discipline "Reliability of building designs" is aimed at developing students' knowledge of the general patterns of manifestations of quantitative and qualitative properties of construction objects using the features of the methods of the theory of reliability of buildings and structures; use of information obtained during measurements on the quantitative properties of objects (buildings and structures) for the quantitative and qualitative assessment of their condition in terms of reliability during their design, installation and operation; the formation of students' understanding of the foundations and role of the theory of reliability in ensuring safety and quality in construction.	5									٧		٧		
	Research activities in the construction sector I	The purpose of the discipline is to give students the skills to solve actual problems through experimental, design and research activities, the implementation of theoretical and applied developments, analysis of the patterns of development of the natural environment, society, and technology. The course	5		٧						٧					

		provides for the practical application of skills in scientific projects.														
38	Organization of construction	The purpose of this discipline is to teach students the basics of organizing and planning construction production, as well as to develop their skills and competencies necessary for successful work in the field of construction. The main objectives of the discipline include the formation of students' understanding of the construction process, its stages and the main methods of organization, as well as how the quality control of construction work is carried out.	6						٧	٧					٧	
	Organization of construction of energy-efficient buildings	The purpose of studying the discipline is to form knowledge that provides professional activity in the field of modern construction of energy-efficient buildings for various purposes. As a result of the training, the student can select a method for performing individual production processes based on the use of effective building materials and structures, perform calendar and linear planning for organizing the logistics of the construction industry, prepare for the construction industry, and plan the main stages of construction.	6						٧	٧					٧	
39	Design of buildings with low heat consumption and the use of renewable energy resources	The purpose of studying this discipline is to master standard and new methods for designing buildings using modern automatic design systems and taking into account the connection of renewable energy sources to the engineering systems of buildings and structures. At the end of the course, the student has the competence to design an energy-efficient building with a planned low heat consumption by connecting renewable energy sources to the engineering systems of buildings.	5			٧						٧		٧		

40	Building climatology	The study of the discipline will allow you to gain knowledge of the basics of building climatology, consider the conditions for the formation of the Earth's climate and its changes, understand the processes of transformation of radiation fluxes, the thermal and water regime of the atmosphere, the earth's surface, land waters and the World Ocean. Upon completion of the course, the student will be able to perform a comprehensive analysis of the interaction of the designed structure with the natural environment; perform forecasting of changes in the natural environment under the influence of natural and artificial factors, taking into account the obtained calculated characteristics of soils and groundwater.	5	٧							٧					
45	Technological equipment of enterprises	The discipline sets out the information required for the equipment for the production of binders, ceramics, and glass. Equipment for extraction of silicate raw materials, primary processing, crushing, sorting, moving and dosing, and alsoSilicate plant accessories.	6					٧							٧	
46	Concrete technology I	The discipline is based on the knowledge of concrete science: physical and chemical foundations for obtaining heavy, light, incl. cellular concrete, studies raw materials for obtaining various types of concrete, the theory of concrete strength (heavy, light on porous aggregates, cellular), designing compositions of various types of heavy and light concrete, the influence of the structure of concrete mixtures and concretes on the physical, mechanical and operational properties of concrete, as well as chemical and mineral additives in concrete, concreting of monolithic structures.	5				٧						٧			
48	Technology of repair	The discipline "Technology of repair	5						٧		٧					

	works	works" examines the foundations and regulations for the practical implementation of execution of the main types of construction works, including processes for repair of utilities, with organic linkages between technological and organizational issues.														
50	Management and organization of construction production	The purpose of the discipline "Management and organization of construction production" is to teach students the basics of construction production management, including the design of the organization of construction and preparation for construction, the study of the basics of the flow organization of construction and scheduling for the facility, as well as the development of an object construction plan and an algorithm for the production of construction quality control.	6							٧					٧	
51	Economics and construction management	The purpose of teaching the discipline "Economics and construction management" is to familiarize students with the basics of economics and management in construction, including the classification and accounting of costs, costs, calculation of production costs, planning of the company's activities, management reporting, control and analysis of budget execution, preparation of reliable information for making managerial decisions. The objectives of the study of this discipline is to familiarize with its structure, the terminology used, general concepts, principles, provisions and methods of economics and management of construction	4									٧			٧	
	Energy saving in building microclimate systems	The purpose of the discipline consists of the formation of students' knowledge about energy resources, energy saving	5								٧					٧

		when consuming energy resources; the Law of the Republic of Kazakhstan On energy saving; energy and resource saving in the distribution of electricity; the use of non-traditional energy sources. As a result of studying the discipline, the student is able to use secondary energy resources, know the requirements for electricity meters; account for energy resources and energy carriers; energy checks.														
52	Energy efficient design and construction of civil buildings	The discipline studies modern requirements for the space-planning organization and constructive solutions for energy-efficient buildings, the main factors that determine the shape and functional-spatial structure of buildings, ways to reduce the energy consumption of existing buildings and structures, the use of non-traditional energy sources, analyzes the model of interaction between the climate and the internal environment of buildings.	5					٧		٧						
Cycle of profile disciplines University component																
53	Industrial internship I	The purpose of the production practice: to consolidate and expand the theoretical knowledge gained by students in the process of studying disciplines. Provides consolidation of knowledge, skills of theoretical training and is an intermediate link between the studied disciplines and production.	2				٧		٧	٧					٧	
54	Industrial internship II	The purpose of the internship is to consolidate and expand the theoretical knowledge gained by students in the process of studying the disciplines of the profile cycle, as well as to familiarize students with occupational safety issues, with the methods of production of certain types of work on the construction of	3				٧		٧	٧					٧	

		engineering systems of buildings and structures.														
	Automation of release estimates in construction	The purpose of the discipline is to master the ability to draw up cost estimates using the resource method in accordance with the regulatory documents on pricing in the construction of the Republic of Kazakhstan, to determine the cost of direct costs, overhead costs and estimated profit, additional costs associated with the decisions of the construction organization project, to draw up local and object estimates, a consolidated cost estimate construction and summary estimates, a list of material resources and equipment, a catalog of contractual unit prices and acceptance certificates for work performed, a register of transportation costs and other budget documents.	4		٧										٧	
	Geotechics II	The purpose of teaching the discipline is to familiarize future specialists with the general provisions of modern methods of calculation, design and construction of foundations, foundations and underground structures, including natural and deep foundations, pile foundations, their classification, calculation and design; features of designing foundations on loess subsidence soils, on weak silt-clay water-saturated and swelling soils.	6								٧	٧		٧		
	Reinforced concrete structures 2	This discipline reflects the current state of the issue of design and calculation, reinforced concrete structures. The study of the discipline gives knowledge in the development of structural systems of buildings and structures, the determination of internal forces, the calculation of the strength and deformability of reinforced concrete structures of prefabricated one- and multi-storey civil industrial buildings.	5		٧								٧		٧	

	Technology of building manufacture II	The course "Technology of building manufacture II" considers the basics of technological design in construction and methods for calculating the main sections of technological maps for construction processes, methods and methods for performing technological processes in the construction of buildings and structures, based on ensuring the quality of construction products and the safety of construction work, principles of development building production - industrialization, complex mechanization, automation, year-round, threading.	5						٧	٧						
Cycle of profile disciplines Component of choice																
58	Office work in construction	The purpose of the discipline is to form a holistic view of the system of documentary support for the activities of construction enterprises; to study the composition of the construction documentation, the rules for its maintenance; to promote knowledge of the procedure for documenting information, the ability to correctly draw up official and business documentation.	4					٧							٧	
59	Road construction materials	The discipline studies the theoretical foundations of road construction materials science, modern ideas about road construction materials, the basic technological principles for obtaining the above materials with desired properties and their quality control, issues of optimizing their technology in order to improve quality and reduce energy intensity. The issues of using by-products of industry and environmental protection are considered.	5				٧	٧					٧			
61	Manufacturing of metal structures	The purpose of teaching the discipline is to gain knowledge related to the technology of manufacturing metal	5						٧					٧		

		structures. The objectives of the discipline are to study the physical and mechanical properties of the materials used; technologies for manufacturing structural elements. As a result of studying the discipline, students should know modern methods of manufacturing metal structures, methods for calculating and designing elements of metal structures, perform calculations of metal structures at various stages of installation, use regulatory and technical literature.														
62	Quality control of construction installation works	The discipline "Quality control of construction installation works" studies the basics and regulations for the practical implementation of methods for ensuring the quality of construction in order to obtain the final product (completed by the construction of a structure for various functional purposes). The purpose of studying the discipline is to familiarize students with the theory and practice of quality control of construction and installation works in the construction of facilities, to teach how to organize work to ensure the quality of construction products by developing and implementing quality control systems in accordance with the recommendations of international standards.	6						٧	٧						
	International Energy Building Standards	The purpose of the discipline is to introduce students to international energy standards such as ISO 50001, BREEAM, BRE, and LEED; train them to use them in planning energy efficiency improvements and designing energy-efficient buildings and structures.	6					٧								٧
63	Metal constructions 2	This discipline allows you to master the practical use of the developed structural systems of buildings and structures, to carry out the calculation and design of	5			٧						٧		٧		

		their elements using regulatory, instructive and technical literature. Basic knowledge and skills in the field of calculation and design of single-span industrial metal buildings and structures, as well as methods for practical calculation of structures in terms of strength, deformability, selection and calculation of joints of metal structures will be presented.														
65	Research activities in the construction sector II	The purpose of the discipline is to prepare students for the systematic implementation of research work in their professional activities. Taking into account the profile of research, general scientific or highly specialized methods and technologies for conducting research work are used. The purpose of the research work is modernization, search for new opportunities and solutions to problems in the construction industry.	5		٧						٧			٧		
66	Inspection and testing of buildings and structures	Discipline studies the issues of technology inspection (diagnostics) and testing of building structures and materials, determining the amount of diagnosis, the sequence of work, technological operations during the examination and testing of structures, drawing up practical design diagrams. Examines the main schemes, constructive solutions, typical damage to buildings, technical means of monitoring structures, their general and detailed examination.	5					٧						٧		
69	Evaluation of seismic stability of buildings and structures	The study of the discipline forms knowledge in the field of calculation and design of earthquake-resistant buildings and structures and their complements in the study of modern approaches to the calculation and analysis of stress strain state of building structures and their nodes coupling under seismic loading.	5									٧		٧		

70	Patenting in construction	Feasibility study and determination of patent purity, patentability of new intellectual objects of industrial property (materials, processes, technical objects); - Definition of conformity of application materials required criteria to obtain security credentials to the new intellectual industrial property; - The use of patent documentation in the creation and development of new materials, processes and technical objects	5						٧							
	Polymeric materials	The discipline studies various types of polymeric materials, their properties, such as mechanical, thermal, electrical, optical and others, production technology, including polymerization methods, composite materials, additives and modifiers, as well as testing methods for polymeric materials.	4				٧	٧					٧			
71	Engineering and design of high-rise buildings	The discipline "Design and analysis of tall buildings" examines the design features of tall buildings. Forms of students ' knowledge in the field of calculation and design of structures of multi-storey buildings and high-rise buildings. The task of developing this discipline - mastery of the principles of design and analysis of structural systems of multi-storey buildings and high-rise buildings; - mastering the principles of layout and design of bearing systems and their elements of high-rise buildings and tall structures.	4			٧								٧		
	Design and calculation of wooden structures	The purpose of this discipline is to familiarize students with the basics of design and calculation of wooden structures, including the characteristics of materials and promising methods that have passed experimental verification in construction. The course will examine in detail the most common designs, as well	4			٧						٧		٧		

		as numerical examples of calculation for understanding the material.														
72	Design and calculation of spatial structures	The purpose of the discipline is to study the theory of surfaces and the basic equations of the statics of elastic shells, including geometric and physical equations. As part of the course, students will learn methods for solving differential equations in the theory of shallow shells, as well as the basics of calculating and designing various types of shells, including shells with positive, negative and zero Gaussian curvature. Particular attention is paid to the calculation and design of metal domes and hanging roofs, such as one-two-belt cable systems, cable networks and membrane roofs, using modern methods and tools.	6			٧								٧		
73	Design and calculation of seismic buildings	The purpose of the discipline is to teach students the methods and principles of designing earthquake-resistant buildings, including the analysis of seismic loads, the choice of structures, methods of strengthening and stability, the development of measures to protect against seismic risks and evaluate their effectiveness in accordance with the requirements of building codes and regulations.	5		٧							٧		٧		
74	Designing and calculation of special constructions	Discipline studies architectural solutions, as well as issues of designing and calculating various types of engineering structures, which, according to their functional characteristics, belong to the following groups: structures for supporting and locating equipment; communication and transport facilities - tunnels, channels, collectors, piers and racks; capacitor constructions for water supply of the sewerage; water towers, reservoirs, gas holders; silos, bunkers,	5		٧							٧				

		chimneys, retaining walls, etc. The significance and role of engineering structures in creating the image of modern industrial enterprises are also considered.														
75	Design solutions for factories for the production of building materials	This discipline develops the skills of designing and reconstructing factories engaged in the production of building materials and products for various purposes. The course covers pre-project work, technical and economic indicators, environmental issues, production flow diagrams, site selection for construction, as well as the basic principles for designing a master plan and basic drawings.	5					٧			٧					
76	Professional computer programs and information technologies in construction	This discipline includes the study of computer programs and technologies used in modern construction companies, aimed at reducing construction time, efficient use of building materials in projects. In the process of studying the discipline, the basic rules and design tasks are considered, the main modern computer programs and technologies for calculating a flat or spatial structure from rods and slabs, evaluating a building model and making the necessary engineering decisions when designing buildings and structures.	5		٧	٧										
78	Automation systems of production	The discipline studies various types of modern automation systems, such as production management software, monitoring and quality control systems, to optimize the production of building materials, products and structures. The discipline studies the main benefits of using automation systems, such as increasing the efficiency and accuracy of production, reducing costs and minimizing risks.	5										٧			
79	Estimated business in	The purpose of studying the discipline is	5								٧				٧	

	the production of building materials	to form knowledge about the amounts of funds required for construction in accordance with design materials, the basis for determining the amount of capital investments, financing construction and calculating the cost of building materials, forming contractual prices for construction products, settlements for completed contract work, payment expenses for the purchase of equipment and its delivery to construction sites, as well as reimbursement of other costs at the expense of the funds provided for in the consolidated estimate.														
80	Modern computer calculations	The discipline gives the concept of modern computer programs for the calculation of building structures, according to modern regulatory documents (Eurocodes), studies the compilation of design schemes, the principles of building finite element models, rational breakdown into finite elements, is based on the study of the LIRA software package.	5									٧		٧		
	Modern finishing materials	The discipline studies the application of classical and innovative finishing materials on the example of world examples of architecture and design. He studies the range of properties and classification of materials according to various criteria, their technological features and operating conditions. Further, students learn to use finishing materials appropriately, taking into account their physical, chemical, mechanical, artistic and aesthetic properties, for interiors and facade systems of buildings and structures. They study the technology of production of finishing materials.	4				٧									
	Modern energy-	The course examines information on	4				٧	٧					٧			

	efficient building materials	modern polymer-building materials used in the production of building materials and in construction and introduces students to the role of polymers in science and technology, methods of obtaining and physico-chemical bases affecting the operational resistance of building														
81	Construction in extreme conditions	The discipline "Construction in extreme conditions" contributes to the formation of professional knowledge and practical skills in the construction of buildings and structures with a standard level of quality based on the study of industrial methods for the construction of various types of buildings and structures based on effective building materials and technologies, taking into account the conditions of low temperatures, dry hot climate, in difficult hydrogeological conditions, seismic activity and subsiding soils.	5							٧	٧					
82	Technology of Concrete II	The discipline studies the current state and world trends in the development of production and use of concrete and reinforced concrete products, types of concrete used in the production of reinforced concrete wall products and prefabricated elements of the frame of buildings and structures, materials for reinforcing elements, methods of reinforcement, technology of precast concrete products, the basics of organizing the technological process , preparation of concrete mixtures, reinforcement and reinforcement of reinforced concrete products and structures, molding of concrete and reinforced concrete products.	5				٧						٧			
83	Mounting Technology MK	The discipline contributes to the formation of professional knowledge and necessary skills in the technology of	4							٧						

		installation of metal structures; development and study of modern methods of installation of metal structures, which must be performed in a certain technological sequence, development of skills for the high-quality implementation of the technology of installation of metal structures using construction equipment in the construction of buildings and structures.														
84	Technology of building reconstructons	In this course, students are given General information about the technology of reconstruction of buildings used in industrial and civil construction, their technical and technological features. Examines the use of technological processes with the highest efficiency depending on the characteristics of the construction and operating conditions, as well as promising directions of their development	5						٧		٧					
85	Technology of thermal modernization and reconstruction of buildings	The study of the discipline will allow you to master the necessary skills for the thermal modernization of existing buildings after an energy audit; know the scheduling of the reconstruction of buildings and structures; features of the design of the construction master plan in the conditions of reconstruction of buildings; organization of reconstruction of industrial enterprises, residential and public buildings; features of the reconstruction of buildings in the conditions operating enterprises; production of construction and installation works; demolition of buildings; technology for strengthening building structures, as well as special methods for performing work during the reconstruction of buildings.	5				٧			٧						٧
	Economics and	The discipline is aimed at studying	4									٧			٧	٧

	planning for building energy efficiency	methods for improving the energy efficiency of buildings, drawing up phased plans for the implementation and reconstruction of the building to the appropriate planned level. As a result of studying the discipline, the student will be able to plan the hanging of the energy efficiency of the building, justify and calculate the necessary economic costs and payback periods.														
86	Economy of production of the building materials	The purpose of studying the discipline is to develop students' basic knowledge of the theoretical foundations and practical skills in the field of economics in the production of building materials. Discipline studies the issues of optimal solutions in the selection and production of building materials.	6								٧	٧				
87	Operation and reliability of buildings and structures	The training of this course is in determining the actual technical condition of the building (structure) and its elements, obtaining a quantitative assessment of the actual indicators of the quality of structures (strength, resistance to heat transfer, etc.), taking into account changes occurring over time, to establish the composition and scope of work on major repairs or reconstruction. Knowledge of the discipline allows students to get acquainted in detail with the methodology for determining the service life of buildings, their capital value, the dependence of wear on the operation of buildings.	5						٧							
	Energy audit of buildings	The aim of the course is to introduce students to the methodology of energy audit and monitoring, drawing up the energy balance and energy passport of equipment and systems of industrial enterprises and civil buildings. As a result of studying the course, the student should	5												٧	٧

		know the technology of energy audit and monitoring of buildings and industrial enterprises; methods for conducting instrumental examination and analysis of the results; technology for compiling an energy passport.														
	Energy-saving microzoning	The purpose of the discipline is to form ideas about the features of designing a comfortable and safe living environment for people in small neighborhoods based on familiarization with the regulatory framework; means and systems for ensuring a barrier-free environment; accounting, monitoring and control systems for the organization; the progress of work on the adaptation of urban infrastructure facilities to energy saving standards.	5					٧				٧				٧

5. Curriculum of educational program

KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I.SATBAYEV

SATBAYEV UNIVERSITY

APPROVED
Chairman of the Management Board-
Rector of KazNRTU named after K.I.Satpayev
M.K. Beisetayev
2023 y.

CURRICULUM
of Educational Program on enrollment for 2023-2024 academic year

Educational program 6B07302 - " Civil Engineering"
Group of educational programs B074 - "Urban planning, civil works and civil engineering"

Form of study: full-time | Duration of study: 4 years | Academic degree: Bachelor of Engineering and Technology

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	Classroom amount lec/lab/pr	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training based on courses and semesters							
								I course		II course		III course		IV course	
								1 semester	2 semester	3 semester	4 semester	5semester	6 semester	7 semester	8 semester
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)															
M-1. Module of language training															
LNG108	English language	GED, RC	10	300	0/0/6	210	E	5	5						
LNG104	Kazakh (Russian) language	GED, RC	10	300	0/0/6	210	E	5	5						
M-2. Module of physical training															
KFK101-104	Physical Culture	GED, RC	8	240	0/0/8	120	Diff.credit	2	2	2	2				
M-3. Module of information technology															
CSE477	Information and communication technologies (in English)	GED, RC	5	150	2/1/0	105	E				5				
M-4. Module of socio-cultural development															
HUM137	History of Kazakhstan	GED, RC	5	150	1/0/2	105	SE		5						
HUM132	Philosophy	GED, RC	5	150	1/0/2	105	E				5				
HUM120	Socio-political knowledge module (sociology, politology)	GED, RC	3	90	1/0/1	60	E				3				
HUM134	Socio-political knowledge module (culturology, psychology)		5	150	2/0/1	150	E			5					
M-5. Module of anti-corruption culture, ecology and life safety base															
HUM126	Fundamentals of anti-corruption culture and law	GED, CCH	5	150	2/0/1	150	E			5					
MNG480	Fundamentals of Economics and Entrepreneurship														
CIV970	Fundamentals of scientific research methods														
HYD438	Ecology and life safety														
CYCLE OF BASIC DISCIPLINES (BD)															
M-6. Module of physical and mathematical training															
MAT101	Mathematics I	BD, UC	5	150	1/0/2	105	E	5							
PHY468	Physics	BD, UC	5	150	1/1/1	105	E	5							
MAT102	Mathematics II	BD, UC	5	150	1/0/2	105	E		5						
M-7. Building mechanics module															
CIV940	Building Mechanics 1	BD, UC	5	150	1/0/2	105	E			5					
CIV556	Building Mechanics 2	BD, UC	5	150	1/0/2	105	E				5				
M-8. Computer modeling and automation module															
GEN429	Engineering and computer graphics	BD, UC	5	150	1/0/2	105	E	5							
CIV590	BIM technology in construction	BD, UC	5	150	1/0/2	105	E						5		
CIV760	Automation of release estimates in construction	PD, UC	4	120	2/1/0	75	E						4		
CIV671	Modern computer calculations	PD, CCH	5	150	1/0/2	105	E								
CIV697	Professional computer programs and information technologies in construction				1/0/2										5
CIV773	Automation systems of production				2/0/1										
CIV430	Estimated business in the production of building materials				1/0/2										
M-9. Building Design Module															
CIV591	Architecture and building structures	BD, UC	5	150	1/0/2	105	E				5				
CIV794	Engineering systems of buildings and structures	BD, UC	6	180	2/1/1	120	E			6					
CIV630	Reinforced concrete structures-1	BD, UC	5	180	2/0/1	105	E					5			
CIV668	Reinforced concrete structures 2	PD, UC	5	150	2/0/1	105	E							5	
M-10. Soil mechanics module															
CIV754	Geotechnics I	BD, UC	5	150	1/1/1	105	E					5			
CIV792	Geotechnics II	PD, UC	6	180	2/0/2	120	E							6	
M-11. Technology and Organization Module															
CIV582	Construction production technology I	BD, UC	5	150	2/0/1	105	E					5			
CIV758	Organization of construction	BD, CCH	6	180	2/0/2	120	E							6	
CIV759	Management and organization of construction production				2/0/2										
CIV963	Organization of construction of energy efficient buildings				2/0/2										

CIV701	Technological equipment of enterprises				2/0/2											
CIV667	Technology of building manufacture II	PD, UC	5	150	2/0/1	105	E							5		
					M-12. Basic training module											
CIV587	Building Materials	BD, UC	4	120	1/1/1	75	E	4								
CIV589	Geotechnics in construction	BD, CCH	5	150	1/0/2	105	E		5							
PHY466	Architectural physics				1/0/2											
CIV590	Design and calculation of structural elements	BD, CCH	5	150	2/1/0	105	E				5					
CIV596	Concrete technology I				2/1/0											
CIV958	Architectural design of energy efficient buildings				1/0/2											
CIV585	Computer graphics in construction drawing	BD, CCH	5	150	1/1/1	105	E			5						
CIV900	Fillers of concrete				1/1/1											
CIV957	Building climatology				2/0/1											
CIV631	Metal constructions I	BD, CCH	5	150	2/0/1	105	E					5				
CIV590	Boilers				1/1/1											
CIV774	Methodological foundations of scientific work (Module of "R&D")				2/0/1											
CIV834	Energy efficient design and construction of civil buildings	BD, CCH	5	150	2/0/1	105	E					5				
CIV859	Design of buildings with low heat consumption and the use of renewable energy resources				2/0/1											
CIV629	Materials for reinforcing concrete				2/0/1											
CIV752	Economics and construction management	BD, CCH	4	120	2/1/0	75	E					4				
CIV753	Buildings and structures testing				2/1/0											
CIV960	Alternative energy sources in civil engineering				2/1/0											
CIV755	Reliability of building designs	BD, CCH	5	150	2/0/1	105	E							5		
CIV756	Technology of repair works				2/0/1											
CIV961	Automation and equipment for energy efficient buildings				2/0/1											
CIV953	Research activities in the construction sector I (Module of "R&D")				0/0/3											
CIV757	Mechanization of construction processes	BD, CCH	5	150	2/0/1	105	E							5		
CIV962	Energy saving in building climate systems				2/0/1											
CIV784	Educational practice	BD, UC	2						2							
					M-13. Professional activity module											
CIV669	Metal structures II	PD, CCH	5	150	2/0/1	105	E								5	
CIV705	Technology of Concrete II				1/0/2											
CIV632	Operation reliability of buildings and structures				2/0/1											
CIV693	Evaluation of seismic stability of buildings and structures				2/0/1											
CIV738	Research activities in the construction sector II (Module of "R&D")				0/0/3											
CIV701	Engineering and design of high-rise buildings	PD, CCH	4	120	2/0/1	75	E							4		
CIV762	Mastering Technology MK				2/0/1											
CIV519	Modern energy-efficient building materials				2/0/1											
CIV484	Modern finishing materials				2/0/1											
CIV795	Design and calculation of special structures	PD, CCH	6	180	2/0/2	120	E								6	
CIV796	Quality control of construction installation works				2/1/1											
CIV965	International Energy Building Standards				2/0/2											
CIV793	Economy of production of the building materials				2/0/2											
CIV763	Design and calculation of seismic buildings	PD, CCH	5	150	2/0/1	105	E									5
CIV701	Building in extreme conditions				2/0/1											
CIV966	Energy audit of buildings				1/0/2											
CIV683	Plant design solutions				1/0/2											
CIV672	Designing and calculation of special constructions	PD, CCH	5	150	1/0/2	105	E									5
CIV700	Technology of building reconstruction				2/0/1											
CIV967	Technology of thermal modernization and reconstruction of buildings				2/0/1											
CIV779	Planning in construction (Module of "R&D")				1/0/2											

CIV676	Inspection and testing of buildings and structures	PD, CCH	5	150	2/0/1	105	E									5
CIV499	Manufacture of metal structures				2/0/1											
CIV968	Energy-saving microzoning				2/0/1											
CIV776	Road construction materials				1/0/2											
CIV400	Design and calculation of wooden structures	PD, CCH	4	120	1/0/2	75	E									4
CIV517	Office work in construction				1/0/2											
CIV510	Polymeric materials				1/0/2											
CIV961	Economics and planning for building energy efficiency				2/0/1											
CIV785	Production practice I	PD, UC	2								2					
CIV786	Production practice II	PD, UC	3										3			
M-14. Module of final attestation																
ECA108	Final examination	FA	8													8
M-15. Module of additional types of training																
AAP506	Military affairs	ATT	0													
Total based on UNIVERSITY:								31	29	28	32	29	31	30	27	
								60		60		60		60		

Number of credits for the entire period of study					
Cycle code	Cycles of disciplines	Credits			
		required component (RC)	university component (UC)	component of choice (CCH)	Total
GED	Cycle of general education disciplines	51		5	56
BD	Cycle of basic disciplines		67	45	176
PD	Cycle of profile disciplines		25	39	
	Total for theoretical training:	51	92	89	*232*
FA	final attestation	8			8
	TOTAL:	59	92	89	240

Decision of the Academic Council of Kazatu named after K.Satpayev. Protocol № 5 от "24" 11 2022 г.

Decision of the Educational and Methodological Council of Kazatu named after K.Satpayev. Protocol № 3 от "17" 11 2022 г.

Decision of the Academic Council of the Institute of A and C. Protocol № 2 от "4" 10 2022 г.

Vice-Rector for Academic Affairs — B.A. Zhautikov

Institute Director — B.U. Kenzhegaliyev

Department Head — D.A. Akhmetov

Specialty Council representative from employers — Zh.A.Omarov