



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

EDUCATIONAL PROGRAM

6B07302 "Civil Engineering"

code and name of the educational program

Educational Field Code and Classification: 6B07 Engineering,
Manufacturing, and Construction Industries

Code and classification of training areas: 6B073 Architecture and
Construction

Group of educational programs: B074 Urban planning, construction
works and civil engineering

NQF level: 6

Level according to the ORK: 6

Duration of study: 4 years

Number of credits: 240

Almaty 2025

NJSC "KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY"
named after K.I. SATPAYEV"

Educational program 6B07302 "Civil Engineering"

approved at a meeting of the Academic Council of KazNITU named after K.I. Satpayev.

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Reviewed and recommended for approval at a meeting of the Educational and Methodological Council of KazNITU named after K.I. Satpayev.

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Educational program 6B07302 "Civil Engineering" developed by the Academic Committee for the 6B073 "Architecture and Construction " program

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List of abbreviations and designations

Satpayev Kazakh National Research Technical University - K.I. Satpayev Kazakh National Research Technical University;

GOSO – State Compulsory Education Standard of the Republic of Kazakhstan;

OP – educational program;

IWS – independent work of a student (undergraduate, master's student, doctoral student);

ISWS – independent work of a student with a teacher (independent work of a student (master's student, doctoral student) with a teacher);

RUP – working curriculum;

KED – catalog of elective courses;

VC – university component;

EC – optional component;

NQF – national qualifications framework;

SQF – sectoral qualifications framework;

LO – learning outcomes.

1. Description of the educational program

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

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

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

The scope of professional activity includes both technical support for construction and work at companies producing building materials. The following industries can be considered: construction, mechanical engineering, chemical industry, mining, oil and gas industry, and manufacturing. The objects of professional activity are: construction and installation departments and organizations, design organizations, construction product manufacturing plants, public utilities, construction machinery and equipment operation and repair companies, joint-stock construction associations, companies conducting energy audits of buildings and enterprises, laboratories for quality control and certification of building materials and structures.

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

The educational program has been updated and now provides training in accordance with the Atlas of New Professions and Competencies of the Republic of Kazakhstan in the following new professions:

- Civil Engineer ⇒ Civil Engineer 2.0. Proficient in calculation principles, design, and construction production technologies, as well as new digital technologies applied on construction sites, such as Autodesk BIM 360 and BIM 360 Build. Proficient in the skills required to work in design, research, calculation, and production construction organizations.

- Professional Construction Renovation Specialis

A sustainable development specialist is knowledgeable about technological innovations in construction, architecture, and urban planning. They explore the feasibility and recommend specific new technologies and materials for the modernization/reconstruction of existing buildings (residential, administrative, and industrial buildings, as well as social and public facilities).

- A sustainable development specialist is proficient in assessment tools and standards that help evaluate a building's environmental performance (e.g., LEED, BREEAM, and DGNB certification systems). They assist construction teams in implementing projects in accordance with environmental standards. The primary goal of this specialist's work is to design and construct energy- and resource-efficient buildings, taking into account the client's goals and the needs and well-being of residents, with a particular focus on minimizing their environmental and ecological impact: developing and implementing sustainable solutions for energy supply, water supply, waste management, resource conservation, and the selection of eco-friendly materials. For existing buildings, the specialist conducts energy audits and recommends necessary improvements before re-commissioning. - A Smart Home designer designs, installs, and configures a customized home/apartment life support system tailored to a person's specific needs and budget, with a single control center via a mobile app. This system can integrate household appliances, a security system, lighting, climate control, audio systems, power and water supply, etc.

- An energy-saving engineer identifies and identifies opportunities to improve energy efficiency in buildings under design and construction, as well as the potential for using renewable energy sources; develops recommendations for improving the energy efficiency of buildings; and 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 activity:

- Production and management — managing teams performing construction and installation work on the erection, operation, and reconstruction of buildings, structures, engineering systems, and equipment; operating and repairing construction machinery, mechanical and electrical equipment, and automation equipment; Conducting energy audits of production lines for building materials, products, and structures;

- Design and engineering — performing design and engineering work on the construction and reconstruction of buildings and structures, utility systems, mechanical and electrical equipment, and mechanization, including energy-efficient ones;

Selection of building materials;

- Organizational and technological — organizing the work of construction, municipal, and manufacturing organizations and enterprises;
- Scientific and pedagogical — participating in research and development and conducting research and teaching activities in general education organizations.

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

Content of professional activity: performing calculations for building and structure elements, formulating technical solutions, participating in the development of technical specifications for construction and reconstruction, taking into account energy efficiency, environmental, and life safety requirements, performing construction and installation work, and selecting the composition and production lines for the production of building materials and structures.

Graduates work as engineers in construction organizations, leading organizations specializing in the 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 students to continue their studies in engineering master's programs.

2. Goal and Objectives of the Educational Program

Goal of the program: To train highly qualified specialists with the necessary knowledge and skills to successfully work in the construction industry in various fields, including calculation, design, installation, and operation of construction projects, as well as renovation, energy-efficient design, and production of building materials.

Objectives of the program:

- To develop students' personal qualities and develop general cultural and professional competencies.
- To study a range of general educational disciplines to provide social and humanitarian education based on the laws of socioeconomic development, history, modern information technology, the state language, foreign languages, and Russian;
- To study a range of basic disciplines to provide knowledge of natural sciences, general engineering, and economic disciplines as the foundation of professional education.

- Study of a series of core disciplines to develop theoretical knowledge, practical skills, and abilities in the field of civil engineering.

3. Requirements for assessing learning outcomes in the educational program

Learning outcomes in the bachelor's degree program are determined by the graduate's acquired competencies, i.e., their ability to apply knowledge, skills, and personal qualities in accordance with professional objectives.

Description of the mandatory standard requirements for graduation and the award of the academic degree of Bachelor of Engineering and Technology: completion of at least 240 academic credits of theoretical study and a final thesis.

4. Passport of the educational program

4.1. General information

№	Field name	Note
1	Code and classification of the field of education	6B07 Engineering, manufacturing, and construction industries
2	Code and classification of training areas	6B073 Architecture and Construction
3	Group of educational programs	B074 Urban development, construction works and civil engineering
4	Name of the educational program	6B07302 «Civil Engineering»
5	Brief description of the educational program	<p>The "Construction Engineering" educational program is aimed at training specialists in construction engineering, design, installation, reconstruction, and operation of buildings and structures, production of building materials and products, and energy-efficient design.</p> <p>Construction engineering (engineering in the construction industry) covers all phases of investment and construction projects: design, selection and production of materials, construction, and operation of facilities.</p> <p>Students gain knowledge in the design of reinforced concrete and metal buildings and structures, construction and installation technologies, and production technologies for building materials and structures..</p>

		My professional activities include both technical support for construction and work at companies producing building materials.
6	The purpose of the OP	Training highly qualified specialists with the necessary knowledge and skills to successfully work in the construction industry in various fields, including calculation, design, installation, and operation of construction projects, as well as renovation, energy-efficient design, and production of building materials.
7	Type of OP	new
8	NQF level	6
9	Level according to the ORK	6
10	Distinctive Features of the OP	Her
11	List of competencies of the educational program:	<ul style="list-style-type: none"> - Ability to apply the fundamental principles of natural science disciplines in professional activities, apply methods of mathematical analysis and mathematical (computer) modeling, and theoretical and experimental research; - Knowledge of the fundamental principles of geometric formation, construction, and mutual intersection of plane and spatial models, necessary for drawing and interpreting drawings of buildings, structures, and components, and for compiling design documentation and components; - Ability to use regulatory legal documents in professional activities; - Knowledge of the regulatory framework in the field of engineering surveys, design principles for buildings, structures, engineering systems, and equipment, planning and development of populated areas, and principles of energy-efficient design; - Proficiency in engineering survey methods, design technology for components and structures in accordance with technical specifications using universal and specialized software and computer-aided design systems; - Ability to participate in the design and survey of professional objects; - Knowledge of occupational health and safety, life safety, and environmental protection requirements during construction, installation, repair, and reconstruction work on construction projects; - knowledge of the organizational and legal foundations of management and entrepreneurial activities in the construction industry.
12	Learning outcomes of the educational program:	PO1. Demonstrate basic knowledge in the natural sciences, social sciences, humanities, and economics, which contribute to the development of a highly educated individual with a broad outlook and cultured thinking. Be proficient in international standards.

		<p>Corruption laws.</p> <p>PO2. Master the methods and tools of physical and mathematical (including computer) modeling using universal and specialized software and computing systems, computer-aided design systems, and standard research automation packages.</p> <p>PO3. Understand current trends in computer graphics development and understand its importance and role in engineering systems and construction projects. Master methods for creating flat projection models of three-dimensional space.</p> <p>PO4. Master modern methods of producing building materials, including the latest energy-saving technologies and production methods, as well as knowledge of the latest developments in construction technology, including innovative energy-efficient methods and processes.</p> <p>PO5. Have knowledge of the regulatory framework for the production of building materials, engineering surveys, design principles for buildings and structures, and the planning and development of populated areas, including international energy standards.</p> <p>PO6. Have knowledge of the requirements and procedures related to the installation, adjustment, testing, and commissioning of construction projects.</p> <p>PO7. Possess knowledge of the concepts, principles, and methods of installation processes, work organization, quality assurance, and compliance with safety regulations, as well as procedures for accepting manufactured product samples.</p> <p>PO8. Possess the ability to apply a system of fundamental knowledge (mathematical, scientific, engineering, and economic) to identify, formulate, and solve engineering problems.</p> <p>PO9. Be able to rationally select building construction and structural systems in accordance with the facility's purpose, its space-planning solution, economic feasibility, energy efficiency, and environmental safety.</p> <p>PO10. Be able to calculate the composition of raw materials for the production of building materials and products, as well as calculate the performance of process equipment.</p> <p>PO11. Possess skills in designing, calculating, and constructing the main elements of construction projects. Possess the ability to make judgments, evaluate ideas, and formulate conclusions on specific professional issues.</p> <p>PO12. Possess the ability to conduct training.</p>
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		Documentation on quality management of technological processes in construction production, workplace organization, their technical equipment, and the placement of process equipment. PO13. Possess skills in conducting surveys of buildings and structures followed by reconstruction and thermal modernization, including energy audits.
13	Form of study	full-time
14	Duration of study	4 years
15	Volume of loans	240
16	Languages of instruction	Kaz, rus, eng.
17	Awarded academic degree	Bachelor
18	Developer(s) and Authors:	Department of "Systems and Communications"

4.2. The relationship between the attainability of the learning outcomes formed in the educational program and academic disciplines

№	Name of the discipline	Brief description of the discipline	Кол-во кредитов	Formed learning outcomes (codes)												
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13
Cycle of general education disciplines																
Compulsory component																
1	English language	English is a general education subject. After determining a student's level (based on diagnostic testing or IELTS scores), students are assigned to groups and courses. The course title corresponds to the student's English proficiency level. When advancing from level to level, prerequisites and postrequisites for each course are met.	10	√												
2	Kazakh (Russian) language	Kazakh (Russian) Language. This course examines the socio-political and socio-cultural spheres of communication and the functional styles of the modern Kazakh (Russian) language. It covers the specifics of scientific style to develop and enhance students' professional and communicative skills. It allows students to gain practical knowledge of the fundamentals of scientific style and develops their ability to perform structural and semantic analysis of text.	10	√												
3	Physical culture	The goal of the discipline is the practical application of skills in performing the basic elements of athletics, sports games, gymnastics, and complex	8	√												

		Standards for general physical training, including professional and applied physical training or one of the sports, and methods for conducting independent physical exercise classes.														
4	Information and Communication Technologies (in English)	The objective of this course is to acquire theoretical knowledge of information processes, new information technologies, local and global computer networks, and information security methods; acquire skills in using text editors and spreadsheets; and create databases and various categories of application programs.	5	✓												
5	History of Kazakhstan	This course examines the historical events, phenomena, facts, and processes that have taken place in Kazakhstan from ancient times to the present day. Sections include: an introduction to the history of Kazakhstan; the Turkic steppe empire; early feudal states in Kazakhstan; Kazakhstan during the Mongol conquest (13th century); and medieval states in the 14th-15th centuries. The course also examines the main stages of the formation of Kazakh statehood: the era of the Kazakh Khanate in the 15th-18th centuries; Kazakhstan as part of the Russian Empire; Kazakhstan during the civil war and under a totalitarian system; Kazakhstan during the Great Patriotic War; Kazakhstan during the period of independence and in the modern era.	5	✓												

6	Philosophy	Philosophy fosters and develops critical and creative thinking, worldview, and culture, providing knowledge about the most general and fundamental problems of existence and providing a methodology for solving various theoretical and practical issues. Philosophy broadens the horizons of our vision of the modern world, fosters civic consciousness and patriotism, and fosters self-esteem and an awareness of the value of human existence. It teaches us to think and act correctly, develops practical and cognitive skills, and helps us seek and find ways and means of living in harmony with ourselves, society, and the world around us.	5	v											
7	Module of socio-political knowledge (sociology, political science)	This course is designed to enhance the quality of students' general humanities and professional training. Knowledge in sociology and political science is essential for effective professional performance in future specialists, as well as for understanding political processes, developing a political culture, developing a personal position, and a clearer understanding of one's responsibilities.	3	v											
8	Module of socio-political knowledge (cultural studies, psychology)	The socio-political knowledge module (cultural studies, psychology) is designed to familiarize students with the cultural achievements of humanity, to help them understand and assimilate the basic forms and universal patterns of formation and	5	v											

		<p>Cultural development, to develop in them the desire and skills to independently comprehend the full wealth of world cultural values for self-improvement and professional growth. During the course in cultural studies, students will examine general issues in cultural theory, leading cultural concepts, universal patterns and mechanisms of cultural formation and development, the main historical stages of the formation and development of Kazakhstani culture, and its most important achievements.</p> <p>During the course, students acquire theoretical knowledge and practical skills, shaping their professional focus from a perspective of psychological aspects.</p>															
Cycle of general education disciplines Elective component																	
9	Fundamentals of anti-corruption culture	<p>The course introduces students to the improvement of socio-economic relations in Kazakhstani society and the psychological characteristics of corrupt behavior. Particular attention is paid to the development of an anti-corruption culture and legal liability for corrupt acts in various fields. The goal of studying the course</p> <p>"Fundamentals of Anti-Corruption Culture and Law" is to enhance students' public and individual legal awareness and legal culture, as well as to develop a system of knowledge and</p>	5	√													

		A civic stance on combating corruption as an antisocial phenomenon. Expected results: to implement the values of moral consciousness and adhere to ethical standards in everyday practice; to work to improve the level of moral and legal culture; to utilize spiritual and moral mechanisms to prevent corruption.													
10	Fundamentals of Economics and Entrepreneurship	This course explores the fundamentals of economics and entrepreneurship from a scientific and legal perspective; its characteristics, challenges, and development prospects; the theory and practice of entrepreneurship as a system of economic and organizational relationships within business structures; and entrepreneurs' readiness for innovation. This course explores the essence of entrepreneurship, career stages, qualities, competencies, and responsibilities of entrepreneurs; theoretical and practical business planning and economic assessment of business ideas; and risk analysis of innovative development, the implementation of new technologies, and technological solutions..	5	v											v
11	Fundamentals of scientific research methods	The goal of this course is to use theoretical and practical knowledge to ensure scientifically sound decision-making in professional tasks. In achieving this goal, tasks such as developing a scientific way of thinking and acquiring a comprehensive knowledge base are addressed.	5	v	v										

		methodology of scientific knowledge and creativity, familiarization with the fundamental principles of planning and organizing scientific work in relevant areas.														
12	Ecology and life safety	This course explores theoretical and practical skills for creating safe, harmless, and environmentally friendly living conditions. It covers the impact of natural and man-made hazards on the human body and their monitoring; occupational safety culture; industrial sanitation; the impact of harmful substances and pollution sources on the human body and their maximum permissible concentrations in the air of the workplace; and natural and man-made emergencies.	5								Y		Y			
Cycle of Basic Disciplines – University Component																
13	Architecture and building structures	This course examines the fundamental principles of building and structure design, examines their classification, primary parts and elements, structural systems and diagrams, fundamental information about building structures, including design principles, and structural analysis methods. Fundamentals of limit state structural analysis.	5						Y				Y		Y	
14	Geotechnics I	This course explores soil mechanics and engineering geology to prepare students for professional work in the construction industry. Within this course, students learn to evaluate engineering	5										Y	Y		Y

		The geological conditions of construction sites, determining the physical and mechanical properties of foundation soils, calculating foundation settlements, and improving the properties of soils and artificial foundations are also discussed. New regulatory documents and foundation assessment methods harmonized with Eurocodes are also considered.													
15	Reinforced concrete structures I	This course examines the process of calculating compressed, tensile, and flexural loads of reinforced concrete structures in civil buildings, including consideration of the building's structural features, calculations of crack formation, crack opening, strength, and crack resistance.	5		√							√		√	
16	Engineering and computer graphics	This course focuses on the study of methods for depicting objects and general drawing rules using computer graphics; the study of the basic principles and geometric approach to modeling and the methodology for developing applications with a graphical interface; and the development of skills in the use of graphic systems for developing drawings using 2D and 3D modeling methods.	5		√				√						√
17	Engineering systems of buildings and structures	Future specialists acquire fundamental theoretical knowledge and practical skills in the field of water supply, sewerage, gas supply, and heating systems in populated areas.	6		√				√						√
18	Mathematics I	This course is designed to explore the fundamental concepts of higher mathematics and its applications. The fundamental principles of this course are used in the study of all	5		√	√									

		<p>General education engineering and specialized disciplines taught by graduate departments. The course sections include elements of linear algebra and analytic geometry, an introduction to analysis, and differential calculus of functions of one and several variables. The course covers methods for solving systems of equations and the application of vector calculus to problems in geometry, mechanics, and physics.</p> <p>Analytical geometry on the plane and in space, differential calculus of functions of one variable, derivatives and differentials, the study of function behavior, directional derivatives and gradients, and extrema of functions of several variables.</p>														
19	Mathematics II	<p>This course is a continuation of Mathematics I. The course sections include integral calculus for functions of one and several variables, and the theory of series.</p> <p>Indefinite integrals, their properties, and methods for calculating them. Definite integrals and their applications. Improper integrals. Theory of numerical series, the theory of functional series, Taylor and Maclaurin series, and the application of series to approximate calculations.</p>	5	√							√					
20	Structural Mechanics I	<p>This discipline studies the behavior of various materials when exposed to force and temperature factors, and methods for calculating the strength, rigidity, and stability of the most common machine and structural elements.</p>	5	√							√					

		Determining stresses and strains in components while rationally satisfying reliability and cost-effectiveness requirements.													
21	Structural Mechanics 2	This course examines the stress-strain state of rods and rod systems under various loads, as well as the principles and methods for calculating the strength, rigidity, and stability of structures to ensure the reliability of structures with minimal material consumption.	5									√		√	
22	Building materials	The "Building Materials" course examines materials as elements of the material-structure system, ensuring the functioning of structures with specified reliability and safety. It explores methods for creating materials with the required performance properties, including the appropriate selection of raw materials, waste disposal, recycling methods, and quality assessment, as well as technological methods for structural formation. It also examines quality indicators for building materials and regulatory methods for their determination and assessment using modern research equipment.	4					√						√	
23	Construction production technology I	This course explores the fundamental principles of construction, the most advanced methods of performing construction processes, the main technologies for constructing buildings and structures, and the development of this informational	5						√	√					

		based on directive organizational and technological documentation.														
24	Physics	This course examines the fundamental 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 in the specialty. The course covers the following topics: mechanics, mechanical harmonic waves, the fundamentals of molecular kinetic theory and thermodynamics, electrostatics, direct current, electromagnetism, geometric optics, the wave properties of light, the laws of thermal radiation, and the photoelectric effect.	5	√							√					
25	BIM technologies in construction	This course develops students' skills in using software packages (ArchiCAD, Revit) designed for building information modeling (BIM). These software packages facilitate the collaborative creation and use of information about buildings and structures. This information forms the basis for all decisions throughout the lifecycle of a facility (from planning to design, production of working documentation, construction, operation, and demolition). It also serves as the foundation for the work of the investor, client, general designer, general contractor, and operating organization.	5		√	√										
26	Educational practice	Internship to acquire basic professional skills and abilities. Consists of practical	2					√			√					

		The training of future specialists and reinforces acquired theoretical knowledge. The goal of practical training is to gain initial professional experience.													
Cycle of Basic Disciplines Elective Component															
27	Automation and equipment for energy-efficient buildings	<p>The objective of this course is to study the classification and characteristics of automation system elements: transmitters, switches, and actuators, as well as methods for analyzing automatic control systems.</p> <p>The main objective is to familiarize students with the fundamental methods of constructing automatic control systems and the tools necessary for their implementation, the characteristics and parameters of automation elements and measuring systems, typical links and functional diagrams of automatic control systems, the fundamentals of analysis and synthesis of automatic systems, and the operation of semiconductor devices in pulsed mode.</p>	5		v										v
28	Alternative energy sources in construction	<p>Studying this course will allow students to gain a comprehensive understanding of alternative renewable energy sources and their potential for use in solving energy supply and energy conservation problems. They will also explore the potential for using alternative and renewable energy sources in power supply systems for civil buildings and industrial enterprises; and solar radiation conversion systems.</p>	4		v										v

		Electric and thermal energy, using wind power, sea currents, and thermal gradients to generate electricity; and the potential for using biomass and municipal solid waste to generate electricity and thermal energy.													
29	Architectural physics	<p>Course objective: to develop knowledge of the fundamental concepts and principles of architectural climatology, thermal engineering, architectural lighting, color science, and architectural acoustics. Brief description: Lighting environment and its characteristics. Physical principles of photometry. Characteristics of the eye as a visual analyzer.</p> <p>The organic relationship between light and architectural form. Insolation and light protection. Fundamentals of architectural lighting engineering. Lighting climate. Features of lighting climate, questions about the unity and interaction of the utilitarian, aesthetic, and hygienic functions of light.</p> <p>Design of lighting architecture taking into account the interaction of light with space, form, plasticity, and color.</p>	5												
30	Архитектурное проектирование энергоэффективных зданий	<p>Studying this course allows students to master architectural and structural design methods for building design, taking into account modern trends and energy efficiency requirements. Upon completion of the course, students acquire a basic understanding of architecture, space-planning solutions for buildings, structures, structures, and their complexes, including:</p>	5												

		In accordance with the forms, styles, and flows of modern architecture, master the most important methods of engineering analysis in the field of building design, and possess methods for determining the quantitative and qualitative indicators of energy-efficient buildings.													
31	Binding agents	This course studies binders, their properties, and compositions. The primary focus of this course is inorganic binders, their properties, production characteristics, and applications. The course focuses on the physicochemical processes of hydration and hardening of mineral binders, exploring the possibilities of regulating and intensifying these processes, and the use of waste from various industries..	5				√					√			
32	Geodesy in construction	The purpose of this course is to define the role of geodesy in construction; obtain a modern understanding of the shape and size of the Earth; understand the concepts of geoid and ellipsoid; study coordinate systems used in geodesy; study coordinate systems at construction sites; and study the orientation of lines on the ground. The objectives of this course include acquiring knowledge of the application of maps and plans, the use of information on state geodetic networks, methods for creating survey networks, and the application of geometric leveling and the main types of topographic surveys.	5				√			√					

33	Concrete aggregates	This course examines aggregates used in concrete production, their classification, properties, and production technology, the influence of aggregate properties on the quality of concrete mixes and concrete, depending on their origin (aggregates from dense natural materials, artificial aggregates, aggregates from industrial waste, special types of aggregates), and the effectiveness of aggregate use in construction.	5			v					v			
34	Testing of buildings and structures	The course "Testing of Buildings and Structures" provides functional links with the core disciplines and aims to teach the theoretical foundations and practical skills of surveying and testing buildings and structures. The course explores methods and tools for experimentally examining the condition of various construction projects and assessing the properties and condition of building materials, building structures, and structures.	4							v				v
35	Computer graphics in construction drawing	This course is aimed at developing the basic principles of working with computer-aided design systems, including AutoCAD drawings, three-dimensional surfaces and solids, perspectives and shadows in orthographic 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.	5		v	v				v				

		design projects, which are an important part of modern engineering education														
36	Design and calculation of structural elements	This course covers the current state of theory and practice in the design of reinforced concrete, steel, and timber structures, as well as methods for determining internal forces and methods for calculating the strength and crack resistance of reinforced concrete structures. It also presents information on the physical and mechanical properties of structural materials, connections between metal and timber structures, and their design.	5		√							√		√		
37	Materials for concrete reinforcement	This course examines the issues and roles of reinforcement, the classification of materials for concrete reinforcement, reinforcing steel, reinforcing products, types of fibers, and their effective application in concrete production technology. The course objectives include explaining the production features and application of new types of reinforcing steel in the design and construction of these products.	5					√					√			
38	Metal structures I	This course focuses on the calculation and design of metal structures for civil buildings. It includes the study of metal properties that affect strength and stiffness characteristics, as well as the calculation of beams, beam structures, centrally compressed columns, and welded, bolted, and riveted joints in metal structures.	5		√							√		√		
39	Methodological foundations of scientific work	Purpose of the study: to provide students with the necessary knowledge for further study	5		√							√				

		<p>Knowledge of the nature and methodology of scientific research in industrial activities. This course explores the organization and design of scientific research projects, the selection of research topics, the stages and content of research projects, the principles of selecting information on a research topic, planning and setting up experiments, requirements for publication materials, patent documentation, and the presentation of scientific results and reports on the research topic. An introduction to the biographies of scientists from Kazakhstan and the CIS and the role of scientific research in the development of the mineral processing industry are presented.</p>														
40	Mechanization of construction processes	<p>The goal of this course is to train highly qualified specialists with the necessary knowledge of the technical performance and technological capabilities of construction process mechanization equipment, so that they can operate with maximum efficiency in construction environments.</p>	5					v	v							

41	Reliability of building structures	The course "Reliability of Building Structures" aims to develop students' knowledge of the general patterns of manifestation of quantitative and qualitative properties of construction projects using the specific methods of reliability theory of buildings and structures; the use of information obtained from measurements on quantitative	5									v		v	
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		properties of objects (buildings and structures) for quantitative and qualitative assessment of their condition in terms of reliability during their design, installation, and operation; developing students' understanding of the fundamentals and role of reliability theory in ensuring safety and quality in construction.													
42	Research and development activities in the construction industry I	The goal of this course is to equip students with the skills to solve current problems through experimental, project-based, and research activities, theoretical and applied research, and analysis of the development patterns of the natural environment, society, and technology. The course includes practical application of these skills in research projects.	5		√						√				
43	Organization of construction	The purpose of this course is to teach students the fundamentals of organizing and planning construction operations, as well as to develop the skills and competencies necessary for successful work in the construction industry. The main objectives of the course include developing students' understanding of the construction process, its stages and basic organizational methods, as well as how construction quality control is implemented.	6						√	√					√
44	Organization of construction of energy-efficient buildings	The purpose of studying this course is to develop knowledge that will support professional activity in the field of modern construction of energy-efficient buildings for various purposes.	6						√	√					√

		Upon completion of this training, students will be able to select methods for implementing individual production processes based on the use of efficient building materials and structures, perform calendar and linear planning for organizing construction industry logistics, prepare for the construction industry, and plan the main stages of construction.													
45	Designing buildings with low heat consumption and using renewable energy resources	The goal of this course is to master standard and new building design methods using modern automated design systems and considering the integration of renewable energy sources into building and structure engineering systems. Upon completion of the course, students will have the competencies to design energy-efficient buildings with planned low heat consumption by integrating renewable energy sources into building engineering systems.	5			√					√		√		
46	Construction climatology	Studying this course will provide students with a foundational understanding of construction climatology, examine the conditions under which the Earth's climate forms and changes, and understand the processes of radiation flux transformation, heat, and water regimes in the atmosphere, Earth's surface, land waters, and the World Ocean. Upon completion of this course, students will be able to conduct a comprehensive analysis of the interaction of the designed structure with the natural environment.;	5	√						√					

		To forecast changes in the natural environment under the influence of natural and artificial factors, taking into account the obtained calculated characteristics of soils and groundwater.													
47	Technological equipment for construction industry enterprises	This course covers requirements for equipment used in the production of binders, ceramics, and glass. It also covers equipment for silicate raw material extraction, primary processing, crushing, sorting, handling, and dosing, as well as auxiliary equipment for silicate plants.	6					√							√
48	Concrete Technology I	This course is based on concrete science: the physical and chemical principles of producing heavy and lightweight concrete, including cellular concrete. It explores raw materials for various types of concrete, the theory of concrete strength (heavy, lightweight, and cellular), the design of various types of heavy and lightweight concrete, the influence of concrete mix and concrete structure on the physical, mechanical, and performance properties of concrete, as well as chemical and mineral additives in concrete, and the concreting of monolithic structures.	5				√						√		
49	Repair technology	The "Repair Technology" course explores the fundamentals and procedures for the practical implementation of key types of repair and construction work, including utility line repair processes, with seamless integration of technological and organizational issues.	5					√		√					
50	Управление и	The purpose of the discipline "Management and	6							√					√

	organization of construction production	The "Organization of Construction Production" program teaches students the fundamentals of construction management, including designing construction organization and preparation for construction, studying the fundamentals of flow-based construction organization and project scheduling, as well as developing a site-specific construction master plan and a construction quality control algorithm.														
51	Construction Economics and Management	The objective of the "Construction Economics and Management" course is to familiarize students with the fundamentals of construction economics and management, including the classification and accounting of costs, expenses, product costing, company activity planning, management reporting, budget monitoring and analysis, and the preparation of reliable information for management decision-making. The objectives of this course are to familiarize students with its structure, the terminology used, and the general concepts, principles, provisions, and methods of construction economics and management.	4									√				√
52	Energy saving in building microclimate control systems	The objective of the course is to develop students' knowledge about energy resources, energy conservation in energy consumption, the Law of the Republic of Kazakhstan "On Energy Conservation" and energy and resource conservation in distribution.	5									√				√

		Electricity; the use of alternative energy sources. Upon completion of this course, students will be able to use secondary energy resources and understand the requirements for electricity meters; energy resource and energy carrier metering; and energy audits.														
53	Energy-efficient design and construction of civil buildings	This course examines modern requirements for the spatial planning and design of energy-efficient buildings, the main factors determining the form and functional spatial structure of buildings, ways to reduce energy consumption in existing buildings and structures, the use of alternative energy sources, and an analysis of the interaction between climate and the internal environment of buildings.	5					√		√						
Cycle of Major Disciplines – University Component																
54	Industrial practice I	The purpose of industrial internships is to consolidate and expand the theoretical knowledge students acquire while studying the disciplines. It ensures the reinforcement of knowledge and theoretical learning skills and serves as a bridge between the disciplines studied and the workplace.	2				√		√	√						√
55	Industrial Internship II	The purpose of the industrial internship is to consolidate and expand the theoretical knowledge acquired by students in the process of studying the disciplines of the specialized cycle, as well as to familiarize students with occupational safety issues and methods	3				√		√	√						√

		production of certain types of work on the construction of engineering systems for buildings and structures.														
56	Automation of cost estimate production in construction	The objective of this course is to develop the ability to prepare cost estimates using the resource-based method in accordance with regulatory documents on pricing in construction in the Republic of Kazakhstan, determine the cost of direct costs, overhead expenses, and estimated profit, additional costs associated with construction project decisions, prepare local and facility estimates, a consolidated construction cost estimate and a consolidated estimate, a list of material resources and equipment, a catalog of contractual unit prices and acceptance certificates for completed work, a register of transportation cost calculations, and other cost estimates..	4		√											√
57	Geotechnics II	The purpose of this course is to familiarize future specialists with the general principles of modern methods for calculating, designing, and constructing foundations, foundations, and underground structures, including natural and deep foundations, pile foundations, their classification, calculation, and design; and the specifics of foundation design on loess subsidence soils, on soft silty clayey soils, water-saturated soils, and swelling soils.	6								√	√		√		
58	Reinforced concrete structures II	This discipline reflects the current state of the issue.	5		√								√		√	

		Design and calculation of reinforced concrete structures. This course provides knowledge in the development of structural systems for buildings and structures, determining internal forces, and calculating the strength and deformability of reinforced concrete structures for precast single- and multi-story civil and industrial buildings.														
59	Construction Technology II	The course "Construction Production Technology II" examines the fundamentals of process design in construction and methods for calculating the main sections of process maps for construction processes, methods and techniques for implementing technological processes during the construction of buildings and structures based on ensuring the quality of construction products and the safety of construction work, and the principles of developing construction production - industrialization, comprehensive mechanization, automation, year-round operation, and flow.	5						√	√						
Cycle of Major (Specialized) Disciplines. Elective Component																
60	Office work in construction	The objective of this course is to develop a comprehensive understanding of the documentation system for construction companies; to study the composition of construction documentation and the rules for maintaining it; to promote knowledge of the procedures for documenting information and the ability to properly prepare official and business documentation..	4						√							√

61		Дисциплина изучает теоретические	5				√	√					√			
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	road construction materials	Fundamentals of road construction materials science, modern concepts of road construction materials, the basic technological principles of producing the above-mentioned materials with specified properties and quality control, and issues of optimizing their technology to improve quality and reduce energy consumption. The use of industrial by-products and environmental protection are also considered.													
62	Manufacturing of metal structures	The objective of this course is to acquire knowledge related to metal structure manufacturing technology. The course's objectives include studying the physical and mechanical properties of the materials used and the manufacturing technology of structural elements. Upon completion of this course, students should be familiar with modern metal structure manufacturing methods, methods for calculating and designing metal structure elements, performing metal structure calculations at various stages of installation, and using regulatory and technical literature.	5						√						√
63	Quality control of construction and installation works	The course "Quality Control of Construction and Installation Work" examines the fundamentals and procedures for the practical implementation of construction quality assurance methods for the purpose of obtaining the final product (a completed structure for various functional purposes).. Целью	6						√	√					

		The purpose of this course is to familiarize students with the theory and practice of quality control of construction and assembly work during construction projects and to teach them 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.													
64	International Energy Building Standards	The course aims to introduce students to international energy standards such as ISO 50001, BREEAM, BRE, and LEED; to teach them how to use them when planning for energy efficiency improvements and designing energy-efficient buildings and structures.	6						Y						Y
65	Metal structures II	This course allows students to master the practical application of newly developed structural systems for buildings and structures, and to calculate and design their elements using regulatory, instructional, and technical literature. Students will be presented with basic knowledge and skills in the calculation and design of single-span industrial metal buildings and structures, as well as practical methods for structural strength and deformation analysis, as well as the selection and design of metal structure connections.	5			Y					Y		Y		
66	Research and development in the construction industry	The aim of the course is to prepare students for the systematic implementation of research work in the professional field.	5		Y						Y		Y		

	II	Activities. Depending on the research profile, general scientific or highly specialized research methods and technologies are used. The goal of research is modernization, the search for new opportunities, and solutions to problems in the construction industry.														
67	Inspection and testing of buildings and structures	This course examines the technology of inspecting (diagnostics) and testing building structures and materials, determining the scope of diagnostics, the sequence of work, technological operations during inspection and testing of structures, and the development of practical calculation schemes. It examines basic diagrams, design solutions, typical building damage, technical means of structural inspection, and their general and detailed inspection.	5						y							y
68	Assessment of seismic resistance of buildings and structures	Studying this course develops knowledge in the field of calculation and design of earthquake-resistant buildings and structures, and complements this knowledge by exploring modern approaches to calculating and analyzing the stress-strain state of building structures and their joints under seismic impacts.	5									y				y
69	Patent law in construction	The course presents a general description of intellectual property objects and examines in detail such industrial property objects as inventions, industrial designs, and utility models.	5													y

		<p>Models, trademarks, and appellations of origin are covered.</p> <p>The course utilizes case law on disputes related to the protection of intellectual property rights. The course is based on current intellectual property legislation, which includes relevant provisions of the Civil Code, specific legislation covering specific intellectual property rights, and provisions of international conventions on the legal protection of intellectual property.</p>													
70	Polymeric materials	<p>This course 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 polymer testing methods..</p>	4				√	√				√			
71	Design and calculation of high-rise buildings	<p>The course "Design and Calculation of High-Rise Buildings" explores the design aspects of high-rise buildings. It develops students' knowledge in the calculation and design of multi-story buildings and high-rise structures. The objectives of this course are to master the principles of designing and calculating structural systems for multi-story buildings and high-rise structures; and to master the principles of laying out and designing load-bearing systems and their components in multi-story buildings and high-rise structures.</p>	4			√							√		

72	Design and calculation of wooden structures	The goal of this course is to introduce students to the fundamentals of timber structure design and calculation, including material characteristics and advanced methods that have been experimentally tested in construction. The course will cover the most common designs in detail, and provide numerical calculation examples to enhance understanding.	4			√						√		√		
73	Design and calculation of spatial structures	The objective of this course is to study the theory of surfaces and the fundamental equations of elastic shell statics, including geometric and physical equations. Students will learn methods for solving differential equations in shallow shell theory, as well as the fundamentals 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 suspended roofs, such as single- and double-strap cable-stayed systems, cable networks, and membrane roofs, using modern methods and tools.	6			√								√		
74	Design and calculation of earthquake-resistant buildings	The objective of this course is to teach students the methods and principles of designing earthquake-resistant buildings, including seismic load analysis, design selection, strengthening and stability methods, development of seismic risk protection measures, and evaluation of their effectiveness in accordance with	5			√						√		√		

		requirements of building codes and regulations.													
75	Design and calculation of special structures	This course explores architectural solutions, as well as design and calculation issues for various types of engineering structures, which, based on their functional characteristics, fall into the following groups: structures for supporting and housing equipment; communication and transport structures – tunnels, canals, collectors, supports, and overpasses; storage facilities for water supply and sewerage; water towers, reservoirs, gas holders; silos, bunkers, chimneys, retaining walls, etc. The significance and role of engineering structures in creating the image of modern industrial enterprises is also examined.	5		√							√			
76	Design solutions for factories producing building structures	This course develops skills and abilities in the design and reconstruction of plants producing building materials and products for various purposes. The course covers pre-design work, technical and economic indicators, environmental protection issues, production flow charts, site selection, and the fundamental principles of master plan design and basic drawings.	5					√			√				
77	Professional computer programs and information	This course includes the study of computer programs and technologies used in modern construction	5		√	√									

	technologies in construction	Companies focused on reducing design time and efficiently using building materials in projects. This course covers the fundamental design rules and objectives, key modern computer programs, and technologies for calculating flat or spatial structures made of rods and slabs, evaluating building models, and making necessary engineering decisions. When designing buildings and structures, this course covers:													
78	Industrial automation systems	This course examines 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. It explores the key benefits of using automation systems, such as increased production efficiency and accuracy, reduced costs, and risk minimization.	5									✓			
79	Estimating in the production of building materials	The purpose of this course is to develop knowledge about the amounts of funds required to carry out construction in accordance with design materials, the basis for determining the amount of capital investment, financing construction and calculating the cost of building materials, forming contract prices for construction products, settlements for completed contract work, and payment of expenses.	5							✓				✓	

		for the acquisition of equipment and its delivery to construction sites, as well as reimbursement of other costs from funds provided in the consolidated estimate.													
80	Modern computer calculations	This course provides an understanding of modern computer programs for calculating building structures in accordance with current regulatory documents (Eurocodes). It also examines the development of calculation schemes, principles of constructing finite element models, and rational breakdown into finite elements. It is based on the study of the LIRA software package.	5									Y		Y	
81	Modern finishing materials	This course explores the application of classic and innovative finishing materials using examples from global architecture and design. It examines the range of properties and classification of materials based on various criteria, their technological characteristics, and operating conditions. Students then learn how to appropriately use finishing materials, taking into account their physical, chemical, mechanical, and artistic-aesthetic properties, for interiors and façade systems of buildings and structures. They also study the production technology of finishing materials.	4				Y								
82	Modern energy-efficient building materials	This course covers modern polymer building materials used in the production of building materials and construction, and introduces students to the role of polymers in science and technology.	4				Y	Y					Y		

		methods of production and physical and chemical principles affecting the operational durability of building materials														
83	Construction in extreme conditions	The "Construction in Extreme Conditions" course promotes the development of professional knowledge and practical skills in constructing buildings and structures to regulatory quality standards. This course explores industrial methods for constructing various types of buildings and structures using efficient building materials and technologies, taking into account low temperatures, dry, hot climates, complex hydrogeological conditions, seismic activity, and subsidence-prone soils.	5							✓	✓					
84	Concrete Technology II	This course examines the current state and global trends in the production and application of concrete and reinforced concrete products, the types of concrete used in the production of reinforced concrete wall products and precast frame elements for buildings and structures, materials for reinforcing elements, reinforcement methods, precast concrete product technologies, the fundamentals of process engineering, the preparation of concrete mixtures, reinforcement and reinforcement of reinforced concrete products and structures, and the molding of concrete and reinforced concrete products.	5					✓					✓			
85	Installation technology of metal	Discipline contributes to the development of professional	4							✓						

	designs	Knowledge and necessary skills in metal structure installation technology; mastering and studying modern metal structure installation methods, which must be performed in a specific technological sequence; and developing skills for high-quality installation of metal structures using construction equipment during the construction of buildings and structures.													
86	Building reconstruction technology	This course provides students with a general overview of building renovation technologies used in industrial and civil construction, as well as their technical and technological features. It examines the use of technological processes with the highest efficiency, depending on the characteristics of the construction site and operating conditions, as well as promising areas for their development.	5						√		√				
87	Technology of thermal modernization and reconstruction of buildings	This course will provide the necessary skills for thermal modernization of existing buildings following an energy audit; knowledge of the scheduling of building and structure renovations; the specifics of designing a construction master plan for building renovations; the organization of renovations of industrial enterprises, residential, and public buildings; and the specifics of building renovations in existing facilities;	5					√			√				√

		Construction and installation work; building demolition; structural reinforcement technology; and special methods for performing work during building reconstruction.														
88	Economics and planning for improving building energy efficiency	This course focuses on methods for improving the energy efficiency of buildings, developing step-by-step plans for implementation, and reconstructing the building to the appropriate planned level. Upon completion of this course, students will be able to plan for improving the energy efficiency of a building, justify and calculate the necessary economic costs and payback periods.	4									Y			Y	Y
89	Economics of construction materials production	The goal of this course is to develop students' basic knowledge of the theoretical foundations and practical skills in the economics of construction materials production. This course explores optimal solutions for selecting and producing construction materials.	6								Y	Y				
90	Operation and reliability of buildings and structures	This course focuses on determining the actual technical condition of a building (structure) and its components, obtaining a quantitative assessment of the actual quality indicators of structures (strength, heat transfer resistance, etc.), taking into account changes over time, to determine the scope and extent of major repairs or reconstruction work. Knowledge of this course allows students	5						Y							

		Learn more about the methodology for determining the service life of buildings, their capital value, and the relationship between depreciation and building operation.														
91	Energy audit of buildings	The objective of this course is to introduce students to the methods of conducting energy audits and monitoring, compiling energy balances, and energy passports for equipment and systems in industrial facilities and civil buildings. Upon completion of this course, students should understand: the technology of conducting energy audits and monitoring buildings and industrial facilities; methods of conducting instrumental surveys and analyzing the results; the technology of compiling energy passports.	5												Y	Y
92	Energy-saving microzoning	The objective of this course is to develop an understanding of the design aspects of comfortable and safe living environments for people in small microdistricts through familiarization with the regulatory framework; barrier-free environment provisioning tools and systems; accounting, monitoring, and control systems; and the progress of efforts to adapt urban infrastructure to energy conservation standards.	5					Y				Y				Y

SIV413	Economics and construction management	3	BD, CCH	4	120	30/15/0	75	E							4			
SIV414	Buildings and structures testing	3	BD, CCH	4	120	30/15/0	75	E							4			
CIV826	Fundamentals of the design of load-bearing structures	3	BD, CCH	4	120	30/0/15	75	E							4			
CIV960	Alternative energy sources in civil engineering	3	BD, CCH	4	120	30/15/0	75	E							4			
CIV953	Research activities in the construction sector I	1	BD, CCH	5	150	0/0/45	105	E							5			
SIV412	Mechanization of construction processes	1	BD, CCH	5	150	30/0/15	105	E							5			
HYD134	Fluid mechanics	1	BD, CCH	5	150	15/15/15	105	E							5			
CIV827	Design of earthquake-resistant structures of buildings	1	BD, CCH	5	150	30/0/15	105	E							5			
CIV962	Energy saving in building microclimate systems	1	BD, CCH	5	150	30/0/15	105	E							5			
CHE950	ESG principles in inclusive culture	1	BD, CCH	5	150	30/0/15	105	E							5			
SIV174	Technology of repair works	1	BD, CCH	5	150	30/0/15	105	E								5		
SIV173	Reliability of building designs	1	BD, CCH	5	150	30/0/15	105	E								5		
CIV633	Architecture of transport facilities	1	BD, CCH	5	150	15/0/30	105	E								5		
CIV828	Design of earthquake-resistant buildings made of reinforced concrete structures	1	BD, CCH	5	150	30/0/15	105	E								5		
CIV961	Automation and equipment for energy-efficient buildings	1	BD, CCH	5	150	30/0/15	105	E								5		
CYCLE OF PROFILE DISCIPLINES (PD)																		
M-8. Computer modeling and automation module																		
SIV177	Automation of release estimates in construction		PD, UC	4	120	30/15/0	75	E							4			
CIV671	Modern computer calculations	1	PD, CCH	5	150	15/0/30	105	E								5		
CIV697	Professional computer programs and information technologies in construction	1	PD, CCH	5	150	15/0/30	105	E								5		
SIV408	Production automation systems	1	PD, CCH	5	150	30/0/15	105	E								5		
CIV430	Estimated business in the production of building materials	1	PD, CCH	5	150	15/0/30	105	E								5		MAT101
M-9. Building Design Module																		
CIV668	Reinforced concrete structures II		PD, UC	5	150	30/0/15	105	E							5			
M-10. Soil mechanics module																		
SIV409	Geotechnics II		PD, UC	6	180	30/0/30	120	E							6			
M-11. Technology and Organization Module																		
CIV667	Technology of building manufacture II		PD, UC	5	150	30/0/15	105	E							5			
M-12. Basic training module																		
AAP102	Production practice I		PD, UC	2				R							2			
M-13. Module of professional activity																		
AAP183	Production practice II		PD, UC	3				R							3			
SIV416	Engineering and design of high-rise buildings	1	PD, CCH	4	120	30/0/15	75	E							4			
SIV178	Mounting Technology MK	1	PD, CCH	4	120	30/0/15	75	E							4			
CIV519	Modern energy-efficient building materials	1	PD, CCH	4	120	30/0/15	75	E							4			
CIV484	Modern finishing materials	1	PD, CCH	4	120	30/0/15	75	E							4			
SIV188	Research activities in the construction sector II	1	PD, CCH	5	150	0/0/45	105	E								5		
CIV669	Metal constructions 2	1	PD, CCH	5	150	30/0/15	105	E								5		
CIV829	Design of earthquake-resistant buildings made of steel structures	1	PD, CCH	5	150	30/0/15	105	E								5		
SIV415	Technology of Concrete II	1	PD, CCH	5	150	15/0/30	105	E								5		

CIV632	Operation and reliability of buildings and structures	1	PD, CCH	5	150	30/0/15	105	E											5		
SIV417	Design and calculation of spatial structures	2	PD, CCH	6	180	30/0/30	120	E												6	
SIV418	Quality control of construction installation works	2	PD, CCH	6	180	30/15/15	120	E												6	
CIV500	Engineering hydrogeology in construction	2	PD, CCH	6	180	30/15/15	120	E												6	
CIV965	International Energy Building Standards	2	PD, CCH	6	180	30/0/30	120	E												6	
SIV419	Economy of production of the building materials	2	PD, CCH	6	180	30/0/30	120	E												6	
SIV420	Design and calculation of seismic buildings	1	PD, CCH	5	150	30/0/15	105	E												5	
SIV179	Construction in extreme conditions	1	PD, CCH	5	150	30/0/15	105	E												5	
CIV966	Energy audit of buildings	1	PD, CCH	5	150	15/0/30	105	E												5	
CIV683	Design solutions for factories for the production of building materials	1	PD, CCH	5	150	15/0/30	105	E												5	
CIV672	Designing and calculation of special constructions	2	PD, CCH	5	150	15/0/30	105	E												5	
CIV831	Modern geotechnical engineering	2	PD, CCH	5	150	15/0/30	105	E												5	
CIV693	Evaluation of seismic stability of buildings and structures	2	PD, CCH	5	150	30/0/15	105	E												5	
CIV967	Technology of thermal modernization and reconstruction of buildings	2	PD, CCH	5	150	30/0/15	105	E												5	
SIV194	Patenting in construction	2	PD, CCH	5	150	15/0/30	105	E												5	
CIV676	Inspection and testing of buildings and structures	3	PD, CCH	5	150	30/0/15	105	E												5	
CIV830	Seismic insulating foundations	3	PD, CCH	5	150	30/0/15	105	E												5	
CIV495	Manufacturing of metal structures	3	PD, CCH	5	150	30/0/15	105	E												5	
CIV968	Energy-saving microzoning	3	PD, CCH	5	150	30/0/15	105	E												5	
SIV405	Road construction materials	3	PD, CCH	5	150	15/0/30	105	E												5	
CIV400	Design and calculation of wooden structures	4	PD, CCH	4	120	15/0/30	75	E												4	
CIV517	Office work in construction	4	PD, CCH	4	120	15/0/30	75	E												4	
CIV518	Polymeric materials	4	PD, CCH	4	120	15/0/30	75	E												4	
CIV964	Economics and planning for building energy efficiency	4	PD, CCH	4	120	30/0/15	75	E												4	
M-14. Module of final attestation																					
ECA103	Final examination		FA	8																8	
Additional type of training (ATT)																					
AAP500	Military training																				
Total based on UNIVERSITY:											31	29	28	32	29	31	33	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	0	5	56
BD	Cycle of basic disciplines	0	67	45	112
PD	Cycle of profile disciplines	0	25	39	64
Total for theoretical training:		51	92	89	232
FA	Final attestation				8
TOTAL:					240

Decision of the Educational and Methodological Council of KazNRTU named after K.Satpayev. Minutes № 3 dated 20.12.2024

Decision of the Academic Council of the Institute. Minutes № 4 dated 10.12.2024

Signed:

Governing Board member - Vice-Rector for Academic Affairs

Approved:

Vice Provost on academic development

Head of Department - Department of Educational Program
Management and Academic-Methodological Work

Director of the Institute - Institute of Architecture and Civil
engineering named T.K. Bassenov

Department Chair - Civil engineering and building materials

Representative of the Academic Committee from Employers

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