

«ALIKHAN BOKEIKHAN UNIVERSITY» EDUCATIONAL INSTITUTION

Faculty of Information Technology and Economics

Department of "Information technical sciences»

6b07527 – «Standardization, certification and metrology in construction»

THE CATALOGUE OF ELECTIVE SUBJECTS

Year of admission - 2021

Semey, year 2021

Considered and approved at the meeting of educational-methodic Council of the faculty

Minutes №_5_ from 20.05.2021y.

Approved at the meeting of EMC of the University

Minutes №_1_ from 17.09.2021 y.

**Awarded degree: bachelor of technology and
technology in the specialty 6B07527 Standardization,
certification and metrology in construction**

Group of education:
B076- Standardization, certification and metrology(by industry)

sequence number of the elective	Discipline	Number of credits	Prerequisites	Postrequisites	Prerequisites Postrekvizity Brief description indicating the purpose of the study, executive summary, and expected results of the study (knowledge, skills, competences)
General Studies					
Be sure to select (BSS)					
Module of economic and legal knowledge					
1	Fundamentals of market economy and entrepreneurship	3	There is a need for legal, historical and economic knowledge that students receive in secondary schools	Sociology, Political Science	<p>The purpose of teaching this discipline is the formation of systemic economic thinking to understand the logic of the economic laws of society, processes and phenomena that occur at all levels, with the possibility of applying knowledge in practice in any situation and in any economic system. Mastering the skills of the scientific and practical foundations of the organization of entrepreneurial activity, the methods of its planning and implementation in modern market conditions.</p> <p>Content: consideration of the institution of entrepreneurship; mastering the economic skills of organizing entrepreneurial activities and evaluating its effectiveness; definition and use of state mechanisms of regulation and support of entrepreneurship. The study of processes, phenomena of the economic life of society; the development of methods, methods, principles, approaches for the study of economic processes;</p> <p>Learning Outcome: Know: the functions of money, the reasons for the differences in the level of remuneration; main types of taxes; organizational and legal forms of entrepreneurship; types of securities; economic growth factors; current state of the theory and practice of entrepreneurial activity; specifics of entrepreneurial activity; To be able to: give examples of factors of production and factor income, public goods, Kazakhstani enterprises of various organizational forms, global economic problems; describe the effect of the market mechanism, the main forms of wages and labor incentives, inflation, the main articles of the state budget of Kazakhstan, economic growth, use the basic terminology of modern entrepreneurship; use methods of entrepreneurial activity; Skills: obtaining and evaluating economic information; drawing up a family budget; assessment of their own economic activities as a consumer, family member and citizen.</p>
1	Fundamentals of law and anti- corruption culture	2	Legal and historical knowledge that students receive in	Sociology, Political Science	<p>The purpose of studying the discipline: Studying the course and introducing students to the formation of a knowledge system on combating corruption and developing a civic</p>

			secondary and secondary schools is necessary		<p>position on this basis in relation to this phenomenon.</p> <p>Content: Fundamentals of the anti-corruption culture is a holistic interdisciplinary system of knowledge for all specialties and areas of bachelor training.</p> <p>Expected result: As a result of studying the discipline, students should know: the essence of corruption and the reasons for its origin, the measure of moral and legal responsibility for corruption offenses.</p> <p>To be able to: possess the skills to acquire new knowledge about the anti-corruption culture is a holistic interdisciplinary system of knowledge.</p> <p>Competencies: general education.</p>
Module of economic and natural knowledge					
2	Fundamentals of market economy and entrepreneurship	5	There is a need for legal, historical and economic knowledge that students receive in secondary schools	Sociology, Political Science	<p>The purpose of teaching this discipline is the formation of systemic economic thinking to understand the logic of the economic laws of society, processes and phenomena that occur at all levels, with the possibility of applying knowledge in practice in any situation and in any economic system. Mastering the skills of the scientific and practical foundations of the organization of entrepreneurial activity, the methods of its planning and implementation in modern market conditions.</p> <p>Content: consideration of the institution of entrepreneurship; mastering the economic skills of organizing entrepreneurial activities and evaluating its effectiveness; definition and use of state mechanisms of regulation and support of entrepreneurship. The study of processes, phenomena of the economic life of society; the development of methods, methods, principles, approaches for the study of economic processes;</p> <p>Learning Outcome:</p> <p>Know: the functions of money, the reasons for the differences in the level of remuneration; main types of taxes; organizational and legal forms of entrepreneurship; types of securities; economic growth factors; current state of the theory and practice of entrepreneurial activity; specifics of entrepreneurial activity;</p> <p>To be able to: give examples of factors of production and factor income, public goods, Kazakhstani enterprises of various organizational forms, global economic problems; describe the effect of the market mechanism, the main forms of wages and labor incentives, inflation, the main articles of the state budget of Kazakhstan, economic growth, use the basic terminology of modern entrepreneurship;</p> <p>use methods of entrepreneurial activity;</p> <p>Skills: obtaining and evaluating economic information; drawing up a family budget; assessment of their own economic activities as a consumer, family member and citizen</p>
2	Fundamentals of safety and life	5	There is a need for legal, historical	Sociology, Political Science	<p>Aim. To form ideas about the safety of life in human life and the possibility of</p>

			and biological knowledge that students receive in secondary schools		<p>regulating the processes of mutual influence of the environment and man.</p> <p>Content. The study of the basic concepts of life safety, ecology, problems of modern civilization and the environmental consequences of economic and other human activities in the intensification of environmental management, emergencies, civil defense. Disclosure of principles and methods of protection of the population from various environmental factors, legislative and legal acts in the field of bzh. Preservation of the environment and biological resources</p> <p>Expected results: students must know: legislative framework of safety and environmental control, as well as methods for identification, eliminating the influence of harmful factors on human beings and the environment, and ensure comfortable conditions for life and human activities; to be able: to systematize safety standards for use in professional activity; to choose methods of protection against hazards in relation to their professional activities and select methods for providing comfortable living conditions; to own skills of life safety in production conditions and in emergency situations, skills of first aid.</p>
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BASIC DISCIPLINE

Be sure to select (BSS)

1	Identification and marking of goods	3	Engineering graphics	Technology of construction materials	<p>Purpose: to study the definition of bar code. Types of information about the product. Marking of goods. Production marking. Trade marking. Information sign.</p> <p>Contents: presentation on the organization of coding activities in developed countries; on international organizations for identification and coding; methods of processing the results of coding organization and technology of products.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - types, forms and means of commodity information; - the main normative and legal documents in accordance with the direction and profile of training; - requirements for the information of marketable products; - shipping documents, media, and the composition of the marking, information signs; <p>Know:</p> <ul style="list-style-type: none"> - to give the conclusion on compliance (discrepancy) of commodity information on any group of goods; - to organize search and use normative documents in the field of information on goods in professional activity; - analyze complaints and claims to the goods, prepare conclusions on the results of their consideration; - to apply the standards of the organization in the practice of trade; - to assess the compliance of product
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					<p>information with the requirements of regulatory documentation.</p> <p>Skills:</p> <ul style="list-style-type: none"> - knowledge of product information requirements; - use of information obtained from the Internet; - methodology of search and use of the existing technical regulations, standards, codes of practice; - work with complaints and claims; - the basics of implementing the standards of the organization in the practice of trade; - methods of operational accounting of information data in commercial activities; - work with the labeling of goods of different product groups; - methods of classification and coding of goods, methods and means of definition of indicators of the range and quality of goods and ways of preservation of quality of goods;
1	Basics of product coding	3	Engineering graphics	Technology of construction materials	<p>Purpose: to Learn the basics of product coding. Contents: Introduction. The history of coding. Types of classification-hierarchical, faceted and their features</p> <p>Contents: Identification, classification and coding of goods, methods, objects of classification and identification, bar coding systems.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - legislation in the field of identification and coding; - normative legal acts and methodical materials; - types of state classifiers. <p>Know:</p> <ul style="list-style-type: none"> - use computer technology for identification and coding; - to orient in the structure of the barcode; - perform the calculation of the control numbers of the barcode. <p>Skills:</p> <ul style="list-style-type: none"> - work on the organization of coding in developed countries; - international organizations for unification and coding; - processing the results of coding, coding products, technology and organization.
2	Technology of construction materials	5	Identification and marking of goods	Building construction	<p>Purpose: to give the basics of materials science, principles of selection of structural materials, technology of their production and processing; to instill skills of practical determination of physical and mechanical properties of materials and directed impact on them; to expand the scientific and technical horizons of students.</p> <p>Contents: Structural materials in construction; basic methods of research of metals and alloys; fundamentals of the theory of heat treatment; technology of production of products from non-metallic materials, technology of welding production; technology of processing of materials by cutting. and schemes</p> <p>Expected result:</p>

					<p>Know:</p> <ul style="list-style-type: none"> - methods of production and development of new structural materials and methods of their processing; - methods of creation of rational programs of quality level of concentration on the basis of modern technologies; - modern technological processes of processing of structural materials. <p>Know:</p> <ul style="list-style-type: none"> - assign and select rational technology for manufacturing machine parts; - to make a choice of methods for obtaining structural materials, manufacturing technology of blanks, machining technology; <p>Skills:</p> <ul style="list-style-type: none"> - skills in design and manufacture of technological parts and structures; - methods of analysis and search of materials for the production of this type of product.
2	Technological machines and equipment	5	Identification and marking of goods	Building construction	<p>Purpose: to study and familiarize with the methods of processing and hardening of building materials in the future necessary for the study of special disciplines.</p> <p>Contents: General information about construction machinery and equipment. Transport and lifting machines. Machines for preparatory and excavation works. Machinery and equipment for pile works. Machines and equipment for preparation and transportation of concrete and mortars and compaction of concrete mixtures</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - crystallization of metals and alloys; - mechanical properties of materials; - heat treatment of metals and their types; - importance of chemical heat treatment of steel; - properties of non-ferrous metals and alloys. <p>Know:</p> <ul style="list-style-type: none"> - analyze microscopic carbon steel; - analyze microscopic cast iron; - thermally (cultivation and softening) to process carbon steel; - investigate aluminum alloys and microstructures of bacteria; - analyze the microstructures of copper and copper alloys. <p>Skills:</p> <ul style="list-style-type: none"> - mechanical properties of materials; properties and methods of structural and tool materials, structures and their hardening.
3	Engineering graphics	5	Qualimetry	Identification and marking of goods	<p>Purpose: to know projection methods. Requirements for graphic images. Standards relating to the design of drawings. Projection models. Projection properties. Unified system of design documentation. Requirements for drawings.</p> <p>Contents: Projection methods. Methods of transformation of orthogonal projections. ESKD standards. Rules of execution of drawings of parts, subassemblies and schemes. Autocad</p>

				<p>basics. Three-dimensional modeling in AutoCAD.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - standards of the Unified system of design documentation (ESKD) and the requirement for ESKD; - laws, methods and techniques of projection drawing; - rules of registration and reading of design and technological documentation; - rules of execution of drawings, technical drawings, sketches, geometric constructions; - technique and principles of dimensioning; laws of linear perspective and basic methods of constructing space on the plane, methods of constructing shadows; - stages and procedures of architectural and construction design; - technique and sequence of the project; - requirements of the state standards of Uniform system of design documentation (ESKD) and Uniform system of technological documentation (ESTD); <p>Know:</p> <ul style="list-style-type: none"> - use autocad computer graphics; solve geometric modeling problems: simple spatial problems and solve geometric modeling problems of any complexity; - use regulatory documents, catalogs and other documentation; - solve problems of geometric nature on the images of spatial forms; - solve simple compositional problems in the construction of three-dimensional objects; - perform working drawings, sketches of parts and architectural and construction drawings using manual graphics techniques; - perform orthogonal, axonometric and perspective projections; correctly Express graphically technical idea; - carry out self-monitoring of the graphical part of the project; - clearly and logically present the ideas and content of your project; - to evaluate the results of their work at each stage and adjust their activities; to discuss problems, to defend their position; - use state standards, reference and technical literature; <p>Skills:</p> <ul style="list-style-type: none"> - solving problems of geometric modeling: simple and complex spatial problems by means of engineering graphics; - rules and methods of work drawing tools, special engineering and construction terminology; - independent construction of an algorithm for solving specific graphical problems; - construction of spatial forms; - design and execution of drawings; - methods of research activities; - ability to plan, organize and perform work in
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					the allotted time;
3	Engineering graphics and descriptive geometry	5	Qualimetry	Identification and marking of goods	<p>Purpose: development of knowledge and skills necessary for students to perform and read technical drawings, sketches of parts, preparation of design and technical documentation of production, the formation of primary skills for the graphic display of technical ideas with the help of drawing, as well as understanding of the drawing design of technical products and the principle of operation of the depicted object.</p> <p>Contents: Theory of construction of drawings. Projection methods. Plots Monge. Methods of transformation of orthogonal projections. Positional and metric problems. Polyhedrons. Surface of revolution. Axonometric projections. General rules of drawings. Images: views, sections, sections. Types of compounds. Reading and detailing Assembly drawings. Circuitry. Basics of computer graphics system AutoCAD. Execution of drawings and diagrams. 3D-modeling.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - laws, methods and techniques of projection drawing; - rules of registration and reading of design and technological documentation; - rules of execution of drawings, technical drawings, sketches, geometric constructions; - stages and procedures of architectural and construction design; - technique and sequence of the project; - requirements of the state standards of Uniform system of design documentation (ESKD) and Uniform system of technological documentation (ESTD); <p>Know:</p> <ul style="list-style-type: none"> - use regulatory documents, catalogs and other documentation; - solve problems of geometric nature on the images of spatial forms; - solve simple compositional problems in the construction of three-dimensional objects; - perform working drawings, sketches of parts and architectural and construction drawings using manual graphics techniques; - perform orthogonal, axonometric and perspective projections; correctly Express graphically technical idea; - carry out self-monitoring of the graphical part of the project; - clearly and logically present the ideas and content of your project; - use state standards, reference and technical literature; <p>Skills:</p> <ul style="list-style-type: none"> - independent construction of an algorithm for solving specific graphical problems; - construction of spatial forms; - design and execution of drawings; - methods of research activities; - ability to plan, organize and perform work in

					the allotted time;
4	Electrical engineering	5	Mathematics, Physics	Standardization of the documentation system	<p>Purpose: to study the basics of electrical resources, the basics of electrical engineering, production technology of electrical equipment in various types of electrical engineering.</p> <p>Contents: Linear electric circuits of direct current; electric circuits of single-phase sinusoidal current; three-phase circuits; transients in linear electric circuits, four-pole and frequency electric filters; circuits with distributed parameters; nonlinear electric circuits; electromagnetic field theory</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - basic laws of electrical engineering, methods of analysis of electrical circuits; - basic laws of electrical engineering for electrical and magnetic circuits; - methods of measurement of electrical and magnetic quantities, principles of operation of the main electrical machines and devices, their operating and starting characteristics; - parameters of modern semiconductor devices: amplifiers, generators, secondary power supplies, digital converters; <p>Know:</p> <ul style="list-style-type: none"> - determine the measurement errors and the laws of their distribution, methods of processing the measurement results; - read electrical and electronic circuits, primary converters and actuator; - to identify simple faults, draw up specifications; <p>Skills:</p> <ul style="list-style-type: none"> methods of calculation of errors of prismerti, processing of measurement results; - application to the calculations of the fundamental laws of electrical engineering, the principle of operation of semiconductor devices, electrical machines and apparatus;
4	Fundamentals of electrical engineering theory	5	Mathematics, Physics	Standardization of the documentation system	<p>Purpose: to master the basic concepts and laws of analysis of DC sinusoidal current circuits .</p> <p>Contents: Basic concepts and laws of the electromagnetic field and the theory of electric and magnetic circuits; theory of linear and electrical circuits (DC, sinusoidal and non-sinusoidal currents), methods of analysis of linear circuits with bipolar and multipolar elements; three-phase circuits; transients in linear circuits and methods of calculation; nonlinear electric and magnetic circuits of direct and alternating current;</p> <p>Expected result:</p> <p>know:</p> <ul style="list-style-type: none"> - the origin of the physical processes taking place in electric and magnetic circuits, the basic laws and methods of calculation of electricity. <p>Know:</p> <ul style="list-style-type: none"> - make calculations and design electrical and electrical systems and their components;

					Skills: - installation, commissioning and operation of electrical equipment.
5	Quality audit	4	Theoretical mechanics	Patenting	Purpose: to study the medical and practical skills of assessing the processes of the quality management system (QMS) in order to improve them. Mastering the methods and techniques of internal audits of the quality management system (QMS) for their future professional activities. Contents: Types of quality audit; external and internal audit; organization of quality audit; audit management; planning and preparation of quality system. Expected result: Know: - main provisions of normative documents; - basic concepts relating to quality audit; - objectives, principles, types of quality audit and their features; - qualification requirements of experts (auditors); - procedures for planning, preparation, quality audit; - algorithm of preparation and quality audit. Know: - work with standards; - develop questionnaires in preparation for the audit; - develop audit documentation; - to draw up reports on the results of the audit; - evaluate actions based on the audit results. Vladetelyami: - fundamentals of industrial relations during quality audits.
5	Audit of quality management system of products and services	4	Theoretical mechanics	Patenting	Purpose: to examine the effectiveness of management programs implemented by management. Quality assurance is based on preventing problems before they are detected. Contents: Quality of management; evolution of quality and quality management systems; product quality control.: control, testing and evaluation of product quality. International standardization of quality systems. Expected result: Know: - essence, goals and objectives of quality audit; - quality system audits; - audit principles; - the stages of audit; - audits of quality management systems; - the essence and objectives of internal control, the content of the main regulations relating to internal control. Know: - to carry out the audit procedure of the quality system, the collection of audit evidence; - use statistical methods for audits; - build an audit sample and evaluate its results; - conduct internal audit; - analyze and summarize audit results;

					<ul style="list-style-type: none"> - draw up the results of the audit; Skills: <ul style="list-style-type: none"> - application of analytical procedures and methods for the selection of documentation and records during inspections; - methods of work of the auditor; - quality management systems; - development of reporting documentation, corrective and preventive actions; - audit planning, scheduling and working group of auditors;
6	Theoretical mechanics	5	Normative base of standardization and certification	Quality audit	<p>Purpose: to study methods of investigation of equilibrium and motion of a material point of a solid body and a mechanical system.</p> <p>Contents: Equilibrium conditions; equilibrium on the plane; the method of cutting nodes; basic concepts and hypotheses of the resistance of materials; basic concepts. Bending; stability; stability of the longitudinal shape of the compressed rods in the elastic stage.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - physical basis of mechanics; - basic concepts and axioms of theoretical mechanics, methods of modification of force systems, equilibrium conditions of a rigid body, methods for determining the speed and acceleration of point motion, the main types of solid physical movements, complex movement of points, the main problems of the dynamics of a mathematical point, the dynamics of a mechanical system to know the General theorem; <p>Know:</p> <ul style="list-style-type: none"> - solve problems of theoretical mechanics; - use methods to transform force systems; - determine the speed and acceleration of point motion; <p>Skills:</p> <ul style="list-style-type: none"> - use the materials studied in all areas; - solve problems associated with the movement of material points; - methods of construction of mathematical models in solving problems of mechanics; - solving practical problems;
6	General mechanics	5	Normative base of standardization and certification	Quality audit	<p>Purpose: to Study the characteristics of the measured bodies.</p> <p>Contents: Statics. Kinematics of a point and simple motions of a rigid body. Basics of point dynamics. Tension and compression of rods. Fundamentals of the theory of stress and strain States. Strength calculations at complex stress state</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - basic concepts and axioms of theoretical mechanics, methods of modification of force systems, equilibrium conditions of a rigid body, methods for determining the speed and acceleration of point motion, the main types of solid physical movements, complex movement of points, the main problems of the dynamics of a mathematical point, the dynamics of a

					<p>mechanical system to know the General theorem;</p> <p>Know:</p> <ul style="list-style-type: none"> - use methods to transform force systems; - determine the speed and acceleration of point motion; <p>Skills:</p> <ul style="list-style-type: none"> - use the materials studied in all areas; - solve problems associated with the movement of material points.
7	Unifi the documentation	4	Electrical engineering	Normative base of standardization and certification	<p>Purpose: to Get acquainted with the teaching methods of registration, the establishment of a rational composition of forms of documents, as well as a set of interrelated technical, economic and social indicators.</p> <p>Contents: the main provisions for documenting management activities. Internal approval of the draft document. External approval of the draft document. Unification of the documentation system.</p> <p>Expected result:</p> <p>Know:</p> <p>basic requirements, laws document, education, terminology, records keeping;</p> <ul style="list-style-type: none"> - methods of classification, unification and standardization of documents, composition of unified documentation systems; - rules of preparation and execution of documents using modern technology; <p>documental terminology;</p> <ul style="list-style-type: none"> - legislative and regulatory legal acts and regulatory and methodological materials for documenting management activities; - ways and means of documentation; - classification of documentary information; - characteristics and composition of unified documentation systems <p>Know:</p> <ul style="list-style-type: none"> - properly prepare documents and execute them in accordance with state standards; - unify, design document forms; - to make the nomenclature of cases and storage of documents; - prepare documents using language options depending on the purpose of the content and type of document; - unify the texts of documents; - execute documents in accordance with the requirements of regulations and state standards; - register accounting documents; - use unified forms of documents; <p>Skills:</p> <ul style="list-style-type: none"> - drawing up, registration, processing, accounting, registration, control, storage, systematization, preparation of documents for archival storage, destruction of documents. - application of the requirements of regulations and state standards in the preparation and execution of documents; - development of unified forms of documents and timesheet forms of documents; - skills in the use of new information

					technologies in the creation of management documents, the development of document templates; - application of criteria and principles for determining the scientific, historical and practical value of documents;
7	Unification and standardization of management documents	4	Electrical engineering	Normative base of standardization and certification	<p>Purpose: to get acquainted with the uniformity of the composition and forms of management documents, fixing the implementation of the same type of management functions.</p> <p>Content: standardization of forms and texts of documents; document classification: the General model of construction of system of documents is based on use of the form: the main directions of unification and standardization of documents:</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - accreditation of US bodies of organizational and administrative documentation; <p>Know:</p> <ul style="list-style-type: none"> - analyze accreditation documentation, prepare for on-site expertise and conduct it, perform audit; <p>Skills:</p> <ul style="list-style-type: none"> - methods of negotiations and evaluation, analyze accreditation documentation, prepare for on-site expertise and conduct it, perform an audit.
8	Technology of standards and regulatory documents development	4	Processes and apparatus for the production of building materials	Diploma work	<p>Purpose: familiarization with the types of regulations. Consider the development of standards and regulations.</p> <p>Content: normative and technical documents. Stages and technology of standards development. Development of technical regulations and national standards.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - legal support, legal norms - to learn the classification of regulations and standards, principles and methods of construction standards normative documentation. <p>Know:</p> <ul style="list-style-type: none"> - use legal norms, legislative acts - possess practical skills in the development, approval and examination of standards and other regulatory documents.
8	Technology and construction of building products	4	Processes and apparatus for the production of building materials	Technical regulations for the safety of buildings and structures, building materials and products	<p>Purpose: to study the legal basis of technical regulation, standardization and certification of goods.</p> <p>Content: development and approval of technical codes of established practice are carried out by the Republican bodies of state administration. The requirements of technical codes for the processes of development (design), production, operation (use), storage, transportation, sale and disposal of products or services are based on the results of established practices. The technical requirements contained in the technical codes shall not contradict the requirements of the technical</p>

					<p>regulations.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - types of technical, regulatory, legal acts, rules for the development and application of technical codes of established practice. <p>Know:</p> <ul style="list-style-type: none"> - distinguish types of technical regulations. <p>Procedure, rules of development and application of technical regulations.</p> <p>Skills:</p> <ul style="list-style-type: none"> - development of technical conditions. The procedure for approval and approval of specifications. Application, verification, modification, revision and cancellation of specifications;
9	Patenting	4	Quality audit	Economics of quality, standardization and certification	<p>Purpose: to familiarize with the basics of patenting, presentation of procedures for the protection of intellectual property, the study of types of solutions of scientific and technical problems and principles of creation and identification of innovative technical solutions.</p> <p>Contents: basic concepts of intellectual property; objects of intellectual property and methods of their protection; objects of industrial property.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - basic provisions and definitions of patent law; - normative legal acts on patenting; - basic concepts used in the field of patenting; - main objectives, principles and criteria of patenting; - rules of registration of patent documentation; - the structure of the national patenting system and the competence of the bodies included in this structure; - rights of authors-patent holders; - international and regional organizations on pathology; <p>Know:</p> <ul style="list-style-type: none"> - apply legislative and regulatory legal acts, teaching materials on patenting; - analyze technology; - from the essential features of the developed object to make the description and the claims, identify and prove its security ability, as well as to prepare the application documents for a patent; - to apply the principles and criteria in the field of patenting; - protect their patent development as intellectual property; <p>Skills:</p> <ul style="list-style-type: none"> - basic concepts in the field of patenting; - ability to create new technological processes based on a systematic approach to the objects under study, the development of technological equipment and product designs; - organization of work on patenting; - proper registration of patent documentation;
9	Patent and	4	Quality audit	Economics of	Purpose: to get acquainted with the

	scientific-technical documentation			quality, standardization and certification	<p>procedures for the protection of intellectual property, to study the types of solutions of scientific and technical problems and principles of creation and identification of innovative technical solutions.</p> <p>Contents: basic concepts of intellectual property, objects of intellectual property and methods of their protection; objects of industrial property.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - classification of scientific research; - research methods; - types of scientific and technical documentation used in production, scientific and educational activities; - concepts of intellectual property, industrial property, invention, utility model, industrial design, trademark(service mark), appellation of origin, know-how, analogue, prototype, license agreement; - the procedure for filing an application for a patent for an invention, utility model; - the procedure for concluding a license agreement. <p>Know:</p> <ul style="list-style-type: none"> - use the indexes of The international classification of inventions to determine the index of the heading; - conduct patent information research in accordance with the selected subject (object) of the search; - identify analogues and prototype of the developed equipment among the known technical solutions; <p>Skills:</p> <ul style="list-style-type: none"> - basic concepts in the field of patenting; - organization of work on patenting; - organization of work on patenting;
10	Building structures	4	Technology of construction materials	Fundamentals of measurement in construction	<p>Purpose: the Purpose of studying this discipline is to teach students the basics of calculation and design of building structures.</p> <p>Contents:basic concepts material for designs of buildings and constructions, types of element sections; determining load design and build their design scheme; design of monolithic and prefabricated floor slabs, columns, foundations.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - method of calculation of building structures by limit States; - method of material selection for structural elements and their connections; - principles of design of building structures. <p>Know:</p> <ul style="list-style-type: none"> - perform calculations of building structures made of reinforced concrete, steel and aluminum, wood. <p>Possess the skills:</p> <ul style="list-style-type: none"> - methods of design of building structures with the help of existing regulations and applied computer programs
10		4			Purpose: to Give students in-depth

	Structural materials in construction		Technology of construction materials	Fundamentals of measurement in construction	<p>information about the basic structural building materials, the quality of building materials and technology of their production. To prepare the future specialist for the ability to make the best decision when choosing materials for the manufacture of structures and technology of their production, to teach methods of analysis of technical and economic efficiency of technological processes in the manufacture of building structures</p> <p>Content: Knowledge, skills and competencies obtained from the study of this discipline, allow the specialist to make informed technical and economic decisions in practice in the manufacture of building structures and their application in the construction of buildings and structures.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - Technological processes in the production of building materials and structures from them. - Regulatory requirements for processes and materials. - Conditions of work of materials and designs in constructions. <p>Know:</p> <ul style="list-style-type: none"> - Develop technical specifications for the technology of manufacturing structures made of concrete and reinforced concrete. <p>Skills:</p> <ul style="list-style-type: none"> - conduct comprehensive studies using standard and certification tests - The ability to use in practice modern ideas about the impact of micro-and nano-structure on the properties of materials, their interaction with the environment, fields, energy particles and radiation
11	The regulatory framework of standardization and certification	5	Standardization of the documentation system	Theoretical mechanics	<p>Purpose: formation of the fundamental knowledge necessary for mastering of professional disciplines; - formation of theoretical and practical knowledge, abilities and skills necessary for their realization in professional activity.</p> <p>Content: product Quality and competitiveness product Quality and consumer protection. Quality audit. Certification system. Certification scheme. Certification bodies, testing laboratories and certification centers. Rules and procedure of certification.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - General theoretical principles of standardization, certification and Metrology; - the main provisions of the state system of standardization and certification; - methods of standardization; schemes and certification systems, rules and procedure for certification; organizational, scientific and methodological foundations of Metrology, the legal basis for ensuring the unity of measurements; <p>Know:</p> <ul style="list-style-type: none"> - use methods of forecasting and optimization,

					<p>unification and aggregation of preferred number systems in the development of standards;</p> <ul style="list-style-type: none"> - verify (calibrate) measuring instruments; - control the quality of measurements, plan measurements, verify and calibrate measuring instruments; <p>Skills:</p> <ul style="list-style-type: none"> - possess the skills of control and verification; - legal framework of Metrology, standardization and certification; - theory of quality assessment of measurement results and their mathematical measurements
11	Normcontrol documents in standardization and certification	5	Standardization of the documentation system	Theoretical mechanics	<p>Purpose: formation of students ' knowledge in the field of reliability, reliability, quality of measurements; skills informed choice of measuring instruments and processing of experimental data; familiarization with the normative and technical documentation on Metrology, standardization and certification of services and product quality.</p> <p>Content: product Quality and competitiveness product Quality and consumer protection. Quality audit. Certification system. Certification scheme. Certification bodies, testing laboratories and certification centers. Rules and procedure of certification.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> classification of measurements by types of measurements and types of measuring instruments; measurement scales; - Be able to: use the methods of forecasting and optimization, unification and aggregation of preferred number systems in the development of standards; <p>Possess skills:</p> <ul style="list-style-type: none"> to have skills of calculation of measurement errors and evaluation of measurement results; to determine the nomenclature of measured and controlled parameters of products and processes, to establish optimal standards of measurement accuracy and reliability of control, to choose measuring instruments and control
12	Basics of measurement in construction	5	Building structures	Technology of production of building materials	<p>Purpose: is to train a specialist who knows the issues of standardization in the field of building materials and structures, in design work, in construction production and has the skills to work with regulatory and technical documentation.</p> <p>Contents: the Formation of a modern engineer is impossible without mastering the methods of quality control of manufacture, installation and construction of building structures, buildings and structures. Currently, there are increased requirements for safety, reliability, environmental cleanliness of materials, their components, as well as structures and structures in General. It allows to carry out certification of the construction production made in our country and arriving from abroad.</p> <p>Expected result:</p>

					<p>Know: - basic concepts related to measurement objects; - basic concepts related to measuring instruments; - regularities of formation of the measurement result; - organizational, scientific and methodological basis of metrological support; Be able to: evaluate the accuracy of the results and minimize possible errors in the measurements. Possess skills: the Formation of a modern engineer is impossible without mastering the methods of quality control of manufacture, installation and construction of building structures, buildings and structures.</p>
12	Measurements in construction	5	Building structures	Technology of production of building materials	<p>Purpose: formation of students ' understanding of the role of Metrology, standardization, certification and quality control in ensuring safety and quality in construction. Contents: classification and characteristics of measurements. The main methods of measurement. Classification of measuring instruments. Expected result: Know: the organization and technology of certification of products, methods of analysis of product quality, scope of work, procedure and rules of engineering inspection of buildings and structures for various purposes; Be able to: participate in the development of new and revision of existing regulations in construction; in the preparation and conduct of certification in construction; in the work on the organization of quality control system in construction; plan work on verification and calibration of measuring instruments and certification of test equipment. Possess skills: skills of processing and analysis of measurement results,</p>
13	Economics of quality, standardization and certification	6	Patenting	Computer technologies in construction	<p>Purpose: formation of students ' system of scientific and professional knowledge and skills in the field of cost formation in the management of quality products and services aimed at increasing production efficiency, saving all types of resources used in the enterprise. Contents: economic resources of the enterprise, product quality indicators, principles and methods of assessing the cost of quality products and services, the cost of metrological support, assessment of technical and economic level of products, assessment of competitiveness, costs in the field of conformity assessment, costs in the field of accreditation, the cost of development and implementation of quality management systems Expected result: Know: methods of estimating the cost of quality products and services, the cost of metrological support</p>

					Know: - analyze the main indicators of economic efficiency of quality assurance; Skills: - be aware of the costs in the quality management system; - to apply methods of determination of costs and Prime cost of works in the field of quality management, standardization and certification, accreditation, conformity assessment.
13	Fundamentals of quality in standardization and certification	6	Patenting	Computer technologies in construction	Purpose: training of highly qualified specialists who are well aware of the main control units in the technological process of production of building materials Contents: Information about the development of production of building materials; basics of technology of natural stone materials; basics of technology of ceramic materials; basics of technology of binders; basics of technology and production of concrete products; basics of technology and production of silicate products. Expected result: Know: technological features of building materials; Be able to: the location of the main points in the process, which require constant and periodic monitoring of changes in the properties of raw materials, semi-finished products and finished products. Possess skills: to define the nomenclature of measured and controlled parameters of products and technological processes, to establish optimal standards of measurement accuracy and control reliability, to choose measuring and control instruments
14	Technology of production of building materials	4	Fundamentals of measurement in construction	Processes and apparatus for the production of building materials	Purpose: to study the basics of technology of wall materials and structures designed to create modern enclosing structures of the building and construction corresponding to modern standards Contents: Brief information on the main wall materials and structures (stone, concrete, ceramic, reinforced concrete, wood and combined); basics of production technology of stone, concrete, ceramic, concrete, wood and combined products and structures. Expected result: Know: perform work to ensure quality control of finished products; rational use of raw materials Be able to: solve various engineering problems; evaluate the properties of wall materials and structures; test raw materials; skills: opredelitelei wall materials and designs are intended to create a modern fencing design building and construction meet modern standards.
14	Equipment for production of building materials	4			Objective: to study the theoretical foundations of heat engineering and the relationship of heat treatment of building materials and products used for these purposes installations; consideration of designs and principles of thermal installations;

			Fundamentals of measurement in construction	Processes and apparatus for the production of building materials	<p>Contents: Fundamentals of thermodynamics and heat transfer; heat and mass exchange, thermal and aerodynamic balance, design features of plants, heat treatment, drying, heat and moisture treatment and firing</p> <p>Expected result:</p> <p>Know: the choice of the design scheme, limit States, the system of reliability coefficients, calculation and design of building structures.</p> <p>Be able to: apply modern advanced technologies, especially with the complex use of man-made raw materials, cost-effective and contributing to the solution of environmental problems, taking into account the requirements of safety and environmental protection.</p> <p>Possess skills: control, regulate and manage processes based on existing regulatory and technical documentation</p>
15	Computer technologies in construction	5	Economics of quality, standardization and certification	Technical regulations for the safety of buildings and structures, building materials and products	<p>Purpose: students acquire knowledge and skills necessary to solve construction problems using numerical methods and modern information technology.</p> <p>Contents: modern computer technologies and ways of their use in the professional activity of civil engineer</p> <p>Expected result:</p> <p>Know: - basic numerical methods used in solving problems of underground and urban construction; - existing software products and information technology design of construction projects.</p> <p>Be able to: - process the information obtained in the course of research by mathematical and statistical methods, analyze and comprehend it taking into account the objectives of research.</p> <p>Possess skills: the ability to independently acquire new knowledge and skills with the help of information technology and use them in their practice, to expand and deepen their scientific worldview</p>
15	Technology in construction	5	Economics of quality, standardization and certification	Technical regulations for the safety of buildings and structures, building materials and products	<p>Purpose: the Purpose of discipline is to develop in students the scientific and engineering knowledge, allowing you to practice performing certain types of construction, mounting and special construction works, to obtain products in the form of load-bearing, cladding, finishing and other structural elements, as well as completed buildings and structures.</p> <p>Contents: Theoretical, computational and practical provisions of the discipline are studied in the process of working on the lecture course, in practical classes, in the implementation of course projects, as well as in independent work with educational and technical literature.</p> <p>Expected result:</p> <p>Know: industrial methods of construction of buildings and structures; basics of line execution, methodology of technological design and content of projects of construction and installation works; modern technologies of construction of buildings and structures.</p>

					<p>Be able to: use this knowledge in practice when performing design work, production planning, work on the construction site and conducting research on the technology of construction production.</p> <p>Possess the skills: creative engineering thinking, the ability to analyze and evaluate emerging complex production situations, make decisions based on the main principles and materials of construction and technological research, the prospects for the development of construction technology.</p>
16	Processes and apparatus for the production of building materials	5	Technology of standards and regulatory documentation development	Diploma work	<p>Purpose: to study the basics of technology of wall materials and structures designed to create modern enclosing structures of the building and construction corresponding to modern standards.</p> <p>Contents: Brief information on the main wall materials and structures (stone, concrete, ceramic, reinforced concrete, wood and combined); basics of production technology of stone, concrete, ceramic, concrete, wood and combined products and structures.</p> <p>Expected result:</p> <p>Know: solve various engineering problems; evaluate the properties of wall materials and structures;</p> <p>Be able to: carry out tests of raw materials; perform work to ensure quality control of finished products; rational use of raw materials</p> <p>Possess skills: possession of measuring instruments and methods of measurement in the conduct of quality control in construction</p>
16	Construction materials production	5	Technology of standards and regulatory documentation development	Diploma work	<p>Purpose: training of a specialist who knows the basics of materials science to obtain building materials with the required properties; issues of durability of materials; their role in ensuring high performance, environmental friendliness, efficiency and aesthetics.</p> <p>Content: to have an idea of the leading position of the industry in the production of important building materials and products: the rational use of raw materials, taking into account environmental safety, saving fuel and energy and other material resources in the production of building materials and products corresponding to its purpose;</p> <p>Expected result:</p> <p>Know: the nomenclature of building materials and their properties; features of their structure, raw materials; the essence of operations and processes of processing of raw materials; production technology of various building materials, their cost, etc.;</p> <p>Be able to: correctly determine the features of building materials; justify the choice of materials and products in the design solutions for the given conditions of their operation; ensure the quality of materials; predict the reliability and durability of materials in structures;</p> <p>Possess skills: material science basics of obtaining building materials with the required</p>

					properties;
17	Technical regulations for the safety of buildings and structures, building materials and products	6	Computer technologies in construction	Diploma work	<p>Purpose: formation of knowledge about the basic principles and provisions of certification in the Republic of Kazakhstan, areas of application of certification, schemes and systems of conformity assessment of products and services</p> <p>Contents: Certification main development trends; basic concepts and definitions; legal framework; law "on technical regulation"; application of technical regulations; conformity assessment schemes, the procedure for conformity assessment of products, processes, services and quality systems.</p> <p>Expected result:</p> <p>Know: manufacturing techniques, methods of control and properties of modern wall materials and products, in accordance with the requirements of current state Standards</p> <p>Be able to: solve various problems; evaluate the properties of wall materials and structures; to test raw materials;</p> <p>Possess skills: conformity assessment of products, processes and services, conformity assessment of quality systems and production; knowledge of the system of mandatory and voluntary certification, legislative and regulatory documents.</p>
17	Safety of building materials and products	6		Diploma work	<p>Purpose: The purpose of studying this discipline is to train specialists for design and production activities in the field of technical supervision and quality control of construction.</p> <p>Contents: Testing of building materials, products and structures, defects and damage to building structures</p> <p>Expected result:</p> <p>Know: the basics of construction design, engineering preparation of the construction site in the conditions of new construction and reconstruction; technical regulations for the construction, repair and reconstruction of buildings and structures, acceptance and quality control;</p> <p>Be able to: use reference and normative literature, design and carry out technological support of construction and installation processes, perform specialized inspections of buildings and structures, field and laboratory tests of building materials, products and structures;</p> <p>possess skills: development of programs of specialized inspections of buildings and structures, drawing up statements of defects and damages of designs, the solution of a complex of tasks on quality control of construction and installation works.</p>
MAIN SUBJECT					
Components optional (KV)					
1	Basis of calculation and design of building structures	3	Engineering graphics	Databases and expert systems	<p>Purpose: calculation and construction of building structures</p> <p>Contents: methods of calculation of building structures, types of building structures, the system</p>

					<p>of reliability coefficients, the strength of normal, inclined sections, the basic provisions of the design.</p> <p>Expected result:</p> <p>Know: the choice of the design scheme, limit States, the system of reliability coefficients, calculation and design of building structures.</p> <p>Be able to: ensure compliance with the design work performed by the current regulatory documents for the design;</p> <p>use regulatory documents, catalogs and other documentation required for the design;</p> <p>To possess skills: to Organize own activity, to choose standard methods and ways of performance of professional tasks, to estimate their efficiency and quality.</p>
1	Basics of calculation of building structures	3	Engineering graphics	Databases and expert systems	<p>Purpose: calculation and construction of building structures</p> <p>Contents: methods of calculation of building structures, types of building structures, the system of reliability coefficients, the strength of normal, inclined sections, the basic provisions of the design.</p> <p>Expected result:</p> <p>Know: the basic requirements of the standards of the unified system of design and design documentation system for construction to the design and preparation of architectural drawings;</p> <p>Be able to: understand the design development of adjacent parts of the project;</p> <p>perform all kinds of architectural and construction drawings at different stages of design.</p> <p>Possess skills: Use information and communication technologies in professional activities.</p>
2	Databases and expert systems	5	Fundamentals of calculation and design of building structures	Statistical methods of construction industry quality management	<p>Purpose:to study the theoretical knowledge of the structure of the organization of databases, technology organization, storage and processing of data and practical skills to create a database and manage them.</p> <p>Contents: design of databases and information systems, the purpose and functionality of the database.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - database design structures and methods; - basic definitions of computer science, basic and composite data structures used in computer technology; - basis for the organization of modern computers and their General characteristics, trends in the development of computer devices and computer networks, principles of use of computer equipment; <p>Know:</p> <ul style="list-style-type: none"> - to use subject terminology, database type and method of its execution, to work in one of the database management systems and to select the criteria necessary for the creation of expert systems; - to use modern software in their activities; <p>Skills:</p> <ul style="list-style-type: none"> - create databases and product quality assurance

					<p>systems;</p> <ul style="list-style-type: none"> - the main methods of analysis and processing of information using modern information technology;
2	Database programming	5	Fundamentals of calculation and design of building structures	Statistical methods of construction industry quality management	<p>Purpose: to present to students the theoretical foundations of data modeling, principles of design and maintenance of database systems.</p> <p>Contents: work program, guidelines for the study of the discipline, tasks for control work, guidelines.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - theoretical basis of data modeling. - the role and place of the database in information systems. <p>Know:</p> <ul style="list-style-type: none"> - normalize data structure. - change basic operations and integrity constraints for datasets.
3	Statistical methods of construction industry quality management	6	Databases and expert systems	Examination of goods quality	<p>Purpose: to Study statistical methods in the enterprise; seven statistical methods, procedures and tools for quality control, stratification (stratification) of data.</p> <p>Contents: Statistical methods (for example, Pareto diagram, Ishikawa diagram) help to systematically find problems in the field of quality and solve them, to determine which of the problems are random or persistent. This systematization of the causes allows to identify the most problematic places in the management system of the organization, the so-called "bottlenecks" and effectively build the organizational structure.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - product quality control and process control; - quality control methods; - fundamentals of probability theory and various methods of statistical analysis and organization of product quality management; <p>Know:</p> <ul style="list-style-type: none"> - determining product quality; - use the method of statistical comparison of the histogram; - to check the accuracy of the process; - use various methods of statistical control and quality management at all stages of the movement of products, ensuring product quality that meets state standards and the lowest cost; <p>Skills:</p> <ul style="list-style-type: none"> - application of Pareto charts; - the procedure for accreditation of certification bodies, testing, verification and calibration laboratories; - product and process quality assessments; - presentation of the main methods of statistical control and quality management of industrial products and consumer goods;
3	Application of statistical methods of quality assurance	6	Databases and expert systems	Fundamentals of calculation and design of building structures	<p>Purpose: to apply statistical methods in the enterprise; seven statistical methods, procedures and tools for quality control, stratification (stratification) of data.</p> <p>Contents: Statistical methods (for example, Pareto chart, Ishikawa chart, histogram) help to systematically find problems in the field of quality</p>

					<p>and solve them, to determine which of the problems are random or persistent. This systematization of the causes allows to identify the most problematic places in the management system of the organization, the so-called "bottlenecks" and effectively build the organizational structure.</p> <p>Expected result:</p> <p>Know:</p> <ul style="list-style-type: none"> - basic concepts and methods of statistical quality assurance; - theoretical and statistical prerequisites on the basis of which the methods of statistical control, acceptance control are built; - theoretical and statistical background, on the basis of which the methods of construction and use of control maps. <p>Know:</p> <ul style="list-style-type: none"> - use the main methods of statistical quality control (seven main methods); - build plans for statistical sampling control on qualitative and quantitative grounds, select the desired plan for collections of control plans and predict the results of its use; - design and use different types of control charts. <p>skill:</p> <ul style="list-style-type: none"> -feature extraction quality and sample characteristics; -methods of constructing control charts and methods of acceptance control.
4	Examination of goods quality	7	Statistical methods of construction industry quality management	Design of construction materials production	<p>Objective: to conduct quantitative and ordinal assessments of the fundamental characteristics of the goods, as well as the processes that affect them.</p> <p>Content: quality Control and quantity of consignments. Views. Rules of selective control. Samples: types, requirements. Sampling rules. The concept of acceptance and rejection number.</p> <p>Expected result:</p> <p>Know: the basic concepts of merchandising; objects, subjects and methods of commodity science;</p> <p>General classification of consumer goods, types, properties, indicators of assortment; fundamental characteristics of goods;</p> <p>- Be able to: recognize the classification groups of goods;</p> <p>- analyze the stages and stages of the technological cycle of goods;</p> <p>Possess the skill: have an idea: about the importance of discipline for professional activity, the consumer properties of food and non-food products, the procedure of examination, standardization, the main directions of its development.</p>
4	Examination of building materials	7	Examination of goods quality	Design of construction materials production	<p>Purpose: training of qualified specialists in the field of expertise and management of real estate, who should know on the one hand – the examination and inspection of the investment process associated with the life cycle of the property, on the other – the quality management of real estate and quality management systems.</p> <p>Contents: - the procedure for the development, coordination and approval of documents for new construction and reconstruction of objects;</p>

					<ul style="list-style-type: none"> - types of expertise, the right of state non-departmental expertise; - norms, documents and materials to be considered during environmental expertise; <p>Expected result:</p> <p>Know: - the procedure for the development, coordination and approval of documents for new construction and reconstruction of objects;</p> <ul style="list-style-type: none"> - procedures for economic, environmental and technical expertise of real estate; <p>Be able to: - perform separate sections of technical, environmental, economic expertise of buildings;</p> <ul style="list-style-type: none"> - draw up documentation on architectural and construction copyright and technical supervision; - issue a license for the required type of activity; - to carry out the examination of the quality management system. <p>Possess the skill: - the procedure for the development, coordination and approval of documents for new construction and reconstruction of objects;</p> <ul style="list-style-type: none"> - types of expertise, the right of state non-departmental expertise; - norms, documents and materials to be considered during environmental expertise;
5	Design of construction materials production	5	Examination of goods quality	Labour protection	<p>Purpose: acquisition of skills for solving engineering problems in the design of precast concrete enterprises, as well as the implementation of their reconstruction.</p> <p>Contents: Technological schemes of production of building materials, equipment, organization of technological process, calculations of processing technology.</p> <p>Expected result:</p> <p>To know: basic physical and mechanical properties of building materials, technology of their production, methods to improve efficiency; guiding normative documents for metrological assurance; standards of construction; fundamentals of Metrology, standardization and certification in the field of production of construction materials.</p> <p>Be able to: own and apply the effective development of leading research, design enterprises, analyze and select resource-saving technologies, waste-free production, integrated use of local raw materials.</p> <p>Possess skills: General methodology of professional activity and development of professional creativity; have skills of handling modern technology, be able to use information technology in the field of professional activity;</p>
5	Bases of production of construction materials	5	Design of construction materials production	Labour protection	<p>Purpose:</p> <p>Contents: General laws and regularities of mechanical, hydromechanical, thermal, mass transfer processes in the technology of building materials and structures</p> <p>Expected result:</p> <p>Know: types of building materials and products in accordance with the nomenclature, methods of designing new and optimization adopted in the</p>

					<p>production of building materials used in practice and the latest technologies for the manufacture of concrete and reinforced concrete, ceramic, finishing, insulation materials and products, technological operations, means of technological equipment production and installation of metal structures, international standards in the field of quality management</p> <p>Be able to: develop processes, perform technological calculations of production, to make and carry out arrangements for the adjustment of technological parameters, the composition of the material to ensure or improve quality products, develop technological maps</p> <p>Possess the skill: methods of quality control of raw materials and products at all stages of production of building materials and structures, evaluation and quality control of construction and installation works</p>
6	Labour protection	5	Design of construction materials production	International standardization and certification	<p>Purpose: to Teach students to proactively assess the dangers and hazards of the working environment, to design safe working conditions</p> <p>Contents: Legal and organizational issues of labor protection. National policy of Kazakhstan in the field of labor protection. Industrial sanitation, Safety, Fire safety.</p> <p>Expected result:</p> <p>Know: Knowledge of the basic methods of action in emergencies</p> <p>Be able: the Ability to create safe working conditions</p> <p>Own the skill:</p>
6	Labour activity	5	Labour protection	International standardization and certification	<p>Purpose: to Teach students to assess the situation in emergencies, to predict the consequences</p> <p>Contents: Engineering situation. Fire situation.</p> <p>Expected result:</p> <p>Know: Knowledge of the basic methods of action in emergencies</p> <p>Be able: the Ability to create safe working conditions</p> <p>Possess skills: Legal and organizational issues of labor protection</p>
7	International standardization and certification	6	Labour protection	Diploma work	<p>Objective: To provide students with sufficient theoretical knowledge and skills in the field of modern international standardization and certification, to analyze and assess the state of the base of international standards, product quality management system operating in joint international enterprises and firms, and on their basis to develop a strategy to systematically improve the efficiency, profitability and quality of products in terms of existing international standards.</p> <p>Contents – - study of the international normative and technical documentation defining progressive requirements to production, and also control of correctness of use of this documentation and study of formation and implementation of systems of certification taking into account manuals</p> <p>Expected result:</p> <p>Know: - General principles and basic scientific provisions of standardization and certification; - basic concepts, terms and definitions related to standardization and certification;</p>

					<ul style="list-style-type: none"> - indicators of the level of product quality and the basis of its quality management; - rules of certification; - principles of certification; <p>Be able to: - learn to work with educational and reference literature relevant to the topics included in the program.</p> <ul style="list-style-type: none"> - learn how to choose a scheme of national certification of products based on certification. <p>Acquire practical skills: - in matters related to the development of national standards on international standards ISO\ IEC.- in matters related to the system of national certification based on international certification.</p>
7	Standardization and certification in Kazakhstan	6	Labour protection	Diploma work	<p>Purpose: arming students with knowledge in the field of standardization, certification, technical measurements necessary for the development of foreign economic activity of enterprises on a modern civilized basis, providing conditions for the country's accession to the international certification systems of accession to the world trade organization</p> <p>Content: to acquaint students with the historical foundations of standardization, certification and technical measurements, their role in improving product quality, legal, organizational and methodological foundations of standardization, certification and Metrology</p> <p>Expected result:</p> <p>Know: ability to use: legal support, legal norms, legislative acts and legal nature of standards; classification of normative documents and standards, principles and methods of building standards and normative documentation, the rules for their use; the procedure for the development, passage and approval of standards and other normative documentation</p> <p>To be able: systems of obligatory and voluntary certification, legislative and regulatory documents.</p> <p>Possess skills: knowledge of the system of mandatory and voluntary certification, legislative and regulatory documents.</p>

LIST OF COMPONENTS BY CHOICE
B076- Standardization, certification and metrology(by industry)
6B07527 Standardization, certification and metrology in construction
DISCIPLINE LIST
elective courses

Form of training: Full-time

Training period: 4 years

Training period: 4 years			
Name of the discipline	discipline code	Credits	Semester
Comprehensive Disciplines			
Component on a choice 1			3
Module of economic and legal knowledge			
Qualimetry	Qua2111	3	
assessment Methods	AM2111	2	
Basic disciplines			
Component on a choice 1			3
Identification and labeling	ILT2207	1	
coding Basics product	CBP2207	2	
Component on a choice 2			3
Engineering graphics	EG2208	2	
Engineering graphics and descriptive geometry	EGDG2208	3	
Component on a choice 3			4
Electrical engineering	EE2209	2	
Fundamentals of electrical engineering theory	FEET2209	3	
Component on a choice 4			4
Technology of structural materials	TSM2210	2	
Technological machines and equipment	TME2210	3	
Component on a choice 5			5
Building structures	BS3211	2	
Structural materials in construction	SMC3211	2	
Component on a choice 6			5
Unify the documentation	UD3212	2	
standardization of administrative documents	/SAD3212	2	
Component on a choice 7			5
The regulatory framework of standardization and certification	NRFSC3213	2	
normcontrol the documents in standardization and certification	NDSS3213	3	
Component on a choice 8			5
Theoretical mechanics	TM3214	2	
General mechanics	GM3214	3	
Component on a choice 9			6
Quality audit	QA3215	2	
Audit of product and service quality management system	APSQMS3215	2	
Component on a choice 10			6
Patenting	Pat3216	2	
Patent and scientific and technical documentation	PSTD3216	2	
Component on a choice 11			6
Basics of measurement in construction	BMC3217	2	
Measurement in construction	MC3217	3	
Component on a choice 12			7

Economics of quality, standardization and certification	EQSC4218	2	
Fundamentals of quality in standardization and certification	FQSS4218	4	
Component on a choice 13			7
Technology of production of building materials	TPBM4219	2	
Equipment of production of building materials	EPBM4219	2	
Component on a choice 14			7
Computer technology in building	CTB4220	2	
/construction Technologies	CT4220	3	
Component on a choice 15			7
Processes and apparatus for the production of building materials	PAPBM4221	2	
Production of building materials	PBM4221	3	
Component on a choice 16			8
Technical regulations for the safety of buildings and structures, building materials and products	TRSBMP4222	2	
Safety of building materials and products	/SBMP4222	2	
Component on a choice 17			8
Technology of development of standards and normative documentation	TDSND4223	2	
Technology and construction of building products	TCBP4223	2	
Profiling Discipline			
Component on a choice 1			4
Basis of calculation and design of building structures	FCT 3303	1	
Basis of calculation of building structures	CTDSD 3303	2	
Component on a choice 2			5
Databases and expert systems	DES3307	2	
database Programming	DP3307	3	
Component on a choice 3			6
Statistical methods of construction industry quality management	SMCIQMSI3308	2	
Application of statistical methods of quality assurance	ASMQA3308	4	
Component on a choice 4			6
Examination of the quality of goods	EQG3309	3	
Examination of building materials	EBM3309	4	
Component on a choice 5			7
Design of production of building materials	DPBM4310	2	
Basis of production of building materials	BPBM4310	3	
Component on a choice 6			7
Labour protection	LP4311	2	
Labour activity	LA4311	3	
Component on a choice 7			8
International standardization and certification	ISS4312	3	
Standardization and certification in Kazakhstan	SSK4312	3	