Kazakh Humanitarian Law Innovation University

MODULAR EDUCATIONAL PROGRAM

According to the educational program - 6B07527 Standardization, certification and metrology in construction

Semey. 2021

EXPLANATORY NOTE

The modular educational program (MEP) is based on the “State Compulsory Standard of Higher Education of the Republic of Kazakhstan. Undergraduate. General Provisions”, approved by Decree of the Government of the Republic of Kazakhstan dated May 13, 2016 No. 292, Rules for organizing the educational process on credit technology of education, approved by Order of the Minister of Education and Science of the Republic of Kazakhstan No. 152 dated April 20, 2011 (as amended and supplemented as of January 28, 2011) .2016), as well as on the basis of the professional standard "Metrology" dated October 22, 2018 No. 283. Model curriculum of the specialty 5B073200 "Standardization and certification" (by industry) approved by order of the Ministry of Education and Science of the Republic of Kazakhstan No. 425 dated 08/05/2016, in accordance with intra-university documents from P.01.04/2012 "Regulations on the formation of the trajectory of students' learning",Form No. 26 "MOP Structure".

The modules of the OOD block include disciplines of the compulsory component (OK) - 51 credits and elective components (EC) - 5 credits, common to all educational programs, in the study of which the graduate must master the following competencies: knowledge of the laws of development of society and its socio-political, legal, economic, environmental foundations, as well as cultural and historical values, the foundations of computer science, language communication and understanding the principles of a healthy lifestyle, possession of information about the political life of the country.

The DB block includes disciplines of the university component (VC), which is 33 credits; and elective components (EC), which is 79 credits. The modules of these disciplines make it possible to form a set of key (research), subject and special competencies acquired by the graduate.

The PD block includes disciplines of the university component (VC), which is 23 credits; and an elective component (EC), which is 37 credits. The modules of these disciplines make it possible to form a set of key and special (developing, creative, organizational and methodological) competencies acquired by the graduate.

IGA - 3 credits;

In total, a student at the end of the MEP must master 228 credits (100%).

A total of 24 modules were compiled on the MEP.

When developing a modular educational program together with employers (RSE "Kazakhstan Institute of Standardization and Certification"), the following recommendations were taken into account:

Since the specialty "standardization and certification" is associated with the food industry, the name of the discipline was introduced into the teaching of the educational program "standardization, certification and metrology in construction".

Target -is the training of highly qualified specialists with a competitive level of knowledge, skills and professional skills in the field of technical regulation and quality management in the construction industry, with the necessary professional and personal competencies sufficient for successful activities at enterprises of the Republic and beyond

Tasks:

- ensuring the compliance of goods and services with the norms and rules of safety for the life and health of the consumer, the property of individuals, legal entities, state property, ecology, the environment, in particular, the safety of animals and plants;
- ensuring the safety of facilities for which there is a possibility of various kinds of emergencies;
- promotion of scientific and technological progress;
- ensuring the competitiveness of products and services;
- economical use of all types of resources;
- compatibility and interchangeability of products;
- unified measurement system.

2. Graduate competency model

The sphere and objects of professional activity of graduates is the field of science and technology, which includes enterprises and production,organizations of state and non-state property that are directly related to products (services).

In modern conditions, the key resource for the country's economic growth is the intellectual and educational potential. In this regard, the system of training highly qualified personnel is of great importance in ensuring high competitiveness.

The competitiveness of a specialist is determined by his professional competence, broad social outlook, flexibility of behavior and a high level of individual activity.

The competence-based approach in higher professional education opens up wide opportunities for better training of specialists for real life.

Graduate competence is formed taking into account the needs and satisfaction of the labor market.

A graduate in the educational program is awarded the academic degree "Bachelor of Engineering and Technology" in the educational program -6B07527 Standardization, certification and metrology in construction.

The objects of professional activity of graduates are: construction and installation departments and organizations, factories for the production of building products, public utilities, enterprises for the operation and repair of construction machinery and equipment, joint-stock construction associations.

Competences that a graduate should have after mastering the MEP:

Competencies in the field of languages:

Know:

- basic definitions in the field of languages that contribute to the formation of a highly educated personality with a broad outlook and a culture of speech;
- scientific vocabulary and scientific constructions of a technical profile;
- the volume of professional vocabulary necessary for the implementation of professional communication in a foreign language
- the use of the Russian (Kazakh) language, both in everyday and professional communication
- rules for producing texts of different genres;
- speech norms of the technical sphere of activity;
- basics of business communication.

Be able to:

- freely conduct a conversation on various topics;
- work with special literature in a foreign language
- use reference literature in Kazakh, Russian and English (explanatory dictionaries, reference books, encyclopedias, including specialized terminology);

Master the skills:

- competent explanation in the state, Russian and English languages;
- competent preparation of current documentation in the state, Russian and foreign languages;
- building a constructive dialogue;
- knowledge and skills of management, planning, organization and forecasting of the labor market; principles and methods of labor market management, requirements for the formation and use of labor resources, their professional training and retraining
- expressing one's opinion in Kazakh, Russian and English from the point of view of a future specialist in the field of professional activity.
- trilingual education, which contributes to the formation of language competencies in future specialists in the field of information technology

Competences of natural sciences:

Know:

- basic definitions in the field of natural sciences that contribute to the formation of a highly educated personality with a broad outlook and thinking;
- The course of higher mathematics in the scope of this program
- basic laws of classical and modern physics and physical phenomena
- methods of physical research
- basic concepts of higher mathematics and their applications in various fields;
- fundamental concepts, laws and theories of classical and modern mathematics, techniques and methods for solving specific problems;
- mathematical methods computing, mathematical intuitions, mathematical cultures;
- about analytical geometry at a professional level;
- the essence of the basic ideas, laws, theories of classical and modern physics in their internal relationship and integrity, the concept of physical laws, the limits of their applicability, which allows them to be effectively used in specific situations.

Be able to:

- build mathematical models, set mathematical problems, select appropriate mathematical methods and algorithms for solving the problem, apply numerical methods to solve the problem using modern computer technology;
- to conduct qualitative mathematical research on the basis of the conducted mathematical analysis to develop practical recommendations;
- apply modern mathematical methods to solve applied problems
- use modern physical phenomena and laws in practice and interpret the results of a physical experiment
- solve generalized typical tasks of the discipline (theoretical and experimental-practical educational tasks) from various areas of physics features;
- solve professional problems;
- simulate physical situations using a computer;
- use methods for analyzing and evaluating the results of experiments.

Master the skills:

- solving professional problems;
- evaluating the degree of reliability of the results obtained using experimental or theoretical research methods;
- conducting a physical experiment;
- to use the achievements of fundamental science for the successful study of general theoretical and special technical disciplines, the development of mathematical thinking and logic
- solving specific problems of physics
- conducting a physical experiment and evaluating the results obtained
- using the achievement of fundamental science for the successful study of general theoretical and special technical disciplines, the development of mathematical thinking and logic.

Socio-ethical competencies:

Know:

– social and ethical values based on public opinion, traditions, customs, social norms and focus on them in their professional activities;

- main sources and historical research;
- about the developments of Kazakhstan during the period of civil confrontation and in the conditions of the Soviet system
- about the important stages in the formation of a sovereign and independent Kazakhstan, the main terms of historical science;
- main stages, directions, teachings and problems of philosophy;
- subject and objectives of the course; the main content of the course “political science”; acquire fundamental knowledge of political theory; range of achievements of historical thought in the study of ancient culture.
- specific features of the subject of religious studies, signs of religious faith, the structure and specifics of religious consciousness;
- traditions and culture of the peoples of Kazakhstan;
- fundamentals of the legal system and legislation of Kazakhstan;
- trends in the social development of society;

Be able to:

- comply with the norms of business ethics, possess ethical and legal standards of conduct;
- correlate general phenomena and single historical facts;

independently work with sources and historiography, prepare abstracts, essays and presentations; analyze and be able to evaluate significant historical events;

- - explain their causal relationships;
- competent philosophical thinking, which is manifested in the ability to independently think through the most important philosophical topics;
- independently work with literature of a general humanitarian nature, be able to find key worldview problems and their solutions
- correlate knowledge of the foundations of sociology with professional activities; own: practical skills of applying the acquired knowledge in the analysis of real social situations.
- distinguish the basic concepts of cultural studies:
- recognize the signs of religious faith, highlight animism as the main feature of religion, distinguish between the main dogmas;
- adequately navigate in various social situations;
- find compromises, correlate your opinion with the opinion of the team;

Master the skills:

- tolerance for traditions, culture of other peoples of the world;
- writing abstracts, reports and essays;
- preparing and making presentations;
- performance of test and situational tasks;
- the conceptual and categorical apparatus of philosophy, the skills of analytical reading of philosophical texts, critical thinking.
- analysis of political statements and programs and political forecasting.
- basic terms and problems of sociology; basic sociological concepts
- ideas about the events of Kazakh and world culture, based on the principle of respect and tolerance; skills in the analysis of cultural sources; methods of conducting discussions and polemics
- work with regulatory documents.
- basic concepts of religious studies, to be competent in the field of religious studies.
- work in a team, correctly defend their point of view, offer new solutions;

– striving for professional and personal growth.

Competence of general education

Know:

- labor legislation of the Republic of Kazakhstan;
- industrial safety rules, labor protection rules and norms;
- safety requirements and methods of providing first aid in case of accidents;
- the main methods of protecting production personnel and the population from the possible consequences of accidents, catastrophes, natural disasters, the ability to make decisions under risk;
- methods for assessing the state of the environment;

Be able to:

- choose technical means and technologies taking into account the environmental consequences of their use;
- control the parameters and the level of negative impacts on their compliance with regulatory requirements;
- effectively apply means of protection against negative impacts;
- develop measures to improve the safety and environmental friendliness of production activities; plan and implement measures to improve the sustainability of production systems and facilities;
- plan measures for the protection of production personnel and the public in emergency situations and, if necessary, take part in rescue and other urgent work in the aftermath of emergency situations;

Master the skills:

- methods of cognition for solving professional problems, the ability to professionally solve problems, work in a team, knowledge of safe working conditions in the workplace.

Information and communication competencies:

Know:

- principles of building a modern operating system and system software;
- economic and political factors in the development of information and communication technologies;
- features of various operating systems, architecture.
- basic models, methods and tools used in computer systems to automate the solution of intellectual problems;
- theoretical and practical problems of computational informatics as a field of knowledge and practical human activity related to the need to analyze information;
- about trends in the development of microelectronics, about promising circuit solutions in the field of digital and analog technology;
- about the current state and trends in the development of computer architectures, computing systems, complexes and networks;
- about architecture and possibilities of microprocessor means;
- about the problems and directions of development of programming technology, about the main methods and means of design automation
- about software, about methods of organizing work in teams of software developers.

Be able to:

- identify problems of a technical, logical nature when analyzing specific situations for programming, suggest ways to solve them and evaluate the expected results;
- determine the main trends in the field of information and communication technologies; use information resources to search and store information;
- work with spreadsheets, perform data consolidation, build graphs;
- apply methods and means of information protection
- systematize and summarize information, prepare references and reviews on professional activities, edit, abstract, review texts; use basic and special methods of information analysis in the field of professional activity; develop and justify options for effective solutions;
- critically evaluate from different angles (production, motivational, institutional, etc.) the development trends of objects in the field of professional activity; apply the knowledge gained in the study of mathematics, physics;
- plan and conduct research, analyze and interpret the data obtained;
- analyze, program, design and operate software and hardware complexes and protection systems;
- use modern technical means necessary in engineering practice.

Master the skills:

- special technical terminology and vocabulary of the specialty, the skills of independent mastery of new knowledge, using modern educational technologies;
- development of the database structure;
- designing and creating presentations, receiving data from the server;
- creating video files
- work with smart applications
- professional argumentation in the analysis of standard situations in the field of future activities;
- work with technical documentation and literature for solving problems of computer technology and telecommunications;
- methods of mathematical, simulation and computer modeling of processes and devices of computer technology;
- organization of individual stages of the process of developing objects of professional activity.

Professional competencies:

Know:

- the essence and content of standardization and certification, the technology of developing standards, the system of supervision over compliance with the mandatory requirements of regulatory documents on standardization;
-methods for obtaining and developing new structural materials and methods for their processing;
-methods for creating rational programs of concentration quality level based on modern technologies;
-modern technological processes for the processing of structural materials.
- physical foundations 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 a point motion, the main types of solid physical motions, complex displacement of points, the main problems of the dynamics of a mathematical point, the dynamics of a mechanical system know the general theorem;
-method of calculation of building structures by limit states;
-method of material selection for structural elements and their connections;
-principles of designing building structures
- basic provisions and definitions of patent law;
- normative legal acts on patenting;
- basic concepts used in the field of patent science;
- main goals, principles and criteria for patenting;
- rules for registration of patent documentation;
- the structure of the national patenting system and the competence of the bodies included in this structure;
-general theoretical principles of standardization, certification and metrology;
- basic provisions of the state system of standardization and certification;
-methods of standardization;
- schemes and systems of certification, rules and procedures for certification;
- basic concepts related to measurement objects; basic concepts related to measuring instruments;
- patterns of formation of the measurement result;
-organizational, scientific and methodological foundations of metrological support;
-basic numerical methods used in solving problems of underground and urban construction;
-existing software products and information technologies for the design of construction projects
- manufacturing technologies, control methods and properties of modern wall materials and products, in accordance with the requirements of current GOSTs
- basics of building design, engineering preparation of a 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 of work;
- structure of the accreditation body;
-directions and basic principles of international cooperation in the field of standardization, conformity assessment, accreditation;
– international, regional, foreign practice of conformity assessment;
– general principles for building quality management systems in accordance with ISO 9000 standards;

Be able to:

- use the information base on standardization, national and international standards, normative and technical documents in the field of certification;
- to apply in practice the rules for the development of standards and the introduction of changes and cancellations of standards;
- apply methods of quality control of products and processes when carrying out work to confirm compliance;
- apply methods of product quality control;
- apply computer technologies for planning and carrying out work on standardization and conformity assessment;
-determine measurement errors and the laws of their distribution;
- methods for processing measurement results;
-build mathematical models of measurement objects;
- evaluate the errors of functions of approximate values of parameters;
- to carry out the summation of the components of the error, both deterministic and random.
- give an opinion on the compliance (non-compliance) of product information for any group of goods;
-organize the search and use of regulatory documents in the field of information about goods in professional activities;
- analyze complaints and claims to goods, prepare conclusions based on the results of their consideration;
- apply the standards of the organization in the practice of trade;
- evaluate the compliance of product information with the requirements of regulatory documentation.
- apply computer technologies for identification and coding;
- to be oriented in the structure of barcodes;
- Perform calculation of barcode control numbers.
- work with standards;
- develop questionnaires in preparation for the audit;
- develop audit documentation;
- draw up protocols based on the results of the audit;
- Evaluate actions following the results of the audit.
-conduct a quality system audit procedure, collect audit evidence;
- use statistical methods for auditing;
- build an audit sample and evaluate its results;
- conduct internal audit;
- analyze and summarize the results of the audit;
- draw up the results of the audit;
- determine measurement errors and the laws of their distribution, methods for processing measurement results;
- read electrical and electronic circuits, primary converters and actuators;
- identify the simplest faults, draw up specifications;
- solve problems of theoretical mechanics;
- use methods of transformation of systems of forces;
- to determine the speed and acceleration of point movement;
- draw up documents using language options depending on the purpose of the content and type of document;
- unify the texts of documents;

- draw up documents in accordance with the requirements of regulations and state standards;
- register accounting documents;
- use unified forms of documents;
- analyze the accreditation documentation, prepare for the on-site examination and conduct it, perform an audit;
- analyze the objects of technology;
- from the set of essential features of the developed object, draw up a description and claims of the invention, identify and prove its patentability, as well as draw up documents for a patent application;
- apply the principles and criteria in the field of patenting;
- protect their patent developments as objects of intellectual property;

use the acquired knowledge in practice when performing design work, production planning, performing work at a construction site and conducting research work on construction production technology.

- use the acquired knowledge in practice when performing design work, production planning, performing work at a construction site and conducting research work on construction production technology.
- test raw materials; perform work to ensure the quality control of finished products; rational use of raw materials
- competently determine the features of building materials; justify the choice of materials and products in design solutions for the given conditions of their operation; ensure the quality of materials; predict the reliability and durability of materials in structures;

– conduct an examination of the documents submitted for accreditation, assess the compliance of the area of accreditation of the testing laboratory with the areas of accreditation of certification bodies with which the laboratory has an agreement to conduct certification tests, issue an expert opinion;

- organize control tests of specific products and assess the qualifications of testers for testing, processing and processing test results, as well as the technical (declared) capabilities of the testing laboratory (center);

– assess compliance with the current legislation of the status of an organization applying for accreditation as a testing (measuring) laboratory;

-elimination of technical barriers to trade, which largely depends on accreditation;

- solving problems on the problems of the system of certification and accreditation of the Republic of Kazakhstan.

-***understand the design development of related parts of the project;***

perform all types of architectural and construction drawings at different design stages.

-learn how to work with educational, methodological and reference literature corresponding to the topics included in the program. learn how to choose a scheme for conducting national certification of products based on certification.

Master the skills:

- solving problems of geometric modeling: simple and complex spatial problems, by means of engineering graphics;
-rules and methods of working with drawing tools, special engineering and construction terminology;
-independent construction of an algorithm for solving specific graphic problems;
-construction of spatial forms;
- design and execution of drawings;
-methods of research activity;
-methods for calculating errors in measurements, processing the results of measurements;

- application to the calculations of the fundamental laws of electrical engineering, the principle of operation of semiconductor devices, electrical machines and apparatuses;
- use the studied materials in all areas;
- solve problems associated with the movement of material points;
- methods of constructing mathematical models in solving problems of mechanics;
- solving practical problems;
- preparation, execution, 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 a table of forms of documents;
- skills of using new information technologies when creating management documents, developing document templates;
- application of criteria and principles for determining the scientific, historical and practical value of documents;
- negotiation and evaluation methods, analyze accreditation documentation, prepare for and conduct on-site examination, perform an audit.
- basic concepts in the field of patenting;
- the ability to createnew technologicalprocesses based on a systematic approach to the objects under study, the development of technological equipment and product designs;
- organization of work on patenting;
- correct execution of patent documentation;
- determine the technologies of wall materials and structures intended for the creation of modern building envelopes and structures that meet modern standards.
- the ability to independently acquire new knowledge and skills with the help of information technology and use them in their practical activities, to expand and deepen their scientific outlook
- materials science bases for obtaining building materials with the required properties;
- carrying out confirmation of conformity of products, processes and services, carrying out confirmation of conformity of quality systems and productions; knowledge of the system of mandatory and voluntary certification, legislative and regulatory documents.
- implementation of systematic checks of standards and other normative documents accepted at the enterprise;
- control over the performance of work on standardization of the enterprise division;
- studying the systematization of advanced domestic and foreign experience in the development and implementation of quality systems;

Special competencies:

Know:

- methods for obtaining and developing new structural materials and methods for their processing; methods for creating rational concentration quality level programs based on modern technologies;
- crystallization of metals and alloys; mechanical properties of materials; heat treatment of metals and their types; the importance of chemical heat treatment of steel; properties of non-ferrous metals and alloys.
- basic requirements, patterns of document formation, terminology of document management; methods of classification, unification and standardization of documents, composition of unified documentation systems;
- accreditation of the RS bodies of organizational and administrative documentation;
- legal support, legal norms, to master the classification of normative documents and standards, the principles and methods of building standards and normative documentation.

- types of technical, regulatory, legal acts, rules for the development and application of technical codes of established practice.
- general theoretical principles of standardization, certification and metrology; the main provisions of the state system of standardization and certification;
-classification of measurements by types of measurements and types of measuring instruments; measurement scales;
- methods for estimating costs for the quality of products and services, costs for metrological support
- perform work to ensure quality control of finished products; rational use of raw materials
- selection of design scheme, limit states, system of safety factors, calculation and design of building structures.
- basic numerical methods used in solving problems of underground and urban construction;
- manufacturing technologies, control methods and properties of modern wall materials and products, in accordance with the requirements of current GOSTs

Be able to:

- give an opinion on the compliance (non-compliance) of the product information for any group of goods; organize the search and use of regulatory documents in the field of information about goods in professional activities;
- work with standards;
- develop questionnaires in preparation for the audit;
- develop audit documentation;
- draw up protocols based on the results of the audit;
- Evaluate actions following the results of the audit.
- conduct a quality system audit procedure, collect audit evidence;
- use statistical methods for auditing;
- build an audit sample and evaluate its results;
-appoint and choose a rational technology for the manufacture of machine parts;
- Correctly draw up documents and draw them up in accordance with state standards; unify, design forms of documents;
- use legal norms, legislative acts, possess practical skills in the development, approval of the examination of standards and other regulatory documentation.
-distinguish between types of technical regulations. Procedure, rules for the development and application of technical regulations.
- use the methods of forecasting and optimization, unification and aggregation of systems of preferred numbers in the development of standards;
- evaluate the accuracy of the results obtained and minimize possible errors in measurements.
- the location of the main points in the technological process, which require constant and periodic monitoring of changes in the properties of raw materials, semi-finished products and finished products
- process the information obtained in the course of research using mathematical and statistical methods, analyze and comprehend it, taking into account the objectives of the research
- use the acquired knowledge in practice when performing design work, production planning, performing work at a construction site and conducting research work on construction production technology.
- correctly determine the features of building materials;

Master the skills:

- knowledge of the requirements for product information;
-use of information obtained from the Internet;
- the basics of implementing the standards of the organization in the practice of trade;
- 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.
- - basics of production relations during quality audits.
-management of product quality and quality management
-modern methods and principles of formation of the quality management system
- -application of analytical procedures and methods for selecting documentation and records during inspections;
- method of work of the auditor;
- quality management systems;
- development of reporting documentation, corrective and preventive actions;
- planning an audit, forming a schedule and a working group of auditors;
- skills in the design and manufacture of technological parts and structures;
- methods of analysis and search for materials for the production of this type of product.
mechanical properties of materials; properties and methods of structural and tool materials, structures and their hardening.
- methods of negotiation and evaluation, analyze accreditation documentation, prepare for and conduct on-site examination, perform audit.
- possess the skills of control and verification; regulatory framework for metrology, standardization and certification;
- The formation of a modern engineer is impossible without mastering the methods of quality control of manufacturing, installation and erection of building structures, buildings and structures Formation of a modern engineer is impossible without mastering the methods of quality control of manufacturing, installation and erection of building structures, buildings and structures
- determine the range of measured and controlled parameters of products and technological processes, establish optimal standards for measurement accuracy and control reliability, select measurement and control tools
- determine the technology of wall materials and structures intended to create modern building envelopes and structures that meet modern standards.

Table 1. The sequence of mastering disciplines in the process of forming special competencies

No.	Competencies	The list of compulsory, elective disciplines and the sequence of their study of choice for the educational program		Expected results
		List of disciplines	**The sequence of their study (sem.)**	
one	Special competencies	Product identification and labeling / Product coding basics	3	**Know:**types, forms and means of commodity information; main regulatory and legal documents in accordance with the direction and profile of training; requirements for information on commercial products; shipping documents, carriers and composition of marking, groups of information marks; **Be able to:** give an opinion on the compliance (non-compliance) of product information for any group of goods; organize the search and use of regulatory documents in the field of information about goods in professional activities; analyze complaints and claims for goods, prepare conclusions based on the results of their consideration; apply the standards of the organization in the practice of trade; evaluate the compliance of product information with the requirements of regulatory documentation. **Master the skills:** knowledge of the requirements for product information; use of information obtained from the Internet; methodology for searching and using 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 labeling of goods of different groups of goods; methods for classifying and coding goods, methods and means for determining indicators of the assortment and quality of goods, and ways to preserve the quality of goods
				Know:legislation in the field of identification and coding; regulatory legal acts and methodological materials; types of state classifiers. **Be able to:** apply computer technologies for identification and coding; orient in the structure of barcodes; perform barcode control numbers calculation. **Master the skills:** work on organizing coding in developed countries; international organizations for unification and coding; processing the results of coding, coding products, technology and organization.

		Quality audit/Audit of the quality management system for products and services	6	**Know:** - main provisions of normative documents; - basic concepts related to quality audit; -goals, principles, types of quality audit and their features; - qualification requirements of experts (auditors); - procedures for planning, preparing, conducting quality audits; -algorithm for preparing and conducting a quality audit. **Be able to:** - work with standards; - develop questionnaires in preparation for the audit; - develop audit documentation; - draw up protocols based on the results of the audit; - Evaluate actions following the results of the audit. **Own**skills: - the basics of industrial relations when conducting quality audits. -management of product quality and quality management -modern methods and principles of formation of the quality management system
				Know: - the essence, goals and objectives of the quality audit; - audits of quality systems; - principles of audit; - stages of the audit; - audits of quality management systems; - the essence and tasks of internal control, the content of the main regulations related to internal control. **Be able to:** -conduct a quality system audit procedure, collect audit evidence; - use statistical methods for auditing; - build an audit sample and evaluate its results; - conduct internal audit; - analyze and summarize the results of the audit; - draw up the results of the audit; **Master the skills:** -applying analytical procedures and methods for selecting documentation and records during audits; - method of work of the auditor; - quality management systems; - development of reporting documentation, corrective and preventive actions; - planning an audit, forming a schedule and a working group of auditors;

		Structural materials technology / Technological machines and equipment	4	**Know:**methods for obtaining and developing new structural materials and methods for their processing; methods for creating rational concentration quality level programs based on modern technologies; modern technological processes for processing structural materials. **Be able to:** appoint and choose a rational technology for the manufacture of machine parts; make a choice of methods for obtaining structural materials, technology for manufacturing blanks, technology for machining; **Master the skills:** skills in the design and manufacture of technological parts and structures; methods of analysis and search for materials for the production of this type of product.
				Know*:*crystallization of metals and alloys; mechanical properties of materials; heat treatment of metals and their types; the importance of chemical heat treatment of steel; properties of non-ferrous metals and alloys. **Be able to:** analyze microscopic carbon steel; analyze microscopic cast iron; thermally (cultivating and softening) to process carbon steel; explore aluminum alloys and microstructures of bacteria; analyze microstructures of copper and copper alloys. **Master the skills:** mechanical properties of materials; properties and methods of structural and tool materials, structures and their hardening.
		Unified documentation system / Unification and standardization of management documents	5	**Know:**basic requirements, patterns of document formation, terminology of document management; methods of classification, unification and standardization of documents, composition of unified documentation systems; rules for the preparation and execution of documents using modern technology; documentary terminology; legislative and regulatory legal acts and regulatory and methodological materials for documenting management activities; methods and means of documentation; classification of documentary information; characteristics and composition of unified documentation systems **Be able to:**correctly draw up documents and draw them up in accordance with state standards; unify, design forms of documents; draw up a nomenclature of cases and storage of documents; compile documents using language options depending on the purpose of the content and type of document; unify the texts of documents; draw up documents in accordance with the requirements of regulations and state standards; register documents; use unified forms of documents; **Master the skills:** compilation, execution, 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 a table of 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
				Know:accreditation of the RS bodies of organizational and administrative documentation; **Be able to:** analyze accreditation documentation, prepare for and conduct on-site examination, perform an audit; **Master the skills:** negotiation and evaluation techniques, analyze accreditation documentation, prepare for and conduct on-site examinations, and perform audits.

		Technology for the development of standards and regulations / Technology and design of building products	eight	**Know:**legal support, legal norms, to master the classification of normative documents and standards, the principles and methods of building standards and normative documentation. **Be able to:**use legal norms, legislative acts, possess practical skills in the development, approval of the examination of standards and other regulatory documentation. **Master the skills:** development of specifications. The order of coordination and approval of technical specifications. Application, verification procedure, amendments, revision and cancellation of specifications
				Know:types of technical, regulatory, legal acts, rules for the development and application of technical codes of established practice. **Be able to**: distinguish types of technical regulations. Procedure, rules for the development and application of technical regulations. **Master the skills:** development of specifications. The order of coordination and approval of technical specifications. Application, verification procedure, amendments, revision and cancellation of specifications;
		Normative base of standardization and certification/ Norm control of documents in standardization and certification	5	**Know:**general theoretical principles of standardization, certification and metrology; the main provisions of the state system of standardization and certification; standardization methods; certification schemes and systems, rules and procedures for certification; organizational, scientific and methodological foundations of metrology, legal foundations for ensuring the uniformity of measurements; **Be able to:** use the methods of forecasting and optimization, unification and aggregation of systems of preferred numbers in the development of standards; verify (calibrate) measuring instruments; control the quality of measurements, plan measurements, verify and calibrate measuring instruments; **Master the skills:** possess the skills of control and verification; regulatory framework for metrology, standardization and certification; theory of quality assessment of measurement results and their mathematical measurements
				Know: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 systems of preferred numbers in the development of standards; **Master the skills:** have skills in calculating measurement errors and evaluating measurement results; determine the range of measured and controlled parameters of products and technological processes, establish optimal standards for measurement accuracy and control reliability, select measurement and control tools
		Measurement in construction / Fundamentals of measurement in construction	6	Know: the organization and technology of product certification, methods for analyzing product quality, the scope of work, the procedure and rules for conducting an engineering survey of buildings and structures for various purposes; **Be able to:** participate in the development of new and revision of existing regulatory documents in construction; in the preparation and implementation of certification in construction; in the work on the organization of a quality control system in construction; plan work on verification and calibration of measuring instruments and certification of test equipment. **Master the skills:** skills in processing and analyzing measurement results,
				Know:basic concepts related to measurement objects; basic concepts related to measuring instruments; patterns

				of measurement result formation; organizational, scientific and methodological foundations of metrological support; **Be able to:** evaluate the accuracy of the results obtained and minimize possible measurement errors. **Master the skills:** The formation of a modern engineer is impossible without mastering the methods of quality control of manufacturing, installation and erection of building structures, buildings and structures.
		Economics of Quality, Standardization and Certification/Fundamentals of Quality in Standardization and Certification	7	**Know:**methods for estimating costs for the quality of products and services, costs for metrological support **Be able to:** analyze the main indicators of the economic efficiency of quality assurance; **Master the skills:** have an idea of the costs in the quality management system; apply methods for determining the costs and cost of work in the field of quality management, standardization and certification, accreditation, conformity assessment.
				Know:technological features of building materials; **Be able to:** the location of the main points in the technological process, which require constant and periodic monitoring of changes in the properties of raw materials, semi-finished products and finished products. **Master the skills:**determine the range of measured and controlled parameters of products and technological processes, establish optimal standards for measurement accuracy and control reliability, select measurement and control tools
		Technology of production of building materials / Equipment for the production of building materials	7	**Know:**perform work to ensure the 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; **Master the skills:** determine the technology of wall materials and structures intended to create modern building envelopes and structures that meet modern standards.
				Know:choice of design scheme, limit states, system of safety factors, calculation and design of building structures. **Be able to:** apply modern progressive technologies, especially with the complex use of technogenic raw materials, economically beneficial and contributing to the solution of environmental problems, taking into account the requirements of safety and environmental protection. **Master the skills:** control, regulate and manage processes based on existing regulatory and technical documentation
		Computer technologies in construction / Technologies in construction	7	**Know:**basic numerical methods used in solving problems of underground and urban construction; existing software products and information technologies for the design of construction projects. **Be able to:** process the information obtained in the course of research using mathematical and statistical methods, analyze and comprehend it, taking into account the objectives of the research. **Master the skills:** the ability to independently acquire new knowledge and skills with the help of information technology and use them in their practical activities, expand and deepen their scientific outlook
				Know:industrial methods of construction of buildings and structures; the basics of in-line execution, the methodology of technological design and the content of projects for the production of construction and installation works; modern technologies for the construction of buildings and structures. **Be able to:**use the acquired knowledge in practice when performing design work, production planning,

				performing work at a construction site and conducting research work on construction production technology. **Master the skills:** creative engineering and technical thinking, the ability to analyze and evaluate emerging complex production situations, make decisions taking into account the main principles and materials for conducting construction and technological research, and the prospects for the development of construction production technology.
		Processes and apparatus for the production of building materials / Production of building materials	7	**Know:**solve various engineering problems; evaluate the properties of wall materials and structures; **Be able to:** test raw materials; perform work to ensure the quality control of finished products; rational use of raw materials **Master the skills:** possession of measuring instruments and methods for performing measurements during quality control in construction
				Know:nomenclature of building materials and their properties; features of their structure, raw materials; the essence of the operation and processes of processing raw materials; production technology of various building materials, their cost, etc.; **Be able to:** correctly determine the features of building materials; justify the choice of materials and products in design solutions for the given conditions of their operation; ensure the quality of materials; predict the reliability and durability of materials in structures; **Master the skills:** materials science bases for obtaining building materials with the required properties;
		Technical regulations for the safety of buildings and structures, building materials and products / Safety of building materials and products	eight	**Know:**manufacturing technologies, control methods and properties of modern wall materials and products, in accordance with the requirements of current GOSTs **Be able to:** solve various problems; evaluate the properties of wall materials and structures; test raw materials; **Master the skills:** conducting confirmation of conformity of products, processes and services, carrying out confirmation of conformity of quality systems and productions; knowledge of the system of mandatory and voluntary certification, legislative and regulatory documents
				Know:fundamentals of building design, engineering preparation of a construction site in terms of new construction and reconstruction; technical regulations for the construction, repair and reconstruction of buildings and structures, acceptance and quality control of work; **Be able to:** use reference and regulatory literature, design and provide technological support for construction and installation processes, perform specialized inspections of buildings and structures, field and laboratory tests of building materials, products and structures; **Master the skills:**development of programs for specialized surveys of buildings and structures, drawing up statements of defects and damage to structures, solving a set of tasks for quality control of construction and installation works.

Table 2. The sequence of mastering the disciplines of social and professional interaction

Well	Supporting disciplines	Competencies	Expected Result
one	2	3	4

Modular educational program in the specialty "Standardization and certification" (by industry)			
General education disciplines			
Required Component			
one	Modern History of Kazakhstan	Socio-ethical competencies	**Know:** -main sources and historical research; - about the most important events of the 20th and early 21st centuries; - about the developments of Kazakhstan during the period of civil confrontation and in the conditions of the Soviet system; - about the important stages in the formation of a sovereign and independent Kazakhstan, the main terms of historical science; **Be able to:** -correlate general phenomena and single historical facts; - independently work with sources and historiography, prepare abstracts, essays and presentations; analyze and be able to evaluate significant historical events; - explain their causal relationships; - think logically, freely discuss and defend one's own opinion; -explain the meaning and significance of basic historical concepts. **Master the skills:** - work with sources, historiography and materials of periodicals and the Internet; - writing abstracts, reports and essays; -preparation and presentations; - compiling comparative tables; - fulfillment of test and situational tasks; - public speaking, discussion and debate.
1.2	Foreign language	Competences in the field of languages	**Know:** - the volume of professional vocabulary necessary for the implementation of professional communication in a foreign language; **Be able to:** -work with special literature in a foreign language; **Master the skills**: -professional oral and written communication in a foreign language.
1.2	Kazakh (Russian) language	Competences in the field of languages	**Know:** - application of the Russian (Kazakh) language, both in everyday and professional communication; **Be able to:** - work with vocational literature, analyze vocational tests, carry out two-way translation; **Master the skills:** -knowledge and skills of management, planning, organization and forecasting of the labor

			market; principles and methods of labor market management, requirements for the formation and use of labor resources, their professional training and retraining;
one	Information and Communication Technology (in English)	Information and communication competencies	**Know**: -economic and political factors in the development of information and communication technologies; -features of various operating systems, architecture. **Be able to:** -determine the main trends in the field of information and communication technologies; use information resources to search and store information; -work with spreadsheets, perform data consolidation, build graphs; - apply methods and means of information protection. **Master the skills:** -development of the database structure; - designing and creating presentations, receiving data from the server; - creating video files; - work with smart-applications; - work with services on the e-government website.
2	Philosophy	Socio-ethical competencies	**Know:** - main stages, directions, teachings and problems of philosophy; **Be able to:** - competent philosophical thinking, which is manifested in the ability to independently think through the most important philosophical topics; **Master the skills:** - conceptual and categorical apparatus of philosophy, skills of analytical reading of philosophical texts, critical thinking.
Selectable Component			
one	Ecology with the basics of life safety / Psychology	Competence of general education	**Know:** - labor legislation of the Republic of Kazakhstan; - rules of industrial safety, rules and norms of labor protection; - safety requirements and first aid procedures in case of accidents; - basic methods of protection of production personnel and the population from the possible consequences of accidents, catastrophes, natural disasters, the ability to make decisions under risk;

			-methods for assessing the state of the environment; - basics of protection of natural resources, flora and fauna; - main legislative, legal and regulatory documents in the field of nature protection and rational use of natural resources; - the ecological situation in the region, Kazakhstan, the world; - economic mechanism of environmental protection. **Be able to:** - choose technical means and technologies taking into account the environmental consequences of their use; - to control the parameters and the level of negative impacts on their compliance with regulatory requirements; -effectively apply means of protection against negative impacts; - develop measures to improve the safety and environmental friendliness of production activities; plan and implement measures to improve the sustainability of production systems and facilities; - plan measures to protect production personnel and the public in emergency situations and, if necessary, take part in rescue and other urgent work in the aftermath of emergency situations; - to carry out a competent analysis of the cause-and-effect conditionality of various situations in the field of environmental protection; - to implement a reasonable system of measures in the field of the agro-industrial complex; - solve specific problems in the field of nature protection, link the solution of production problems with compliance with relevant environmental requirements; -plan and organize environmental protection work. **Master the skills:** -knowledge methods for solving professional problems, the ability to professionally solve problems, work in a team, knowledge of safe working conditions in the workplace.
			Know: The essence of the basic psychological processes and properties, mental states that provide a person with his life; the basic methods of psychology and be able to use them in the practice of activity, taking into account its economic specifics; psychological theories of personality, group and collective. **Be able to:**use the acquired knowledge of psychology in their practical activities; organize individual and group activities of people, taking into account their psychological characteristics and compatibility; competently use communicative competence in the process of group joint activities. **Master the skills:** methods of development of memory, thinking, analysis and generalization of information

2	Political science / Sociology / Culturology / Fundamentals of anti-corruption culture	Socio-ethical competencies	**Know:**subject and objectives of the course; the main content of the course "political science"; acquire fundamental knowledge of political theory; range of achievements of historical thought in the study of ancient culture. **Be able to:**independently work with literature of a general humanitarian nature, be able to find key worldview problems and their solutions; think logically, systematically and critically; to use the acquired baggage of philosophical erudition to formulate and prove their own judgments on various everyday issues. **Master the skills:** analysis of political statements and programs and political forecasting.
			Know: laws of development and functioning of society; features of the analysis of the modern system of social inequality, social mobility and stratification; own: practical skills of independent analysis of the current state of society. use basic knowledge in the field of humanities and economic sciences in cognitive and professional activities. **Be able to:** correlate knowledge of the foundations of sociology with professional activities; own: practical skills of applying the acquired knowledge in the analysis of real social situations. **Master the skills:** basic terms and problems of sociology; basic sociological concepts.
			Know:the structure and composition of modern cultural knowledge; cultural studies and philosophy of culture; sociology of culture, cultural anthropology; culturology and history of culture; **Be able to:** distinguish between the basic concepts of cultural studies: the dynamics of culture, the language and symbols of culture, cultural codes, intercultural communications, cultural values and norms, cultural traditions, the cultural picture of the world, social institutions of culture. **Master the skills:**ideas about the events of Kazakh and world culture, based on the principle of respect and tolerance; skills in the analysis of cultural sources; methods of conducting discussions and polemics
			Know:the concept of anti-corruption culture of government; **Be able to:**determine a set of basic moral and ethical norms; **Own skills**: work with normative documents.
one	Fundamentals of market economy and entrepreneurship	Socio-ethical competencies	**Know:** - fundamentals of economics and entrepreneurship, marketing, management in educational institutions, industrial institutions and the service sector; Be able to: - practical business planning skills; **- Possess skills:**adaptation to the types and nature of market relations.
Basic disciplines			
Required Component			

one	Mathematics	Competences of natural sciences	**Know:**The course of higher mathematics in the scope of this program; **Be able to**: apply modern mathematical methods to solve applied problems; **Own skills:**to use the achievements of fundamental science for the successful study of general theoretical and special technical disciplines, the development of mathematical thinking and logic. When choosing methods of mathematical modeling for solving specific technical problems.
one	Physics	Competences of natural sciences	**Know:** - basic laws of classical and modern physics and physical phenomena; - methods of physical research; - the influence of physics, as a science, on the development of technology; -connection of physics with other sciences and its role in solving scientific and technical problems of the specialty; **Be able to:** -use modern physical phenomena and laws in practice and interpret the results of a physical experiment; - build a model of a physical phenomenon with an indication of the boundaries of application; **Own skills:** - solving specific problems of physics; - conducting a physical experiment and evaluating the results obtained; Be competent: - in matters of setting and solving physical problems in professional activities; - in the modern representation of the surrounding world and the state of the scientific and technical process.
one	Standardization and certification	Professional competencies	**Know:** - the essence and content of standardization and certification, the technology of developing standards, the system of supervision over compliance with the mandatory requirements of regulatory documents on standardization; -legislative and regulatory documents, methodological materials for certification, rules and procedures for conformity assessment of products and services, systems of mandatory and voluntary certification, schemes for maintaining compliance, rules for testing for conformity assessment; **Be able to:** - use the information base on standardization, national and international standards, normative and technical documents in the field of certification; - to apply in practice the rules for the development of standards and the introduction of changes and cancellations of standards; - apply methods of quality control of products and processes when carrying out work to

			confirm compliance; - apply methods of product quality control; - apply computer technologies for planning and carrying out work on standardization and conformity assessment; **Master the skills:** - work with normative documentation on standardization and certification; -revision of existing standards and other certification documents; - implementation of systematic verification of normative documentation on standardization and certification; - study and systematization of advanced domestic and foreign experience in the field of standardization and certification; Be professionally competent: In the legal and legislative field of standardization and certification; In the field of organization of standardization activities, in matters of development of normative documentation and its application; In the main provisions of the state certification system of the Republic of Kazakhstan, schemes and systems of conformity assessment, conditions for the implementation of compliance, rules and procedures for conformity assessment.
2	Professional Kazakh (Russian) language	Competences in the field of languages	**Know:** - basic terms and concepts of professional activity in the Kazakh (Russian) language; - rules of ethics of business, professional communication; **Be able to:** - work with vocational literature, analyze vocational texts, carry out two-way translation; - to determine the language means of organizing the text and use them when generating their own statements on the topic; **Own skills:** - understanding the content of texts of general and professional content; - scientific and technical translation and oral communication in monologue and dialogic forms in the specialty; - drawing up plans, converting the plan into an oral retelling, a written retelling - a summary of the content; abstract description of the content, writing annotations to the text. Be professionally competent: In solving real communicative problems in specific situations of professional activity.
2	Professionally oriented foreign language	Competences in the field of languages	**Know:** - the specifics of oral and written speech in the areas of professional, scientific, socio-political communication; -national and cultural features of the construction and organization of the text in a foreign language within the framework of a professionally conditioned situation;

			-stylistic features of the vocabulary of a foreign language in the field of professional communication; **Be able to:** - to carry out professional activities in the linguistic, sociolinguistic, information-analytical and communicative aspects; - to build their verbal and non-verbal behavior in the areas of professional and scientific socio-political communication; - apply a variety of language and speech means adequately to social factors, the situation of communication, the status of the interlocutor and his communicative dimensions; **Own skills:** - perception and listening comprehension of the appropriate level of messages of a business, informational and vocational nature; - introductory and studying reading of business and scientific and technical documentation, providing for the extraction of information from what has been read and its use in speech. Possess professional communication skills: - communicative competence, the ability and readiness of the student to realize communicative intentions; -professional-oriented competence, professional knowledge of foreign language in all aspects of speech and communication activities, associated with the technology of future professional activity.
2	General theory of measurements	Professional competencies	**Know**: -terms and definitions of the system ensuring the uniformity of measurements, the international system of units SI; - general laws and rules of measurements; - methods and measuring instruments; - the international system of units of quantities and the foundations of the theory of dimension. Be able to: -determine measurement errors and the laws of their distribution; - methods for processing measurement results; -build mathematical models of measurement objects; - evaluate the errors of functions of approximate values of parameters; - to carry out the summation of the components of the error, both deterministic and random. **Master the skills:** - methodology for calculating errors in measurements, processing the results of measurements; - conviction about the decisive role of measurements in the knowledge of nature by man; - have an idea about the principles of constructing equations for the measurement processes

			of various physical quantities.
Selectable Component			
2	Product identification and labeling/Product coding basics	Professional competencies	**Know:** - types, forms and means of commodity information; - basic regulatory and legal documents in accordance with the direction and profile of training; -requirements for information of marketable products; - shipping documents, carriers and composition of marking, groups of information signs; **Be able to:** - give an opinion on the compliance (non-compliance) of product information for any group of goods; -organize the search and use of regulatory documents in the field of information about goods in professional activities; - analyze complaints and claims to goods, prepare conclusions based on the results of their consideration; - apply the standards of the organization in the practice of trade; - evaluate the compliance of product information with the requirements of regulatory documentation. **Master the skills:** - knowledge of the requirements for product information; -use of information obtained from the Internet; - methodology for searching and using 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 labeling of goods of different groups of goods; - methods for classifying and coding goods, methods and means for determining the indicators of the assortment and quality of goods, and ways to preserve the quality of goods.

			Know: -legislation in the field of identification and coding; -regulatory legal acts and methodological materials; - types of state classifiers. **Be able to:** - apply computer technologies for identification and coding; - to be oriented in the structure of barcodes; - Perform calculation of barcode control numbers. **Master the skills:** - 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; -methods and means of assessing the compliance of commodity information with the requirements of regulatory documentation; -methods of classification and coding of goods, methods and means for determining indicators of the range and quality of goods and ways to preserve the quality of goods; - methods and means of natural science disciplines for assessing the consumer properties of goods; - rational ways and methods of storage, transportation and sale of goods.
3	Quality audit/Audit of the quality management system for products and services	Professional competencies	**Know:** - main provisions of normative documents; - basic concepts related to quality audit; -goals, principles, types of quality audit and their features; - qualification requirements of experts (auditors); - procedures for planning, preparing, conducting quality audits; -algorithm for preparing and conducting a quality audit. **Be able to:** - work with standards; - develop questionnaires in preparation for the audit; - develop audit documentation; - draw up protocols based on the results of the audit; - Evaluate actions following the results of the audit. **Own**skills: - the basics of industrial relations when conducting quality audits. -management of product quality and quality management -modern methods and principles of formation of the quality management system

			Know: - the essence, goals and objectives of the quality audit; - audits of quality systems; - principles of audit; - stages of the audit; - audits of quality management systems; - the essence and tasks of internal control, the content of the main regulations related to internal control. **Be able to:** -conduct a quality system audit procedure, collect audit evidence; - use statistical methods for auditing; - build an audit sample and evaluate its results; - conduct internal audit; - analyze and summarize the results of the audit; - draw up the results of the audit; **Master the skills:** -applying analytical procedures and methods for selecting documentation and records during audits; - method of work of the auditor; - quality management systems; - development of reporting documentation, corrective and preventive actions; - planning an audit, forming a schedule and a working group of auditors;
2	Engineering graphics / Engineering graphics and descriptive geometry	Professional competencies	**Know:** -standards of the Unified System for Design Documentation (ESKD) and the requirement for ESKD; -laws, methods and techniques of projection drawing; - rules for the design and reading of design and technological documentation; - rules for the implementation of drawings, technical drawings, sketches, geometric constructions; - technique and principles of sizing; laws of linear perspective and basic methods for constructing space on a plane, methods for constructing shadows; -stages and procedures of architectural and construction design; - technique and sequence of the project; - requirements of state standards of the Unified System for Design Documentation (ESKD) and the Unified System of Technological Documentation (ESTD);

			Be able to: - use computer graphics AutoCAD; solve problems of geometric modeling: simple spatial problems and solve problems of geometric modeling of any complexity; - use normative documents, catalogs and other documentation; -solve problems of a geometric nature based on images of spatial forms; -solve simple compositional problems in the construction of three-dimensional objects; - to carry out working drawings, sketches of parts and architectural and construction drawings using manual graphics techniques; -perform orthogonal, axonometric and perspective projections; correctly express technical ideas graphically; -carry out self-control of the implementation of the graphic part of the project; - clearly and logically state the ideas and content of your project; - evaluate the results of their work at each stage and adjust their activities; to discuss problems, to defend one's position with reason; - use state standards, reference and technical literature; **Master the skills**: - solving problems of geometric modeling: simple and complex spatial problems, by means of engineering graphics; -rules and methods of working with drawing tools, special engineering and construction terminology; -independent construction of an algorithm for solving specific graphic problems; -construction of spatial forms; - design and execution of drawings; -methods of research activity; - the ability to plan, organize and perform work in the allotted time;
2	Electrical engineering/Fundamentals of the theory of electrical engineering	Professional competencies	**Know:** -basic laws of electrical engineering, methods of analysis of electrical circuits; -basic laws of electrical engineering for electrical and magnetic circuits; - methods for measuring electrical and magnetic quantities, the 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; **Be able to:** - determine measurement errors and the laws of their distribution, methods for processing measurement results; - read electrical and electronic circuits, primary converters and actuators; - identify the simplest faults, draw up specifications; **Master the skills:**

			-methods for calculating errors in measurements, processing the results of measurements; - application to the calculations of the fundamental laws of electrical engineering, the principle of operation of semiconductor devices, electrical machines and apparatuses;
2	Structural materials technology / Technological machines and equipment	Professional competencies	**Know:**methods for obtaining and developing new structural materials and methods for their processing; methods for creating rational concentration quality level programs based on modern technologies; modern technological processes for processing structural materials. **Be able to:** appoint and choose a rational technology for the manufacture of machine parts; make a choice of methods for obtaining structural materials, technology for manufacturing blanks, technology for machining; **Master the skills:** skills in the design and manufacture of technological parts and structures; methods of analysis and search for materials for the production of this type of product.
			Know*:*crystallization of metals and alloys; mechanical properties of materials; heat treatment of metals and their types; the importance of chemical heat treatment of steel; properties of non-ferrous metals and alloys. **Be able to:** analyze microscopic carbon steel; analyze microscopic cast iron; thermally (cultivating and softening) to process carbon steel; explore aluminum alloys and microstructures of bacteria; analyze microstructures of copper and copper alloys. **Master the skills:** mechanical properties of materials; properties and methods of structural and tool materials, structures and their hardening.
2	Theoretical mechanics/General mechanics	Professional competencies	**Know:** - physical foundations 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 a point motion, the main types of solid physical motions, complex displacement of points, the main problems of the dynamics of a mathematical point, the dynamics of a mechanical system know the general theorem; **Be able to:** - solve problems of theoretical mechanics;

			- use methods of transformation of systems of forces; - to determine the speed and acceleration of point movement; **Master the skills:** - use the studied materials in all areas; - solve problems associated with the movement of material points; - methods of constructing mathematical models in solving problems of mechanics; - solving practical problems;
3	Unified documentation system / Unification and standardization of management documents	Professional competencies	**Know:** - basic requirements, patterns of document formation, terminology of document management; - methods of classification, unification and standardization of documents, composition of unified documentation systems; - rules for the preparation and execution of documents using modern technology; documentary terminology; - 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 **Be able to:** - Correctly draw up documents and draw them up in accordance with state standards; - unify, design forms of documents; - draw up a nomenclature of cases and storage of documents; - draw up documents using language options depending on the purpose of the content and type of document; - unify the texts of documents; - draw up documents in accordance with the requirements of regulations and state standards; - register accounting documents; - use unified forms of documents; **Master the skills:** - preparation, execution, 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 a table of forms of documents; - skills of using new information technologies when creating management documents, developing document templates; - application of criteria and principles for determining the scientific, historical and practical

			value of documents;
			Know: - accreditation of the RS bodies of organizational and administrative documentation; Be able to: - analyze the accreditation documentation, prepare for the on-site examination and conduct it, perform an audit; **Master the skills:** - negotiation and evaluation methods, analyze accreditation documentation, prepare for and conduct on-site examination, perform an audit.
3	Building structures/Structural materials in construction	Professional competencies	**Know:**method of calculation of building structures by limit states; -method of material selection for structural elements and their connections; principles of designing building structures. **Be able to:** perform calculations of building structures made of reinforced concrete, steel and aluminum, wood. **Master the skills:** method of designing building structures with the help of existing regulatory documents and applied computer programs
			Target: To give students in-depth information about the main structural building materials, about the quality indicators of building materials and the technology of their production. To prepare a future specialist for the ability to make the best decision when choosing materials for the manufacture of structures and their production technology, to teach methods for analyzing the technical and economic efficiency of technological processes in the manufacture of building structures **Content:**Fundamentals of technology of natural stone materials; fundamentals of technology of ceramic materials; fundamentals of technology of binders; fundamentals of technology and production of concrete products; fundamentals of technology and production of silicate products. **Expected Result:** **Know:**Technological processes in the production of building materials and structures from them. Regulatory requirements for processes and materials. Working conditions of materials and structures in structures. **Be able to:** Develop terms of reference for the technology of manufacturing structures made of concrete and reinforced concrete. **Master the skills:** conduct comprehensive studies using standard and certification tests, Ability to use in practice modern ideas about the influence of micro- and nano-structures on the properties of materials, their interaction with the environment, fields, energy particles and radiation

3	Patent science/Patent and scientific and technical documentation	Professional competencies	**Know:** - basic provisions and definitions of patent law; - normative legal acts on patenting; - basic concepts used in the field of patent science; - main goals, principles and criteria for patenting; - rules for registration of patent documentation; - the structure of the national patenting system and the competence of the bodies included in this structure; - the rights of the authors-owners of the patent; - international and regional organizations on pathology; **Be able to:** - apply legislative and regulatory legal acts, methodological materials on patenting; - analyze the objects of technology; - from the set of essential features of the developed object, draw up a description and claims of the invention, identify and prove its patentability, as well as draw up documents for a patent application; - apply the principles and criteria in the field of patenting; - protect their patent developments as objects of intellectual property; **Master the skills:** - basic concepts in the field of patenting; - the ability to createnew technologicalprocesses based on a systematic approach to the objects under study, the development of technological equipment and product designs; - organization of work on patenting; - correct execution of patent documentation;
3	Regulatory framework for standardization and certification / Regulatory framework for standardization and certification	Professional competencies	**Know:**general theoretical principles of standardization, certification and metrology; the main provisions of the state system of standardization and certification; standardization methods; certification schemes and systems, rules and procedures for certification; organizational, scientific and methodological foundations of metrology, legal foundations for ensuring the uniformity of measurements; **Be able to:** use the methods of forecasting and optimization, unification and aggregation of systems of preferred numbers in the development of standards; verify (calibrate) measuring instruments; control the quality of measurements, plan measurements, verify and calibrate measuring instruments; **Master the skills:** possess the skills of control and verification; regulatory framework for metrology, standardization and certification; theory of quality assessment of measurement results and their mathematical measurements

			Know: general theoretical principles of standardization, certification and metrology; the main provisions of the state system of standardization and certification; standardization methods; certification schemes and systems, rules and procedures for certification; organizational, scientific and methodological foundations of metrology, legal foundations for ensuring the uniformity of measurements; **Be able to:** use the methods of forecasting and optimization, unification and aggregation of systems of preferred numbers in the development of standards; verify (calibrate) measuring instruments; control the quality of measurements, plan measurements, verify and calibrate measuring instruments; **Master the skills:** possess the skills of control and verification; regulatory framework for metrology, standardization and certification; theory of quality assessment of measurement results and their mathematical measurements
3	Fundamentals of measurement in construction / Measurement in construction	Professional competencies	**Know:**basic concepts related to measurement objects; basic concepts related to measuring instruments; patterns of measurement result formation; organizational, scientific and methodological foundations of metrological support; **Be able to:** evaluate the accuracy of the results obtained and minimize possible measurement errors. **Master the skills:** The formation of a modern engineer is impossible without mastering the methods of quality control of manufacturing, installation and erection of building structures, buildings and structures.
			Know:organization and technology of product certification, methods for analyzing product quality, scope of work, procedure and rules for conducting an engineering survey of buildings and structures for various purposes; **Be able to:** participate in the development of new and revision of existing regulatory documents in construction; in the preparation and implementation of certification in construction; in the work on the organization of a quality control system in construction; plan work on verification and calibration of measuring instruments and certification of test equipment. **Master the skills:** skills in processing and analyzing measurement results,
4	Economics of Quality, Standardization and Certification/Fundamentals of Quality in Standardization and Certification	Professional competencies	**Know:**methods for estimating costs for the quality of products and services, costs for metrological support **Be able to:** analyze the main indicators of the economic efficiency of quality assurance; **Master the skills:** have an idea of the costs in the quality management system; apply methods for determining the costs and cost of work in the field of quality management, standardization and certification, accreditation, conformity assessment.

			Know:technological features of building materials; **Be able to:** the location of the main points in the technological process, which require constant and periodic monitoring of changes in the properties of raw materials, semi-finished products and finished products. **Master the skills:**determine the range of measured and controlled parameters of products and technological processes, establish optimal standards for measurement accuracy and control reliability, select measurement and control tools
	Technology for the production of building materials / equipment for the production of building materials	Professional competencies	**Know:**perform work to ensure the 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; **Master the skills:** determine the technology of wall materials and structures intended to create modern building envelopes and structures that meet modern standards.
			Know:choice of design scheme, limit states, system of safety factors, calculation and design of building structures. **Be able to:** apply modern progressive technologies, especially with the complex use of technogenic raw materials, economically beneficial and contributing to the solution of environmental problems, taking into account the requirements of safety and environmental protection. **Master the skills:** control, regulate and manage processes based on existing regulatory and technical documentation
4	Computer technologies in construction / Technologies in construction	Professional competencies	**Know:**basic numerical methods used in solving problems of underground and urban construction; existing software products and information technologies for the design of construction projects. **Be able to:** process the information obtained in the course of research using mathematical and statistical methods, analyze and comprehend it, taking into account the objectives of the research. **Master the skills:** the ability to independently acquire new knowledge and skills with the help of information technology and use them in their practical activities, expand and deepen their scientific outlook
			Know:industrial methods of construction of buildings and structures; the basics of in-line execution, the methodology of technological design and the content of projects for the production of construction and installation works; modern technologies for the construction of buildings and structures. **Be able to:**use the acquired knowledge in practice when performing design work, production planning, performing work at a construction site and conducting research work on construction production technology. **Master the skills:** creative engineering and technical thinking, the ability to analyze and

			evaluate emerging complex production situations, make decisions taking into account the main principles and materials for conducting construction and technological research, and the prospects for the development of construction production technology.
4	Processes and apparatus for the production of building materials / Production of building materials	Professional competencies	**Know:**solve various engineering problems; evaluate the properties of wall materials and structures; **Be able to:** test raw materials; perform work to ensure the quality control of finished products; rational use of raw materials **Master the skills:** possession of measuring instruments and methods for performing measurements during quality control in construction
			Know:nomenclature of building materials and their properties; features of their structure, raw materials; the essence of the operation and processes of processing raw materials; production technology of various building materials, their cost, etc.; **Be able to:** correctly determine the features of building materials; justify the choice of materials and products in design solutions for the given conditions of their operation; ensure the quality of materials; predict the reliability and durability of materials in structures; **Master the skills:** materials science bases for obtaining building materials with the required properties;
4	Technical regulations for the safety of buildings and structures, building materials and products / Safety of building materials and products	Professional competencies	**Know:**manufacturing technologies, control methods and properties of modern wall materials and products, in accordance with the requirements of current GOSTs **Be able to:** solve various problems; evaluate the properties of wall materials and structures; test raw materials; **Master the skills:** conducting confirmation of conformity of products, processes and services, carrying out confirmation of conformity of quality systems and productions; knowledge of the system of mandatory and voluntary certification, legislative and regulatory documents.
			Know:fundamentals of building design, engineering preparation of a construction site in terms of new construction and reconstruction; technical regulations for the construction, repair and reconstruction of buildings and structures, acceptance and quality control of work; **Be able to:** use reference and regulatory literature, design and provide technological support for construction and installation processes, perform specialized inspections of buildings and structures, field and laboratory tests of building materials, products and structures; **Master the skills:**development of programs for specialized surveys of buildings and structures, drawing up statements of defects and damage to structures, solving a set of tasks for quality control of construction and installation works.
4	Technology for the development of standards and regulations / Technology and		**Know:**legal support, legal norms, to master the classification of normative documents and standards, the principles and methods of building standards and normative documentation.

	design of building products		**Be able to**: use legal norms, legislative acts, possess practical skills in the development, approval of the examination of standards and other regulatory documentation
			Know:types of technical, regulatory, legal acts, rules for the development and application of technical codes of established practice. **Be able to**: distinguish types of technical regulations. Procedure, rules for the development and application of technical regulations. **Master the skills:** development of specifications. The order of coordination and approval of technical specifications. Application, verification procedure, amendments, revision and cancellation of specifications;
Major disciplines			
Required Component			
2	Accreditation of certification bodies and testing laboratories / System of accreditation in the Republic of Kazakhstan	Professional competencies	**Know:** - structure of the accreditation body; -directions and basic principles of international cooperation in the field of standardization, conformity assessment, accreditation; – international, regional, foreign practice of conformity assessment; – general principles for building quality management systems in accordance with ISO 9000 standards; - basic forms of documents; - methods of accreditation and examination procedures; - legal protections of accreditation; **Be able to:** - apply the requirements of legislative acts and regulatory documents to accredited laboratories; – organize the work and compliance with the rules and procedures for accreditation of testing (measuring) laboratories (centers); – conduct an examination of the documents submitted for accreditation, assess the compliance of the area of accreditation of the testing laboratory with the areas of accreditation of certification bodies with which the laboratory has an agreement to conduct certification tests, issue an expert opinion; - organize control tests of specific products and assess the qualifications of testers for testing, processing and processing test results, as well as the technical (declared) capabilities of the testing laboratory (center); – assess compliance with the current legislation of the status of an organization applying for accreditation as a testing (measuring) laboratory; - give recommendations on how to eliminate shortcomings in the work of the organization applying for accreditation; – assess the organization’s compliance with the requirements for testing laboratories of a

			particular specialization, issue an attestation certificate, if necessary – issue a reasoned dissenting opinion; – draw up a set of documents for accreditation, including an accreditation certificate; – organize and conduct inspection control of compliance by an accredited testing (measuring) laboratory (center) with the requirements, compliance with accreditation criteria, draw up documents and a decision based on the results of inspection control. **Master the skills:** - computer technologies for planning and carrying out work on standardization, certification; - preparation of documentation for the accreditation of testing (measuring) laboratories (centers); - processing of experimental data and assessment of the accuracy (uncertainty) of measurements, tests and the reliability of control; - registration of test results and making appropriate decisions. **Know:** - procedure for the development of regulatory documents, coordination, accreditation of certification bodies and testing centers; **Be able to:** -elimination of technical barriers to trade, which largely depends on accreditation; - solving problems on the problems of the system of certification and accreditation of the Republic of Kazakhstan. **Master the skills:** - knowledge about registration, registration and issuance of the Accreditation Certificate.
3	Quality control of building materials	Professional competencies	**Know:**quality control of products and process management; quality control methods;basics of probability theory and various methods of statistical analysis and organization of product quality management; **Be able to:** determine the quality of products; use the method of statistical comparison of the histogram; check the accuracy of the technological process;use various methods of statistical control and product quality management at all stages of product movement, ensuring product quality that meets state standards and at the lowest cost; **Master the skills:** application of Pareto charts; Procedure for accreditation of certification bodies, testing, verification and calibration laboratories; evaluating the quality of products and processes;understanding of the main methods of statistical control and quality management of industrial products and consumer goods;

3	Quality Systems	Professional competencies	**Know:** - the evolution of quality systems, the technology for the development and implementation of quality systems at the enterprise, information support for the quality system, the principle of building quality management systems according to MS ISO 9000, the rules for testing compliance confirmation, the rules for confirming the quality system and production; **Be able to:** - evaluate and analyze the existing quality system at the enterprise, develop and implement a quality system, plan an internal audit, carry out corrective and preventive actions, improve the quality system; **Own skills:** - implementation of systematic checks of standards and other normative documents accepted at the enterprise; - control over the performance of work on standardization of the enterprise division; - studying the systematization of advanced domestic and foreign experience in the development and implementation of quality systems;
Selectable Component			
3	Statistical methods for controlling the quality of products and processes / Industrial application of static methods for quality assurance	Professional competencies	**Know:** - quality control of products and process management; -methods of quality control; -basics of probability theory and various methods of statistical analysis and organization of product quality management; **Be able to:** - determine the quality of products; - use the method of statistical comparison of the histogram; - check the accuracy of the technological process; -use various methods of statistical control and product quality management at all stages of product movement, ensuring product quality that meets state standards and at the lowest cost; **Master the skills:** - application of Pareto charts,scatter plots, Ishikawa plots, histograms; - orderaccreditationbodiesoncertification, testing, verification and calibration laboratories; - evaluation of the quality of products and processes; -understanding of the main methods of statistical control and quality management of industrial products and consumer goods;
3	Databases and Expert Systems/Database Fundamentals	Professional competencies	**Know:** - structures and methods of database development; - basic definitions of informatics, basic and composite data structures used in computer technology; - the basics of the organization of modern computers and their general characteristics, trends

			in the development of computer devices and computer networks, principles for organizing the use of computer technology; **Be able to:** - use the terminology of the subject, the type of database and the method of its implementation, work in one of the database management systems and select the criteria necessary to create expert systems; - use modern software in their activities; **Master the skills:** - create databases and systems for ensuring product quality; - the main ways of analyzing and processing information using modern information technologies;
2	Fundamentals of calculation and design of building structures / Fundamentals of calculation of building structures	Professional competencies	**Know:**choice of design scheme, limit states, system of safety factors, calculation and design of building structures. **Be able to:** ensure compliance of the performed design work with the current regulatory documents on design; use regulatory documents, catalogs and other documentation necessary for the design; **Master the skills:** Organize their own activities, choose standard methods and methods for performing professional tasks, evaluate their effectiveness and quality.
			Know:the main requirements of the standards of the unified system of design and project documentation for construction for the design and preparation of architectural and construction drawings; **Be able to:** understand the design development of related parts of the project; perform all types of architectural and construction drawings at different design stages. **Master the skills:** Use information and communication technologies in professional activities.
3	Examination of the quality of goods / Examination of building materials	Professional competencies	**Know:**basic concepts of commodity science; objects, subjects and methods of commodity science; general classification of consumer goods, types, properties, range indicators; fundamental characteristics of goods; **Be able to:** recognize classification groups of goods; analyze the stages and stages of the technological cycle of goods; **Master the skill:** Have an idea: about the importance of discipline for professional activity, about consumer properties of food and non-food products, about the procedure for conducting an examination, about standardization, the main directions of its development.
			Know:the procedure for the development, coordination and approval of documents for new construction and reconstruction of facilities; procedures for conducting economic, environmental and technical expertise of real estate objects; **Be able to:** carry out separate sections of technical, environmental, economic expertise of buildings; draw up documentation for architectural and construction author's and technical

			supervision; issue a license for the required type of activity; conduct an examination of the quality management system. **Master the skill:**- the procedure for the development, coordination and approval of documents for new construction and reconstruction of facilities; types of expertise, rights of state non-departmental expertise; norms, documents and materials to be considered during environmental expertise
4	Designing the production of building materials / Fundamentals of the production of building materials	Professional competencies	**Know:**the main physical and mechanical properties of building materials, the technology of their manufacture, methods for increasing the efficiency of use; guiding normative documents of metrological support; building production standards; basics of metrology, standardization and certification in the field of production of building materials. **Be able to:**own and apply effective developments of leading research and design enterprises, analyze and select resource-saving technologies, waste-free production, comprehensively use local raw materials. **Master the skill:**general methodology of professional activity and development of professional creativity; have skills in handling modern technology, be able to use information technology in the field of professional activity;
			Know:types of building materials and products in accordance with the nomenclature, methods for designing new and optimizing the compositions of building materials adopted in production, used in practice and the latest technologies for the manufacture of concrete and reinforced concrete, ceramic, finishing, insulating materials and products, technological operations, technological equipment for production and installation of metal structures, international standards in the field of quality management **Be able to**: develop technological processes, perform technological calculations of production, draw up and carry out measures to adjust the technological parameters of production, material compositions in order to ensure or improve product quality, develop technological maps **Master the skill:** methods of quality control of raw materials and products at all stages of production of building materials and structures, assessment and quality control of construction and installation works
4	Labor protection / Labor activity	Professional competencies	**Know:**Knowledge of basic emergency procedures **Be able to:** Ability to create safe working conditions **Master the skill:** Legal and organizational issues of labor protection
4	International standardization and certification / Standardization and certification in the Republic of Kazakhstan	Professional competencies	**Know:**general principles and basic scientific provisions of standardization and certification; basic concepts, terms and definitions related to standardization and certification; indicators of the level of product quality and the basics of its quality management; certification rules; principles of certification; **Be able to:**learn how to work with educational, methodological and reference

			literature corresponding to the topics included in the program. learn how to choose a scheme for conducting national certification of products based on certification. **Master the skill:** acquire practical skills in matters related to the development of national standards for international standards ISO / IEC. in matters related to the national certification system based on international certification.
			Know:ability to use: legal support, legal norms, legislative acts and the legal nature of standards; classification of normative documents and standards, principles and methods of building standards and normative documentation, rules for using them; the procedure for developing, passing and approving standards and other regulatory documentation **Be able to:**systems of obligatory and voluntary certification, legislative and normative documents. **Master the skill:**knowledge of the system of mandatory and voluntary certification, legislative and regulatory documents.

Table 3. List of modules included in the educational program

Module No.	Module name	List of disciplines included in the module	Block	Semester	Number of credits	form of control	Total credits modulo
M1	*Fundamentals of life safety*	Fundamentals of market economy and entrepreneurship / Psychology	KV OOD	2	3	Exam	3
M2	*Fundamentals of bilingual training*	Foreign language	OK OOD	one	5	Exam	twenty
		Foreign language	OK OOD	2	5	Exam	
		Kazakh (Russian) language	OK OOD	one	5	Exam	
		Kazakh (Russian) language	OK OOD	2	5	Exam	
M3	*functional literacy*	Information and Communication Technologies (in English)	OK OOD	one	5	Exam	5
M4	*natural disciplines*	Mathematics	OK DB	one	5	Exam	14
		Physics	OK DB	one	4	Exam	
		Electrical engineering / Fundamentals of the theory of electrical engineering	KV BD	4	5	Exam	
M5	*Standardization and certification, product coding*	Standardization and certification	OK DB	3	5	Exam	14
		Product identification and labeling / Product coding basics	KV BD	3	3	Exam	
		International standardization and certification/Standardization and certification in the Republic of Kazakhstan	KV PD	eight	6	Exam	

M6	*Modern*The history of Kazakhstan and the Kazakh model of interethnic tolerance and social harmony	Modern History of Kazakhstan	OK OOD	2	5	GE	thirteen
		Political science / Sociology / Culturology / Fundamentals of anti-corruption culture	OK OOD	2	eight	Exam	
M7	*Mechanics, graphics and materials science.*	Structural materials technology/Technological machines and equipment	KV BD	4	5	Exam	15
		Engineering graphics/Engineering graphics and descriptive geometry	KV BD	3	5	Exam	
		Theoretical mechanics/General mechanics	KV BD	5	5	Exam	
M8	*Professional languages*	Professional kaz. (Russian) language	OK DB	3	3	Exam	6
		Professionally oriented foreign language	OK DB	4	3	Exam	
M9	*Certification Quality*	Quality audit/System audit of product and service quality	KV BD	6	4	Exam	9
		Accreditation of certification bodies and testing laboratories / Accreditation system in the Republic of Kazakhstan	OK PD	3	5	Exam	
M10	*Economy of quality*	Economics of Quality, Standardization and Certification/Fundamentals of Quality in Standardization and Certification	KV BD	7	6	Exam	6
M11	*Measuring system*	General theory of measurements	OK DB	4	5	Exam	14
		Fundamentals of measurement in construction/Measurement in construction	OK DB	5	6	Exam	
		Fundamentals of calculation and design of building structures / Fundamentals of calculation of building structures	KV BD	4	3	Exam	
M12	*Normative documents*	Unified Documentation System/Unification and Standardization of Management Goods	KV BD	4	3	Exam	14
		Normative base of standardization and certification / Norm control of documents in standardization and certification	KV BD	5	5	Exam	
		Technical regulations for the safety of buildings and structures, building materials and products / Safety of building materials and products	KV BD	eight	6	Exam	

M13	*religious studies, Philosophy*	Philosophy	OK OOD	4	5	Exam	eight
		religious studies	OK OOD	5	3	Exam	
M14	*Technological processes and technologies*	Building structures/Structural materials in construction	KV BD	5	4	Exam	9
		Computer technologies in construction/Technologies in construction	KV BD	7	5	Exam	
M15	*Enterprise design Construction industry*	Processes and apparatus for the production of building materials / Production of building materials	KV BD	7	5	Exam	5
M16	*Management control methods*	Statistical methods for controlling the quality of products and processes/Industrial application of static methods	KV PD	6	6	Exam	eleven
		Databases and Expert Systems/Database Fundamentals	KV PD	5	5	Exam	
M17	*Documentation and packaging.*	Technology for the development of standards and regulatory documentation / Technology and design of building products	KV PD	eight	4	Exam	6
M18	*Fundamentals of Scientific Research*	Patent science/Patent and scientific and technical documentation	KV BD	6	4	Exam	4
M19	*Safety and expertise of building materials*	Examination of the quality of goods / Examination of building materials	KV PD	6	7	Exam	5
M20	*Production of building materials*	Designing the production of building materials / Fundamentals of the production of building materials	KV PD	7	5	Exam	9
		Technology of production of building materials / Equipment for the production of building materials	KV BD	7	4	Exam	
M21	*Labor activity*	Labor protection / Labor activity	KV PD	7	5	Exam	5
M22	*DVO*	Physical education	DVO	1, 2, 3, 4	eight	Differentiated offset	eight
M23	*Practice*	Educational	UP	2	one	Report	thirteen
		Internship	PP	4	2	Report	
		Internship	PP	6	2	Report	
		Internship	PP	eight	5	Report	

		Undergraduate practice	PP	eight	3	Report	
M24	*Final state certification*	State exam in the specialty	IA	eight	one	GE	3
		Writing and defending a thesis (project) or passing state exams in two major disciplines	IA	eight	2	Thesis	