APPROVING:
Rector of the EETI named after academician K.Satpayev
D.M.Sivaraksha
«26» March 2025

QUALITY MANAGEMENT SYSTEM

REGULATION

ON THE DEVELOPMENT AND USE OF ADDITIONAL EDUCATIONAL PROGRAMS (MINORS) IN THE EDUCATIONAL PROCESS FOR THE 2025-2026 ACADEMIC YEAR

Ekibastuz

The preface

1 DEVELOPED by the management service of the quality management system, standardization and norm control

2 INTRODUCED by the management service of the quality management system, standardization and norm control

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Content

1 Scope of application

This Regulation defines the implementation of major-minor programs at the Ekibastuz engineering and technical institute named after Academician K.Satpayev (hereinafter referred to as the Institute).

2 Regulatory references

These Rules use references to the following regulatory documents:

– Law of the Republic of Kazakhstan dated July 27, 2007 No. 319-III «On Education»;

– Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No.2. On the approval of the state mandatory standards of higher and postgraduate education (hereinafter – SES);

– Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 30, 2018 No.595. On approval of the Standard Rules of Higher and Postgraduate Education organizations;

– Order of the Minister of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No.152. On approval of the Rules for the organization of the educational process on credit technology of education in organizations of higher and (or) postgraduate education.

3 Basic concepts and definitions

academic debt – unsatisfactory results of an interim assessment in one or more disciplines (modules), practices, course projects (works), or failure to complete an interim assessment in the absence of valid reasons.

academic failure – the student's failure to fulfill the curriculum.

restoration is the resumption of educational relations with an individual who was expelled from the university before completing the bachelor's degree program.

A graduate – a person who has successfully completed his studies at an educational institution under a study program with a certificate of education.

The final certification of students (Qualification Examination) – a procedure conducted to determine the degree to which they have mastered the scope of academic disciplines and (or) modules and other types of educational activities provided for in the educational program in accordance with the state mandatory standard of the appropriate level of education;

An individual curriculum (IC) – a curriculum that is formed for each academic year by students independently with the help of an adviser based on the educational program and the catalog of elective subjects.;

educational activity – the activity of implementing educational programs.

learning – a purposeful process of organizing students' activities to acquire knowledge, skills, and competencies, gain experience in activities, develop abilities, gain experience in applying knowledge in everyday life, and motivate students to receive lifelong education.

intermediate certification of students – a procedure for assessing the level of academic achievements (knowledge, skills, and competencies) of students in accordance with the curriculum of a discipline after completing its study.

transfer is the transfer of a student from another educational organization that implements an educational program of the appropriate level to a university or from a university to another educational organization, the transition from one field of study to another within the university, from one form of study to another.

recalculation – the recognition of academic disciplines (modules), practices, course projects (works) mastered by the student before graduation, recognition of the grades (credits) obtained on them and their transfer to the documents on the development of the educational program of higher education upon restoration.

A student – an individual who is studying a bachelor's degree program.

Grade Point Average (GPA) – a weighted average assessment of the student's academic achievements over a certain period of time in the chosen program (the ratio of the sum of the products of credits to the digital equivalent of the final grade points for all types of academic work to the total number of credits for these types of work for a given period of study).;

An Advisor – a teacher who performs the functions of an academic mentor studying in the relevant educational program, assisting in choosing a learning path (forming an individual curriculum) and mastering the educational program during the study period.;

3.1 Designations

EMW – educational and methodical work;
QMS – quality management system;
UNT – unified national testing;
CT – comprehensive testing;
RO – the Registrar's office
HEI – higher education institution.
EP – educational program

4 General provisions

4.1 The main educational program is a Major, defines the main profile of the educational cycle in accordance with the curriculum of the educational program, but does not exclude the possibility for students to choose an additional Minor program.

4.2 Major – the main educational program (the main profile of the educational cycle in the main educational field).

4.3 Minor – an additional educational program, the disciplines of which form additional competencies. At the same time, these disciplines are not core to the training area, and they may be interrelated disciplines or unrelated to each other.

Features of Minor implementation:

4.4 Is studied in the second and subsequent courses;

4.5 Consists of several disciplines that are studied sequentially when they are interconnected, or in any academic period when they are not interconnected;

4.6 Each minor discipline can be studied in several modules;

4.7 The Minor «weighs» 15-20 credits;

4.8 Is included in the main part of the educational program (credits for minor subjects are included in 240 credits of the main program);

4.9 Is selected by the student of each educational program independently from the general list;

4.10 Is implemented by an educational program specialized for minor disciplines;

4.11 Are based on the principles of «prerequisites-post-requirements».

4.12 An educational program may recommend certain minors to its students, but it cannot prohibit a student from choosing any major from the suggested general list.

4.13 The reason for the refusal to study a minor may be the absence of previously studied specific training courses - prerequisites.

4.14 The selection conditions are formulated in the minor program.

4.15 After attending three classes, the student has the right to change his choice and choose another major.

A Minor – an additional educational program, the disciplines of which form additional competencies. At the same time, these disciplines are not core to the training area, and they may be interrelated disciplines or unrelated to each other.

Advantages of Minor:

1) Interdisciplinarity and expansion of competence horizons.

2) The subjects studied in the framework of the minor are included in the diploma, so it is evaluated by employers.

3) Forms a special worldview («not for school, but learning for life!»).

4) Helps to master additional competencies («this – a valuable employee»).

Appendix A

3	Formed competencies	Amount of credits	Module components			
			Discipline code	Name of disciplines	Brief course description	Form of control
«MODULE «Energy efficient design, technology of repair and reconstruction of construction objects»						
1	To master the methods of conducting qualitative analysis and the optimal choice of building materials, structures, machines, mechanisms and engineering systems Knowledge of the main regulatory, technical and legal framework in the field of engineering surveys, building design and construction, engineering systems and equipment, planning and development of populated areas Possession of methods for strengthening bases, calculating and designing foundations, buildings and structures, engineering systems based on automation and modeling tools Possession of technology installation, commissioning, testing and commissioning of structures, engineering systems and equipment of construction objects Forecasting the possibilities of using new technologies and energy-efficient solutions aimed at reducing the energy and material intensity of the construction industry	**5**	**EEST 3320**	**Energy-saving engineering systems technology**	Study of modern types of engineering systems and engineering equipment. Engineering systems of water, heat, electricity and gas supply, sewerage, ventilation, air conditioning in buildings and settlements, as well as temporary engineering networks of construction sites. Assessment of technical condition and operational characteristics of engineering systems. Studying the issues of rational use of energy resources and complex perception of economic and environmental problems of resource conservation.	Exam
2	Knowledge of labor protection requirements, industrial safety and environmental protection during construction and installation, repair and reconstruction of construction projects Possession of technology installation, commissioning, testing and commissioning of structures, engineering systems and equipment of construction objects Implementation of routine inspections, acceptance of work performed; preparation of technical documentation, instructions; carrying out activities to control the quality of construction work Ability to determine the method of reconstruction, repair of buildings and structures, and ownership of the method of technological design of certain types of repair work and reconstruction processes Possession of methods of organizational and technological design at the stage of project development: the project of the organization of construction, the project of work	**5**	**TRCW 3325**	**Technology of repair and construction works**	The study of the theoretical foundations and regulations for the practical implementation of the implementation of certain types of construction and installation works; determining the composition and significance of production and technical bases of repair and construction organizations; building overhaul tasks; organization of quality control, work performed, development of flow sheets for repair and construction work.	Exam

3	Possession of methods for strengthening bases, calculating and designing foundations, buildings and structures, engineering systems based on automation and modeling tools Knowledge of labor protection requirements, industrial safety and environmental protection during construction and installation, repair and reconstruction of construction projects Implementation of routine inspections, acceptance of work performed; preparation of technical documentation, instructions; carrying out activities to control the quality of construction work Ability to determine the method of reconstruction, repair of buildings and structures, and ownership of the method of technological design of certain types of repair work and reconstruction processes Possession of methods of organizational and technological design at the stage of project development: the project of the organization of construction, the project of work	**5**	**BRT 4330**	**Building renovation technology**	The study of the theoretical foundations of modern methods and regulations for the practical implementation of the implementation of construction work on the reconstruction of buildings. Diagnostics of the state of building structures, methods for improving the space-planning and design solutions of buildings, ways to strengthen the foundation of the building, repair or replace building structures.	Exam
MODULE «Information Systems»						
4	Develops information systems and their components in various subject areas using modern information and communication technologies and IT project management methods/ Develops efficient algorithms and program codes in modern programming languages	**5**	**PC 2207**	**Programming in C++**	Stages of software development. Programming style. Technical specification. Fundamentals of C++ language. C++ operators. Conditional statements. Branching and loops. Functions, pointers, references, arrays, strings, classes, and C++ objects.	Exam
5	Performs administration of information systems and computer networks in order to ensure uninterrupted functioning and information security/ Develops information systems and their components in various subject areas using modern information and communication technologies and IT project management methods	**5**	**ISP 3234**	**Information Security and Protection**	Develops professional competencies in comprehensive protection of information assets. Studies modern cyber threats (phishing, ransomware, APT attacks) and countermeasures, including designing protection systems (SIEM, DLP, IDS/IPS). Masters principles of vulnerability analysis, security models (Zero Trust, RBAC) and international standards (ISO 27001, NIST CSF, GDPR). Enhances skills in incident investigation (DFIR) and protection of distributed systems (cloud platforms, IoT devices). Contributes to creating sustainable information security systems that meet modern requirements for protecting critical infrastructure and digital assets.	Exam
6	Designs comprehensive architectures of IT systems, including hardware solutions and databases.Develops information systems and their components in various subject areas using modern information and communication technologies and IT project management methods	**5**	**DBIS 3216**	**Databases in information systems**	Develops competencies in database design, including ER modeling, normalization, and physical implementation. Teaches data storage, indexing, and protection technologies, princi-	Exam

					ples of big data processing, and Database Management System (DBMS) administration. Enhances skills for creating reliable and scalable information systems that meet the requirements of the digital economy and sustainable development.	
MODULE «Economics»						
7	The ability to use methods of mathematical information processing, theoretical and experimental research. Ability to search, analyze and evaluate information for the preparation and adoption of managerial decisions, willingness to bear responsibility for them. Ability to navigate in modern information flows and adapt to dynamically changing phenomena and processes in the global economy. Ability to apply the acquired knowledge to solutions in conditions of free entrepreneurial activity, work on economics, analysis and management.	**5**	**EFAIE 2308**	**Fundamentals of Artificial Intelligence in Economics**	Introduction to artificial intelligence and digital economy. Artificial intelligence in data analysis and forecasting. Artificial intelligence in business and management. Artificial intelligence and society. Careers in artificial intelligence and economics: what professions are related to artificial intelligence, what skills will be in demand in the future. Trends and the future of artificial intelligence in the economy: the development of autonomous systems, smart cities, digital platforms.	Exam
8	Ability to search, analyze and evaluate information for the preparation and adoption of managerial decisions, willingness to bear responsibility for them. Ability to give instructions, manage actions of other people, taking into account abilities, opportunities and motivation of employees. Be flexible and mobile in various conditions and situations related to professional activities. Possession of economic and organizational decision-making skills in conditions of uncertainty and risk	**5**	**PM 3219**	**Production management**	The purpose of the discipline is to give an idea of state, problems and prospects of effective organization of production and operational processes; to form students' theoretical knowledge and practical skills on the basic principles of production (operational) management, study of production organization methods; study of the principles of building organizational structure of a manufacturing enterprise; consideration of quality management and competitiveness in an enterprise; study of basic logistics training at domestic enterprises.	Exam
9	Possession of economic and organizational decision-making skills in conditions of uncertainty and risk. Ability to apply the acquired knowledge to solutions in conditions of free entrepreneurial activity, work on economics, analysis and management. Development of skills in working with documentary material, being able to systematize and analyze their content.	**5**	**CMC 4330**	**Crisis Management Company**	The purpose of the discipline is to form a holistic view of the concept of crisis management in a market economy based on the study of patterns of development of economic systems, theoretical foundations of crisis management, methodology of recognition, diagnosis, adoption and implementation of management decisions to prevent or overcome crisis of an organization, as well as students acquiring practical knowledge and skills to	Exam

					substantiate and evaluate anti-crisis management measures.	
MODULE «Mining»						
10	To master the methods of analysis, knowledge of the behavior patterns and management of the properties of rocks and the state of the massif in the processes of mining and processing solid minerals, as well as in the construction and operation of mining enterprises. To be proficient in analyzing mining and geological conditions in the exploration and production of solid minerals, as well as in the construction and operation of mining facilities. Master the methods of rational and integrated development of the georesource potential of the subsoil. Willingness to carry out technical management of mining and blasting operations in the operational exploration, extraction of solid minerals, construction and operation of mining facilities, and to directly manage processes at production facilities. Possession of knowledge of processes, technologies and mechanization of open mining and blasting operations. Ability to substantiate the main parameters of the open pit, opening of the open pit field, open pit mining systems, mining mode, technology and mechanization of open pit mining, accident prevention methods and ways to eliminate their consequences.	**5**	**TCMOM 4326**	**Technology of complex mechanization of open-pit mining**	General regularities of the organization and production of open-pit mining on the basis of their complex mechanization for all periods of existence of the mining enterprise; opening of working horizons of quarries, providing freight transport links between the faces and points of reception of rock mass; movement of overburden and minerals from the massif to their destination.	Exam
11	Willingness to use scientific laws and methods in the geological and industrial assessment of deposits of solid minerals. To master the methods of analysis, knowledge of the behavior patterns and management of the properties of rocks and the state of the massif in the processes of mining and processing solid minerals, as well as in the construction and operation of mining enterprises. To be proficient in analyzing mining and geological conditions in the exploration and production of solid minerals, as well as in the construction and operation of mining facilities. Master the methods of rational and integrated development of the georesource potential of the subsoil. Demonstrate the skills to develop action plans to reduce the technogenic load of production on the environment during operational exploration, mining and processing of solid minerals, as well as during construction and operation of mining facilities. Ability to design environmental activities.	**5**	**RSLWT 4327**	**Resource-saving and low-waste technologies**	Study of nature conservation and rational use of natural resources, disturbance of lands allocated for open-pit mining, regulatory indicators for determining loss and dilution of ores, identifying the most resource-saving technologies during mining, ways of involving the development of poorer deposits with low content of useful components work at great depths, the introduction of internal dumping.	Exam
12	To master the methods of analysis, knowledge of the behavior patterns and management of the properties of rocks and the state of the massif in the processes of mining and processing solid minerals, as well as in the construction and operation of mining enterprises. To be proficient in analyzing mining and geological conditions in the exploration and production of solid minerals, as well as in the construction and operation of mining facilities. Willingness to carry out technical management of mining and blasting operations in	**5**	**ASC 4328**	**Array state control**	Mining-geological, hydrogeological, and gas-dynamic factors that form the structure, type, and condition of the rock mass containing reservoir deposits. Physical processes occurring in the massif during mining of mineral deposits. Methods for determining the stress state of a rock mass and the reference pressure in mine workings. Methods for managing the condition of a rock mass in various	Exam

	the operational exploration, extraction of solid minerals, construction and operation of mining facilities, directly manage processes at production facilities. The ability to determine the spatial and geometric position of objects, to perform the necessary geodetic and surveying measurements, process and interpret their results. Ability to substantiate the main parameters of the open pit, opening of the open pit field, open pit mining system, mining mode, technology and mechanization of open pit mining, accident prevention methods and ways to eliminate their consequences. Ability to design environmental activities.				mining systems that ensure the safety and efficiency of mining operations.	
MODULE «Technological machines and equipment»						
13	Possession of methods of experimental verification of equipment and means of technological support. Ability to apply methods to solve logistic problems, manage material flows in the areas of production and circulation. The ability to choose the most economical types of transport, to calculate the performance of the selected type of transport, its inventory, types and amount of necessary repairs.	**5**	**TEC 4330**	**Tunneling equipment and complexes**	Discipline about modern equipments and complexes, production processes with open and underground mining of minerals; know the economic feasibility of applying various methods of mining; the environmental impact of mining and its environmental impact.	Exam
14	Willingness to participate in the research of objects of professional activity and their structural elements. The structure and properties of materials, the main technological methods of forming blanks and machine parts, get acquainted with the possibilities of modern production and development prospects. Possession of methods of experimental verification of equipment and means of technological support. The ability to make technological maps of the repair of mining machines; adapt to real working conditions in various mining and geological environments, draw up project documentation, process maps, working drawings; choose the best solutions for engineering and production problems. Effectively use knowledge and skills in the field of operation and repair of mining and smelting equipment, life safety, environmental protection, labor protection, use of computer science, business economics, and environmental management.	**5**	**IOTM 4331**	**Installation and operation of technological machines/ for mining production**	Basic information related to the installation, operation and maintenance of technological machines and equipment used in the mining industry. Systems for the installation of technological machines, assembly and installation technology, systems for the operation and management of maintenance and repair of electromechanical equipment, methods of technical diagnostics. Organization of work during maintenance, conducting work by safe methods.	Exam
15	Have the skills to handle modern technology, the ability to use information technology in the field of professional activity. Have the skills to acquire new knowledge necessary for daily professional activities and continuing education in the magistracy. The ability to solve problems of professional activity on the basis of information and bibliographic culture using information and communication technologies and taking into account the basic requirements of information security. Possession of methods of experimental verification of equipment and means of technological support. The ability to make technological maps of the repair of mining machines; adapt to real working conditions in various mining and geological conditions, draw up project documentation, process maps, working drawings; choose the best solutions for engineering and production problems. The ability to choose the most economical types of transport, to calculate	**5**	**RTM4332**	**Repair of technological machines**	The system and methods of solving production problems in the repair of technological machines and equipment. Study of rational ways to restore machines, drawing up technical documentation for performing repair work. Classification of types of repairs, engineering support of repairs, technology and mechanization of repairs, repair of technological machines and equipment.	Exam

	the performance of the selected type of transport, its inventory, types and amount of necessary repairs. The ability to design technological processes for the assembly of machines and the manufacture of parts for mechanical engineering, to analyze technical conditions and standards of accuracy, based on the service purpose of machines. Have skills in applying the methods of developing technological processes for assembling machines and manufacturing parts of any type under single, serial and mass production, be competent in developing technological processes for machining standard machine parts under single, serial and mass production.					
MODULE «Electricity»						
16	To know the requirements of safety rules, labor protection and the ability to use them in practice; To know the types and features of electrical networks and systems, overhead lines; To know the basic equipment of relay protection and automation; To apply the principles of construction of schemes of electric power systems; Reflection of the modern scientific-theoretical and practical level of research of the problems under consideration, conducted by scientists, analysts, practitioners.	**4**	**Ele 2211**	**Electroenergetics**	The discipline "Electric Power Engineering" is aimed at studying the fundamentals of production, transmission and distribution of electric energy for sustainable and safe energy supply. Particular attention is paid to energy technologies, energy efficiency issues, environmental safety and innovations that meet the principles of sustainable development.	Exam
17	To be flexible and mobile in various conditions and situations related with professional activities; To be able to use the physical and mathematical apparatus for solving problems arising in the course of professional activity; Choose to electric machines and transformers for the specific conditions of practice; To know the types and features of electrical networks and systems, overhead lines; To be able to use modern computer technology to solve problems of design, analysis of modes and operation of electrical networks and systems.	**6**	**ENS 3219**	**Electrical networks and systems**	General information about electrical networks and systems. Design, models, parameters and characteristics of the elements of electrical networks. Calculation of the established normal and post-accident modes of electric networks of various configurations. Power balances in the electric power system. Regulation of voltage and frequency in the electric power system. Calculation of power and electricity losses in elements of EPS. Technical and economic fundamentals of designing electrical networks. The choice of circuit configurations and the main parameters of electrical networks.	Exam
18	To possess basic knowledge in the field of general theoretical disciplines that contribute to the formation of the foundations of the scientific worldview, the development of logical thinking, the ability to analyze physical processes, the ability and willingness to participate in the development of modern theoretical and experimental research methods; Choose to electric machines and transformers for the specific conditions of practice; To know the types and features of electrical networks and systems,	**6**	**EPSS 3220**	**Electrical part of stations and substations**	General information about power plants and substations. Measuring transformers. Designs, parameters and characteristics of electrical conductors. High and low voltage devices. Power transformers. Synchronous generators and compensators.	Exam

	overhead lines; To be able to use modern computer technology to solve problems of design, analysis of modes and operation of electrical networks and systems; To know the basic equipment of relay protection and automation.					
MODULE «Thermal power engineering»						
19	Own different types of calculation of heat exchangers, flow of liquids and gases, and heat transfer; To own methods of calculation of hydraulic, aerodynamic and heat of various machines and ustroit used in the fuel and energy complex.	**4**	**MLG 2213**	**Mechanics of liquids and gases**	It is studied with the aim of developing knowledge about the basic skills for obtaining methods of hydraulic and aerodynamic calculations of heat and power equipment, fluid dynamics equations, similarity theory and modeling for considering flows in pipes and flow around bodies, studying the laws of motion and equilibrium of incompressible and compressible fluids.	Exam
20	Own different types of calculation of heat exchangers, flow of liquids and gases, and heat transfer; To own methods of calculation of hydraulic, aerodynamic and heat of various machines and ustroit used in the fuel and energy complex.	**6**	**TDTPE 3215**	**Thermodynamics in thermal power engineering**	Formation of knowledge and practical skills in obtaining, converting, transferring and using thermal energy, as well as the correct choice and operation of thermal equipment with maximum savings in thermal energy resources and materials, intensification of technological processes.	Exam
21	Possession of skills in acquiring new knowledge necessary for daily professional work and continuing education in the magistracy; Possessionof basic knowledge in the field of General theoretical disciplines that contribute to the formation of the foundations of the scientific worldview, the development of logical thinking, the ability to analyze physical processes, the abilites and readiness to participate in the mastering modern theoretical and experimental methods of research; Evaluate production and non-production costs to ensure a given level of product quality, taking into account international standards; Own methods of calculation of energy consumption by various consumers of the industrial area.	**4**	**TPP 4328**	**Thermal power plants**	Formation of information about the device, purpose and designs of equipment of thermal power plants, methods of aerodynamic, hydraulic, thermal and strength calculations of equipment of thermal power plants, methods of accounting for thermal and electrical energy and limitation, regulation of coolant parameters.	Exam
MODULE «Metallurgy						
22	Choose charge materials that optimally improve the quality of finished metal products. Use modern methods of calculation in the technology of metallurgical production. Evaluate the effectiveness of typical and integrated modes of obtaining various metals and alloys know the basic equipment	**5**	**TTMP 3213**	**Theory and technology of metallurgical production**	It covers the fundamentals of the theory of metallurgical production, including the processes of obtaining and processing ferrous and non-ferrous metals. Modern technological schemes, designs of metallurgical aggregates, thermodynamics and kinetics of reactions, slag formation, gas exchange, as well as issues of product quality management are considered.	Exam

					The course focuses on sustainable development issues.: reducing the negative impact of metallurgy on the environment, rational use of natural resources, recycling of metallurgical waste, and the introduction of waste-free and energy-efficient technologies.	
23	Analyze technical documentation on the technology of producing metals and alloys of ferrous and nonferrous metallurgy. Solve technical problems in the technology of producing high-quality metals and alloys Solve technical problems. Use modern methods of calculation in the technology of metallurgical production. Ability to develop and adjust technological schemes for the production of ferrous metals and alloys, considering energy efficiency and environmental safety requirements	**5**	**FM 3217**	**Ferrous metallurgy**	The study of various processes, such as melting, refining, rolling and heat treatment, aimed at obtaining metals with the necessary physico-chemical properties for further use in various industries, construction, mechanical engineering, energy and other field	Exam
24	Use measurement tools in various practical areas. To be able to put into practice theoretical knowledge in physico-chemical studies of metallurgical processes. Choose equipment for specific conditions of practice (work) at metallurgical facilities. Use modern methods of calculation in the technology of metallurgical production	**5**	**TtehPM 4324**	**Theory and technology for producing non-ferrous metals**	The study of the processes of extraction of non-ferrous metals from ores, their purification, refining and processing into high-quality products with the necessary properties. Non-ferrous metals such as copper, aluminum, lead, zinc, nickel, titanium and others play an important role in modern industry due to their unique physico-chemical properties such as high conductivity, lightness, corrosion resistance and others.	Exam
MODULE «Transport equipment maintenance and repair system»						
25	Have general understanding of the methods of research and design schemes of mechanisms necessary to create machines, installations, instruments, automatic devices and complexes that meet the requirements of efficiency, accuracy, reliability and efficiency	**5**	**FACT 3214**	**Fundamentals of Automatic Control Theory**	The main tasks of the theory of automatic control; mathematical models; research methods for linear systems; research methods for nonlinear systems; stability of the automatic control system; quality of automatic control systems; random impacts in linear systems; optimal control problems; current trends in the development of control systems	Exam
26	To know the pattern of changes in technical condition of transport equipment arising under the influence of various factors in the course of its operation; To be able to develop and apply sound methods to maintain transport equipment in technically sound condition Determine optimal parameters of reliability and optimal performance indicators of transport equipment and, forecast and plan rational operating and maintenance conditions on the basis of them Able to recognize the theoretical foundations of the reliability of transport	**5**	**RTE 3221**	**Reliability of transport equipment**	The study of methodological approaches to solving the issues of ensuring the required level of reliability of transport equipment, based on a system approach that involves the presentation of the machine as a technical system and a process of ensuring reliability as a system logic and tools used. Modules: General information about the reliability of transport equipment.	Exam

	equipment; methods of ensuring the reliability of transport equipment; principles and methods of managing the reliability of transport equipment in operation				General information about the tribotech. Reliability studies in the operation of transport equipment. Reliability of the complex system	
27	Know the requirements of safety regulations, labor protection and ability to use them in practice Ability to ensure safe working conditions at transport enterprises, to assess occupational risks, and to implement preventive measures against occupational injuries and emergency situations.	**5**	**LST 4227**	**Labor safety in transport**	Legislative and legal framework in the field of labor protection and safety in transport. Nature of hazardous and harmful production factors in the processes associated with production, installation, operation and repair of transport equipment. Order of operation, repair and storage of means of protection of people from dangerous and harmful production factors at transport enterprises. Theoretical foundations of human life safety in transport	Exam
MODULE «Organization of transportation and transport logistics»						
28	Use the obtained theoretical knowledge when: choosing the type of transport, types of rolling stock, loading and unloading machines and devices, means of packaging, modes of transportation and storage, registration of transportation documents and non-security transportation, conducting examinations, ensuring the safety of transported goods and traffic safety	**5**	**IMT 3216**	**Interaction modes of transport**	Forms of interaction of modes of transport; general patterns of development of technical means and operation of modes of transport; features of modes of transport in a single transport system; technical and operational characteristics of modes of transport. Coordination of the work of transport hubs, the study of relevant documentation, coordination of directions of movement.	Exam
29	Knowledge of the basics of the legal system and legislation of Kazakhstan Know the rules and systems for licensing and certification in transport, the forms of licenses and certificates, and the rules for issuing them	**6**	**BLCT 4224**	**The basics of licensing and certification on transport**	The content of licensing and certification; types of licensing and certification of enterprises, equipment, vehicles, activities, personnel services, legislation and regulations on licensing and certification; methods and procedure for licensing and certification; features of certification and licensing of the transportation process, other activities and services of transport enterprises and organizations.	Exam
30	Know the requirements of safety regulations, labor protection and ability to use them in practice Ability to ensure safe working conditions at transport enterprises, to assess occupational risks, and to implement preventive measures against occupational injuries and emergency situations.	**5**	**LST 4227**	**Labor safety in transport**	Legislative and legal framework in the field of labor protection and safety in transport. Nature of hazardous and harmful production factors in the processes associated with production, installation, operation and repair of transport equipment. Order of operation, repair and storage of means of protection of people from dangerous and harmful production factors at transport enterprises. Theoretical foundations of	Exam

					human life safety in transport	
«MODULE «Automation and control»»						
31	Is able to participate in the organization of acceptance and development of the equipment, technical means and systems of automation, control, diagnostics, tests and management put into operation. Able to determine the range of parameters of technological processes to be monitored and measured. Able to perform verification and debugging of systems and means of automation of technological processes. Ability to choose technologies, tools and computer facilities in the organization of the processes of design, manufacture, control and testing of products, automation tools and systems, control, diagnostics, testing, production management, product life cycle and quality.	**5**	**ICM 3218**	**Industrial controllers and microcontrollers**	The composition of software and hardware complexes. Microprocessor control controllers. Industrial controllers in the structure of automated process control systems. Industrial controller networks. Switches, hubs, integrators. Industrial tires, methods of implementation in automated process control systems. Representation of serial data transmission interfaces in automated control systems. Full-scale distributed control systems. Software development tools in the IEC 61131-3 languages. Graphical programming languages. Text-based programming languages	Exam
32	Ability to solve standard tasks of professional activity on the basis of information culture with the use of information and communication technologies and taking into account the basic requirements of information security. The ability to use modern information technology, technology, software applications in solving problems of professional activity. The ability to use modern information technology in the design of products, production. Able to choose methods and means of measuring the performance of equipment, tools and systems of automation, control, diagnostics, testing and management, configuration and maintenance: system, tool and application software of these tools and systems	**5**	**CI 4227**	**Cybersecurity in industry**	Develops skills in protecting industrial systems from cyber threats by studying vulnerability analysis, malware detection, and attack prevention methods. Masters real-time security monitoring technologies, including identifying exploits and minimizing denial-of-service risks. Develops the ability to design data protection and privacy systems, taking into account the legal and ethical aspects of cybersecurity. Introduces approaches to ensuring the sustainability of critical infrastructure, which helps reduce the environmental and economic risks associated with cyberattacks. Develops competencies in the field of creating reliable security devices and strategies for responsible use of digital technologies. The discipline explores solutions aimed at building trust in industrial systems, supporting the stability of production processes, and adapting to global challenges such as climate change and digital transformation.	Exam
33	It is able to collect and analyze initial information data for the design of automation tools and systems. Is able to participate in the organization of acceptance and development of the equipment, technical means and systems of automation, control, diagnostics, tests and management put into operation. It is able to accumulate scientific and technical information, domestic and foreign experience in the field of automation of technological processes and production. Able to choose methods and means of measuring the performance of equipment, tools and systems of automation, control, diagnostics, testing and management, configuration and maintenance: system, tool and application software of these tools and systems	**5**	**TMAC 3217**	**Technical means of automation and control**	Develops skills in working with automation equipment by studying methods of collecting data on the state of control facilities and transmitting commands for their regulation. Masters the design of systems based on programmable controllers and microprocessors, developing the ability to create solutions that optimize energy consumption and reduce the environmental impact of industrial processes. It implements automatic control technologies aimed at the rational use of resources, which corresponds to the objectives of the transition to clean energy and sustainable infrastructure.	Exam

					Studies the integration of technical means into production chains that minimize waste and support responsible consumption. Develops competencies in the field of management digitalization, contributing to reducing the carbon footprint and adapting industrial systems to climate change.	

The list of registration of changes, additions and revisions of the document

Change №	Date of amendment, addition and revision	Page numbers	The document on the basis of which the changes were made and the revision was carried out	Summary of the change	Signature of the person who made the change
1	2	3	4	5	6