

AGREED

Director of the branch of JSC " NC "" KTZ " –

"Almaty branch of the backbone network"

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CATALOGUE OF DISCIPLINES OF AN ELECTRIC COMPONENT

EDUCATIONAL PROGRAM

6B07128 - Railway track and track management

Education level: bachelor's degree

Duration of study: 4 years

Year of admission: 2024 y.

Cycle	Component	Name of the discipline	Total labor intensity		Semester	Learning Outcomes	Brief description of the discipline	Prerequisites	Post-requisites
			academic hours	academic credits					
1	2	3	4	5	6	7	8	9	10
OOD	KV	Ecology and life safety	150	5	3	PO4	The discipline studies the main approaches to solving environmental problems, ensuring safe life, sources and types of pollutants in construction production, methods for reducing emissions of harmful substances into the environment, natural and man-made emergencies, their causes, methods of prevention and protection, carrying out environmental protection, rescue and other emergency work, rules of conduct for people in extreme conditions.	Biology, self-knowledge (school course)	Occupational safety, Final certification
		Methods of scientific research				PO3	The discipline provides knowledge and ideas about the content of scientific activity, its methods and forms of knowledge. The theoretical and applied knowledge obtained by students on the methods of scientific research of problems in the studied area instills in future specialists the skills of cognitive activity in the field of science.	Module of socio-political knowledge (Sociology, Political Science, Cultural Studies, Psychology)	Final certification
		Economics				PO1.4	The discipline studies the activities of enterprises in various	History of	Management

		business activity					types of market, the model of equilibrium and market functioning, state regulation of prices and tariffs. Considers the concept of entrepreneurship and the limits of its legal regulation, conditions for the development of entrepreneurship, organizational and legal forms of doing business, businessplanning, business secrecy, social responsibility of entrepreneurship.	Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural studies, Political Science, Psychology	
		Fundamentals of law and anti-corruption culture				RO7	The discipline sets out the fundamental concepts of law, the constitutional structure of state power of the Republic of Kazakhstan, the rights and freedoms of citizens enshrined in the Constitution, the mechanism and protection of legitimate human interests if they are violated. The discipline provides students with an increase in public and individual legal awareness and legal culture, as well as a system of knowledge and civic position on combating corruption as an anti-social phenomenon. Active learning methods - analysis of specific situations, brainstorming.	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional Foreign language, Sociology, Cultural Studies, Political Science, Psychology	
BD	KV	Theoretical mechanics	180	6	3	RO8	Formation of scientific engineering thinking, familiarization with the basic concepts, laws and theorems that allow you to create equations describing the behavior of mechanical systems, the ability to write down a specific phenomenon in mathematical form, the application of basic methods of mechanics in the study of motion and equilibrium of mechanical systems in the study of professional disciplines.	Engineering mathematics, Applied Physics.	Material resistance, Engineering Mechanics 2, Construction Mechanics, Engineering Mechanics 2
		Engineering Mechanics 1				RO8	Formation of logical thinking and scientific foundation of engineering education. Study of the laws of motion and equilibrium of material bodies, construction of mathematical models of behavior of mechanical systems using theorems of mechanics. Application of methods for studying the equilibrium and motion of mechanical systems for solving technical problems.	Engineering mathematics, Applied physics	Material resistance, Engineering Mechanics 2, Construction mechanics, Engineering Mechanics 2

BD	KV	Material resistance	180	6	4	PO8	Formation of fundamental knowledge in the field of calculations of structural elements for strength, rigidity and stability, development of computational and experimental bases and practical methods for calculating structures under the condition of reliability, durability, economy, taking into account the mechanical properties of structural materials and the ability to design according to strength criteria, correctly assessing the limit state, conduct verification and design calculations using modern educational and information technologies.	Engineering mechanics 1, Geology and soil mechanics,	Construction mechanics, Engineering mechanics 3, Track, construction machinery and equipment, Track management Mechanization
		Engineering mechanics 2				RO, 8	Introduce basic techniques for determining internal forces and stresses for each type of deformation, methods for calculating structures and their elements for strength, rigidity and stability, research skills loads, displacements and stress-strain state in structural elements, construction of design schemes for machine parts and product calculations to meet the requirements of reliability and efficiency under the influence of static and dynamic loads.	Engineering mechanics 1 Geology and soil mechanics, foundations and foundations	Construction mechanics, Engineering mechanics 3, Track, construction machinery and equipment, Track management Mechanization
BD	KV	Construction mechanics	180	6	4	PO8	Studies basic methods for calculating structural elements and structures for strength, rigidity and stability, perform calculations of load-bearing elements of transport structures and structures for strength, rigidity, stability and durability, taking into account the time-varying mechanical properties of the materials used, it is necessary to choose the right structural forms and materials that provide the required indicators of reliability, safety and efficiency of both operated and created structures and structures.	Engineering Mathematics, Applied Physics1,2, Engineering Mechanics 1,2	Railway construction technology, Railway construction technology, Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport structures
		Engineering mechanics 3				PO8	Studies the theoretical foundations and methods of calculations for strength, rigidity and stability of structural elements of transport structures, the main types of mechanisms, parts and assemblies of machines, general principles of design and construction, construction models and	Engineering mathematics1,2, Applied Physics1,2, Engineering mechanics 1,2	Технология Railway construction technology, Railway construction technology, Organization of

							algorithms for calculating products based on the main performance criteria when evaluating the reliability of operating equipment under operating conditions.		construction of transport infrastructure facilities, Organization and planning of construction of transport structures
BD	KV	Geology, soil mechanics, foundations and foundations	180	6	3	PO5	The discipline studies the basic laws of soil behavior under load, stress-strain theory conditions and their interactions with structures, basic methods for determining foundation sediments, slope and slope stability, morphology, dynamics, and regional features of the upper horizons of the Earth's crust (lithosphere) and their relationship with engineering structures (elements of the technosphere).	Applied Physics 1. Applied Physics 2. Engineering Mathematics 1. Engineering Mathematics 2.	Engineering geodesy
BD	KV	Fundamentals of Geoinformatics				PO3	Studies the history of the development of geoinformation systems (GIS), basic concepts and terms, general issues of geoinformatics, application technologies in the subject areas of professional activity, the current state of GIS technical, software and information support, forms an idea of the features of GIS creation, hardware and software, applied GIS for the development of GIS systems. applications in business, management, science and technology.	Applied Physics 1. Applied Physics 2. Engineering Mathematics 1. Engineering Mathematics 2.	Engineering geodesy
BD	KV	Fundamentals of designing transport structures	180	6	2	PO3	Develops knowledge and skills in using computer-aided design tools for artificial structures using the AutoCAD software package, designing communication routes, basic elements of highways, basic elements of airfields and airports, bridges and transport interchanges, teaches you to work in text editors and spreadsheet editors in the following areas: in order to implement rational design principles for transport structures.	Engineering Mathematics 1,2, Applied Physics 1,2, Engineering Mechanics 1,2,3	Artificial structures on railways Railway surveys and design, Modernization of railway lines, Reconstruction of railways
		Introduction to the design of transport infrastructure				PO3, PO6	Principles and methods of graphic and geometric modeling of engineering problems, general requirements of the ESKD, SPDS and	Engineering mathematics 1,2, Applied Physics 1,2, Engineering	Artificial structures on railways Research and design of

		objects					other regulatory documents standards for the execution and design of drawings, modern methods of automating graphic works, the possibility of automated creation of geometric models of spatial objects and drawing. Creating 2D and 3D models in the framework of graphic systems (Compass 3D, Solidworks). The discipline provides software training, computer modeling and practical analysis of results.	mechanics 1,2,3	railways, Modernization of railway lines, Reconstruction of railways
BD	KV	Track, construction machinery and equipment	180	6	6	RO10	Study of track structures, construction machinery and equipment, their technical capabilities when used for renovation, repair and current maintenance of the upper structure of the track, small artificial structures, during the construction of railways; small-scale mechanization equipment, energy support for track and construction, as well as various types of loading and unloading and transport operations; machines and mechanisms for monitoring the state of the geometric parameters of the rail track and rail flaw detection. The discipline uses interactive teaching methods.	Ecology and life safety, Engineering geodesy, Construction materials, Electrical engineering and fundamentals of electronics	Switches and blind intersections, Technology of railway track repairs, Organization of current maintenance of the railway track, Production practice1, 2
		Mechanization of track management				RO10	Study of designs, theory and calculations of track machines received in the track management of JSC NC " Kazakhstan Temir zholy "" application for repairing and maintaining the roadbed, ballasting and lifting the track, cleaning crushed stone, assembling, disassembling and laying the rail grid, compacting and stabilizing the ballast layer, straightening and finishing the railway track, as well as diagnostic tools and equipment for monitoring the geometry and condition of the rail track, cleaning the track from snow.	Ecology and life safety, Engineering geodesy, Construction materials, Electrical engineering and basic electronics	Switches and blind intersections, Technology of railway track repairs, Organization of current railway track maintenance, Production practice1, 2
BD	KV	Managerial economics	90	3	6	RO1	Formation of the conceptual framework and development of economic analysis skills using modern models and laws of economic science, consideration of economic problems and tasks facing the head of the company. Studying this discipline will allow students to gain and develop knowledge in the field of analytical	Engineering mathematics, Fundamentals of economics and entrepreneurship	Organization of construction of transport infrastructure facilities, Organization and

							research of economic, technological and technical parameters of the enterprise, as well as to master the skills of applying special methods of economic justification of management decisions and assessing their consequences.		planning of construction of transport structures, Modernization of railway lines, Reconstruction of railways
BD	KV	Time management	90	3	6	RO1	The discipline studies a system of methods, tools and approaches that are aimed at effective time management in order to achieve the tasks set. The course is designed to improve the skills of organizing and optimizing the use of working time, increase productivity, reduce stress, plan, delegate, use tools and technologies, and know your time and energy rhythms in order to use your time effectively.	Economics entrepreneurship. Fundamentals of financial literacy. and of	Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport structures, Modernization of railway lines, Reconstruction of railways
BD	KV	Fundamentals of financial literacy	90	3	5	PO1	Formation of general functional economic and financial literacy, mastering methods and tools of economic and financial calculations for solving practical problems	Engineering mathematics, Applied Physics.	Managerial economics. Time management.
BD	KV	Critical thinking	90	3	5	PO10	The discipline studies forms and techniques of rational cognition, creating a general idea of logical methods and approaches used in the field of professional activity, and developing practical skills of rational and effective thinking.	Engineering Mathematics, Applied Physics.	Managerial economics. Time management.
PD	KV	Railway construction technology	180	6	7	RO10	Study of the regulatory, technical and technological foundations of railway construction, the main provisions of regulatory and technical documents on construction production, methods for designing the production of certain types of work on the construction of a railway line section, taking into account the regional physical, geographical and natural-climatic features of the main	Building materials, Artificial structures on railways, Railway track construction, Track, construction machinery and equipment, Track management Mechanization	Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport structures,

							network. The methods of training are interactive form of training: analysis of specific situations, project method. As part of the discipline, there are field classes in the department's branch and guest lectures by top managers.		Reconstruction of railways, Modernization of railway lines
		Railway construction technology				RO10	Study of the main provisions of railway construction technology and mechanization, composition of construction works and processes, methods of design and development of technological processes for the construction of railway roadbed, track laying, track ballasting, construction of contact network supports for electrified sections of the main network. The teaching methods are interactive forms of learning: analysis of specific situations, project method. As part of the discipline, there are field classes in the department's branch and guest lectures by top managers.	Construction materials, Artificial structures on railways, Railway track construction, Track, construction machinery and equipment, Track management Mechanization	Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport facilities, Reconstruction of railways, Modernization of railway lines
PD	KV	Organization of construction of transport infrastructure	facilities 180	6	8	PO4, PO6	Development of a system view about construction processes and types of work, the principles of their implementation, the requirements for organizing the work of a working link or team, in compliance with the requirements of safety and environmental protection, the fundamental principles of planning, industriality, complex mechanization and automation of production, the flow of construction, all seasonality of work.	Construction materials, Artificial structures on railways, Railway track construction, Track, construction machinery and equipment, Track management Mechanization	Modernization of railway lines, Reconstruction of railways, Production practice 2.
		Organization and planning of construction of transport structures				RO4, RO6	Studies the use of advanced technologies and organization of construction and installation works that reduce labor costs material and energy costs in compliance with the requirements of state standards, the order of execution of preparatory, main and final works for the construction of transport facilities and commissioning of facilities, the needs of materials, equipment, labor, and completion dates. Within the framework of the discipline, the calculation and analytical method is used.	Construction materials, Artificial structures on railways, Railway track construction, Track, construction machinery and equipment, Track management Mechanization	Modernization of railway lines, Reconstruction of railways, Production practice 2.
PD	KV	Modernization of railway lines	180	6	7	PO3, PO5	Study of the technical condition of operated railways with the solution of problems to	Artificial structures on railways, Surveys and	Production practice 2, FINAL

						increase the capacity and carrying capacity using new techniques in the context of changes in regulatory requirements and structures of the upper structure of the track, the type of traction, modernization of rolling stock for modern operating conditions of the main network. Active learning methods are used-situational tasks, project method, case method. Within the framework of the discipline, visiting classes in project organizations and guest lectures by top managers are provided.	design of railways, Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport structures	CERTIFICATION
		Reconstruction of railways			RO1, RO3	Study of the main technical parameters and means of technical equipment, plan and profile of the railway in operation, their reconstruction to comply with building codes and regulations when train speeds increase, traffic increases, and the road capacity is gradually increased based on economic and technical indicators. Active learning methods are used-situational tasks, project method, case method. Within the framework of the discipline, visiting classes in project organizations and guest lectures by top managers are provided.	Artificial structures on railways, Railway surveys and design, Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport structures	Production practice 2, FINAL CERTIFICATION

Head of the Department of "Construction Engineering"



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