

APPROVED:

Director of the branch of JSC "NC" "KTZ"  
"Almaty branch of the backbone network"  
Zheksenbiev A.T

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«Логистика және көлік академиясы» АҚ

APPROVED: «инженерия» институты

Director of the Institute

Transport Engineering

Chigambayev T.O.

«28»



### CATALOG OF DISCIPLINES OF THE COMPONENT BY CHOICE

EDUCATIONAL PROGRAM

6B07323- Railway construction, track and track facilities

Education level: Bachelor's degree Duration of study: 4 year Year of admission: 2023

Module	Cycle	Component	Name of the discipline	Total labor		Term	intensity Semeste rResults of training of training	Short description	of the discipline	Prerequisites	Post require ments Departm ent
				acade mic hours	acade mic credit s						
1	2	3	4	5	6	7	8	9	10	11	12
Module 1- Natural Sciences disciplines	GED	KV	Ecology and lifesafety- life safety	150	5	3	PO5	Study of basic environmental concepts environmental problems and approaches to their solution, sources and types of environmental pollution by enterprises, principles of regulating the quality of atmospheric air and water, main provisions of legislation in various fields, natural and man-made emergencies, their causes, methods of prevention and protection. Teaching methods - analysis of specific situations (case-study).	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural studies, Political Science, Psychology	Final attestation	ATS BGD
			Railways Methods of scientific research				RO9	Students ' acquisition of theoretical and applied knowledge on methods of scientific research of problems in the field under study, training of specialists with cognitive skills in the field of science, formation of deep ideas about the content of scientific activity, its methods and forms of knowledge.			

the SRSIFV Module 2- Withsocial and political knowledge			Fundamentals of economics and entrepreneurship				RO6	Studies the activities of enterprises in various types of markets, 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, business planning, business secrecy, social responsibility of entrepreneurship. Active learning methods: casestudies; business role-playing games, group work.	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural Studies, Political Science, Psychology	Final certification	LMT
			Fundamentals of law and anti- corruption culture				RO9	Improving public and individual legal awareness and legal culture of students, as well as forming a system of knowledge and civic position on combating corruption as an anti-social phenomenon. As a result of studying the course, the student should master 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 interests of a person in case of their violation.	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural Studies, Political Science, Psychology	Final certification	SRS IFV
	BD	KV	Theoretical mechanics	180	6	3	PO2	Introduce you to the basic concepts, laws and theorems that allow you to compose and study equations describing the behavior of mechanical systems, develop logical thinking and understanding that the laws of mechanics express the laws of mechanical motion of bodies expressed in mathematical form, the ability to write down a specific phenomenon in mathematical form, the formation of practical skills in applying the basic methods of mechanics in balance of mechanical systems in the study of disciplines of the professional cycle and solving specific problems that have to be faced in professional activity. Active learning methods – performing and defending individual calculation and graphic works.	Engineering mathematics, Applied Physics.	Material resistance, Engineering Mechanics 2, Construction Mechanics, Engineering Mechanics 2	SI

Module 6- Basic special disciplines			, Engineering Mechanics 1				PO2	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. Active learning methods include the use of interactive tools, a blitz survey – a series of short questions, and performing individual calculation and graphic works.	Engineering mathematics, Applied physics	Material resistance, Engineering Mechanics 2, Construction mechanics, Engineering Mechanics 2	SI
	BD	EK	Material resistance	180	6	4	PO2	Formation of a set of knowledge in the field of engineering calculations for simple and complex resistance to strength, rigidity and stability of structural elements that provide the required reliability and safety of products under static conditions using the forms of static equilibrium conditions, applying the methods of differential and integral calculus. Active learning methods – performing individual calculation and graphic tasks.	Engineering mechanics 1, Geology and soil mechanics,	Construction mechanics, Engineering mechanics 3, Track, construction machinery and equipment, Track management Mechanization	SI
			, Engineering mechanics 2				PO2	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. Active learning methods – performing individual calculation and graphic tasks.	Engineering mechanics 1 Geology and soil mechanics, foundations and foundations	Construction mechanics, Engineering mechanics 3, Track, construction machinery and equipment, Track management Mechanization	SI
	BD	KV	Construction mechanics	180	6	4	PO2	Formation of basic laws of deformation of rod systems that make up the frame of structures, when exposed to external forces in order to ensure strength, stability, basic methods for calculating typical structures and structures. Formation of skills in designing typical structures related to the choice of design scheme	Engineering mathematics, Applied physics, Engineering mechanics 1,2	Railway construction technology, Railway construction technology, Organization of construction of transport infrastructure	

Module 6- Basic special disciplines								and determination of the most loaded structural elements, and calculation of internal forces and stresses.		facilities, Organization and planning of construction of transport structures	SI
			, Engineering mechanics 3				PO2	Formation of design skills of structures and structures related to the choice of the design scheme and determination of the most loaded structural elements, and calculation of internal forces and stresses, the main laws of deformation of rod systems that make up the frame of structures, when exposed to external forces to ensure strength, stability, basic methods for calculating typical structures and structures.	Engineering mathematics, Applied Physics, 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	SI
Module 7- Engineering 1	BD	KV	Engineering geodesy	180	6	3	PO4	Studies the composition and technology of geodetic works that provide surveys, design, construction, operation of structures, basic requirements for solving typical engineering and geodetic problems, their geometric essence. Gets skills in reading a topographic map, solving corresponding problems of both graphic and mathematical calculation on its basis. The discipline uses interactive teaching methods.	Engineering Mathematics, Applied Physics, Engineering Mechanics 1,2,3	Basics of designing transport structures, Introduction to designing transport infrastructure objects, Artificial structures on railways Research and design of railways, Modernization of railway lines, Reconstruction of railways	SI
			Fundamentals of geoinformatics				PO4	Study of general information about geoinformation systems, basic terms and concepts, data input and output issues their digitization, ways of presenting spatial and attribute information, brief characteristics of the main GIS, their advantages and disadvantages, general ideas about GIS software, basic geoinformation technologies and techniques for preparing source information, creating and editing objects. The discipline uses interactive teaching methods.	Engineering Mathematics, Applied Physics, Engineering Mechanics 1,2,3	Fundamentals of design of transport structures, Introduction to the design of transport infrastructure objects, Artificial structures on railways Research and design of railways, Modernization of railway lines, Reconstruction of	SI

										railways	
Module 7- Engineering 1	BD	KV	Basics of designing transport structures	180	6	4	PO4	Study of the basic rules (methods) for constructing and reading drawings, methods for solving metric and positional problems, rules for drawing up design documentation in accordance with ESKD standards, mastering the skills of sketching, depicting technical products, design drawings using graphical tools (AutoCAD, Compass 3D). The discipline provides software training, computer modeling and practical analysis of results.	Engineering mathematics, Applied Physics, Engineering Mechanics 1,2,3	Artificial structures on railways Surveys and design of railways, Modernization of railway lines, Reconstruction of railways	SI
			Introduction to the design of transport infrastructure objects				PO4	Principles and methods of graphic and geometric modeling of engineering problems, general requirements of ESKD, SPDS and other regulatory documents for the implementation and design of drawings, modern methods of automating graphic works, the possibility of automated creation of geometric models of spatial objects and execution of drawings. 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.	Engineering mathematics, Applied Physics, Engineering mechanics 1,2,3	Artificial structures on railways Surveys and design of railways, Modernization of railway lines, Reconstruction of railways	SI
	BD	KV	Track, construction machinery and equipment	180	6	5	RO8	Study of track structures, construction machinery and equipment, their technical capabilities when used for renewal, repair and maintenance maintenance of the upper structure of the track, small artificial structures, in the construction of railways; means of small mechanization, 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 practice 1,2,2	SI
Module 7-			Mechanization of track management				RO8	Study of the designs, theory and calculations of track machines that received in the track management of JSC "NC " Kazakhstan Temir	Ecology and life safety, Engineering geodesy, Construction materials, Electrical	Switches and blind intersections, Railway track repair technology,	

Engineering 1								zholy"" application for repairing and maintaining the road, 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.	engineering and basic electronics	Organization of current maintenance of the railway track, Production practice 1,2,2	SI
Module 8-Engineering 2	PD	KV	Railway construction technology	180	6	6	PO7	Study of regulatory, technical and technological foundations construction of railways, 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, natural and climatic features of the main 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.	Construction materials, Andagricultural 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, Reconstruction of railways, Modernization of railway lines	SI
			Railway construction technology				RO7	Study of the main provisions of technology and mechanization of railway construction, composition of construction structures works and processes, methods of design and development of technological processes for the construction of railway road, 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	Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport structures, Reconstruction of railways, Modernization of railway lines	SI
	PD	KV	Organization of construction of transport infrastructure	facilities 180	6	7	RO7	Development of a systematic view of construction processes and types of work, principles of their implementation, about the requirements for organizing the work of a working link or team, in compliance with the	Construction materials, Artificial structures on railways, Railway track construction, Track, construction	Modernization of railway lines, Reconstruction of railways, Production practice 2.	SI

Module 8- Engineering 2								requirements of safety and environmental protection, the fundamental principles of planning, industriality, complex mechanization and automation of production, the flow of construction, and all seasonality of work.	machinery and equipment, Track management Mechanization			
			Organization and planning of construction of transport structures					RO7	Studies the use of advanced technologies and organization of construction and installation works that reduce labor, material costs 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, Railway reconstruction, Production practice 2.	SI
Module 8 Engineering 2	PD	KV	Modernization of railway lines	180	6	8		RO10	Study of the technical condition of operated railways with the solution of problems to 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, and the 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.	Artificial structures on railways, Surveys and design of railways, Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport structures	Production practice 2, FINAL CERTIFICATION	SI
			Reconstruction of railways					RO10	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 in case of increase in train speeds, increase in traffic with the choice of a scheme for gradually increasing the capacity of the road according to 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	Artificial structures on railways, Railway research and design, Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport structures	Production line Production practice 2, FINAL CERTIFICATION	SI

								managers are provided.			
Module 9- Resource management	PD	KV	Managerial economics	90	3	5	RO6	Formation of the conceptual framework and development of economic analysis skills using modern models and patterns of economic activity 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 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.	Engineering mathematics, Fundamentals of economics and entrepreneurship	Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport structures, Modernization of railway lines, Reconstruction of railways	LMT
Module 5 IT competencies	PD	KV	Time management	90	3	5	PO6	Formation of students ' general ideas about the essence and types of time management, principles and methods of management a temporary resource for more successful implementation of professional activities.	Sociology, Cultural Studies, Psychology, Philosophy, Engineering mathematics.	Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport structures, Modernization of railway lines, Reconstruction of railways	LMT
Module 9- Resource management	PD	KV	Transport logistics	90	3	6	PO6	Study of the main provisions of transport support of logistics systems, activities in the field of transportation, covering the entire range of operations and services for the delivery of goods from the manufacturer to to the consumer, principles of design and construction of logistics systems. Mastering the skills of optimizing and organizing rational cargo flows, their processing in specialized logistics centers, ensuring an increase in their efficiency, reducing unproductive costs and expenses. The	Fundamentals of economics and entrepreneurship, новые компьютер моделирование	Organization of construction of transport infrastructure facilities, Organization and planning of construction of transport Modernization of railway lines, Reconstruction of	LMT



								training methods are: problem solving, conducting thematic colloquiums, brainstorming seminars. The discipline includes guest lectures by leading experts of transport and logistics companies		railways	
Module 5-IT competencies	PD	KV	Digital diagnostics of transport structures	90	3	6	RO6	Study of digital technologies of transport structures information processing systems, basic functional units, principles of information division and multiplexing, analysis of characteristics of digital communication channels in diagnostics of transport construction objects	Information and communication technologies, Engineering mathematics, Applied physics, Fundamentals of computer modeling	Organization of construction of transport infrastructure objects, Organization and planning of transport construction Modernization of railway lines, Reconstruction of railways	SI
Module 9- Resource management	PD	KV	Resource saving in transport	90	3	7	PO6	Study of the main types and characteristics of energy resources, regulatory support for energy saving, improving the energy efficiency of the transportation process; energy-saving technologies in repair production and operation of transport infrastructure facilities; organization and methods of energy saving management. It is used to solve problems, conduct thematic colloquiums, debates. Guest lectures are held by leading experts of the transport and communication industry	Ecology and life safety, Methods of scientific research, Fundamentals of law and anti-corruption policy. culture, Fundamentals of economics and entrepreneurship	Modernization of railway lines, Reconstruction of railways	PS
Module 5-IT competencies			Business analytics Power BI	90	3	7	PO6	Teaches the skills of creating interactive visualizations of data obtained from various sources and providing them to employees of this organization, obtaining valuable information when making strategic decisions, analyzing retrospective and current results. data analysis, presentation of results in intuitive visual formats providing general access to business-critical analytical data using Power BI	Information and communication technologies, Fundamentals of Economics and Entrepreneurship, Engineering Mathematics, Fundamentals of Computer Modeling	Railway line modernization, Railway Reconstruction	ICT
	<b>Total</b>			<b>2580</b>	<b>86</b>						

Head of the Department of "Construction Engineering"

Ismagulova S. O.