

AGREED
 Leading Researcher
 Candidate of Technical Sciences
 KazdorNII JSC

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 2023 G.
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APPROVED
 Director of the Institute
 "Transport Engineering"
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 2023 y.
 «07» 03
 АО «Академия логистики и транспорта»
 Институт «Транспортная инженерия»

CATALOG OF DISCIPLINES OF THE COMPONENT BY CHOICE

EDUCATIONAL PROGRAM 6B07320 – Highways and airfields

Education level: **bachelor course** Duration of study: **4 years**

Cycl e	Compo nent	Name of the discipline	Total labor intensity		Ter m	Result of the study	Brief description of the discipline	Prerequisites	Post-requirements	Departme nt
			in academic hours	in academic credits						
1	2	3	4	5	6	7	8	9	10	11
OD D	SQ	Ecology and life safety	150	5	3	RO5	The study of the basic environmental concepts, environmental problems and approaches to their solution, sources and types of environmental pollution by enterprises, the principles of standardizing the quality of atmospheric air and water, the 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 certification	MV&LS
OD D	SQ	Scientific research methods				RO9	Obtaining theoretical and applied knowledge by students on the methods of scientific research of problems in the studied area, training specialists with cognitive skills in the field of science, forming deep ideas about the content of scientific activity, its methods and forms of knowledge.	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural Studies, Political Science, Psychology	Final certification	SHD&PE
OD D	SQ	Basics of economics and entrepreneurship				RO9	Studies the activities of enterprises in various types of market, the model of equilibrium and functioning of the market, state regulation of prices and tariffs. Examines 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	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural Studies, Political Science,	Final certification	TLM

							secrecy, social responsibility of entrepreneurship. Active teaching methods: case methods; business role-playing games, group work.	Psychology		
OD D	SQ	Basics of law and anti-corruption culture					RO 6 Improving public and individual legal awareness and legal culture of students, as well as the formation of a knowledge system and a civic position on combating corruption as an antisocial phenomenon. As a result of studying the course, the student must master the fundamental concepts of law, the constitutional structure of the 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 in case of their violation.	History of Kazakhstan, Kazakh (Russian, foreign) language, Professional foreign language, Sociology, Cultural Studies, Political Science, Psychology	Final certification	TLM
DB	SQ	Theoretical mechanics					RO 2 To familiarize with the basic concepts, laws and theorems that make it possible to compose and study equations describing the behavior of mechanical systems, the development of logical thinking and understanding that the laws of mechanics express the laws of mechanical motion of bodies expressed in mathematical form, the ability to record a specific phenomenon in mathematical form, the formation of practical skills in applying the basic methods of mechanics in the study of motion and balances of mechanical systems in the study of disciplines of the professional cycle and solving specific problems that one has to face in professional activity. Methods of active training – execution and protection of individual calculation and graphic works.	Engineering Mathematics, Applied Physics	Engineering mechanics 2,3, Geology and mechanics of soils, foundations and foundations, Artificial structures on highways,	SE
DB	SQ	Engineering Mechanics I	180	6	3		RO 2 Formation of logical thinking and scientific foundation of engineering education. The study of the laws of motion and equilibrium of material bodies, the construction of mathematical models of the behavior of mechanical systems using the theorems of mechanics. Application of methods for studying the equilibrium and motion of mechanical systems for solving technical problems. Methods of active learning – the use of interactive tools, a blitz survey – a series of short questions, the performance of individual calculation and graphic works.	Engineering Mathematics, Applied Physics	Engineering mechanics 2,3, Geology and mechanics of soils, foundations and foundations, Artificial structures on highways,	SE
DB	SQ	Resistance of materials					RO 2 Formation of a complex of knowledge in the field of engineering calculations with simple and complex resistance to strength, rigidity and stability of structural elements that ensure the required reliability and safety of products under static and dynamic loads using forms of static equilibrium conditions,	Engineering mechanics 1, Geology and mechanics of soils, foundations and foundations	Geology and mechanics of soils, foundations and foundations, Artificial structures on highways	SE

							using methods of differential and integral calculus. Methods of active learning – performing individual computational and graphical tasks.			
DB	SQ	EngineeringMechanics 2	180	6	4	RO 2	To familiarize with the 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, skills for studying loads, displacements and stress-strain state in structural elements, constructing design diagrams of machine parts and product calculations to ensure reliability and cost-effectiveness requirements under the influence of static and dynamic loads. Methods of active learning – performing individual computational and graphical tasks.	Engineering mechanics 1 Geology and mechanics of soils, foundations and foundations	Geology and mechanics of soils, foundations and foundations, Artificial structures on highways,	SE
DB	SQ	Constructionmechanics				RO 2	Formation of the basic laws of deformation of core systems that make up the frame of structures when exposed to external forces in order to ensure strength, stability, basic methods of calculation of standard structures and structures. Formation of design skills of standard structures related to the selection of the design scheme and the determination of the most loaded structural elements and the calculation of internal forces and stresses.	Engineering Mathematics, Applied Physics, Engineering Mechanics 1,2	Geology and mechanics of soils, foundations and foundations, Artificial structures on highways, Construction of highways	SE
DB	SQ	EngineeringMechanics 3	180	6	5	RO 2	Formation of design skills of structures and structures related to the selection of the design scheme and the determination of the most loaded structural elements and the calculation of internal forces and stresses, the basic laws of deformation of core systems that make up the frame of structures when exposed to external forces to ensure strength, stability, basic methods of calculation of standard structures and structures.	Engineering Mathematics, Applied Physics, Engineering Mechanics 1,2	Geology and mechanics of soils, foundations and foundations, Artificial structures on highways,, Construction of highways	SE
DB	SQ	Engineeringgeodesy				RO 4	Studies the composition and technology of geodetic works that provide surveys, design, construction, operation of structures, the basic requirements for solving typical engineering and geodetic tasks, their geometric essence. Obtains the skills of reading a topographic map, solving on its basis the corresponding tasks of both graphical and mathematical computational nature. Interactive teaching methods are used within the discipline.	Engineering Mathematics, Applied Physics, Engineering Mechanics 1,2,3	Bridges and tunnels on highways, Highways, Technology of construction of highways and airfields	SE
DB	SQ	Fundamentals of geoinfor				RO 4	The study of general information about	Engineering	Bridges and tunnels	SE

		ematics	180	6	3		geoinformation systems, basic terms and concepts, issues of data input and output, 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 initial information, creating and editing objects. Interactive teaching methods are used within the discipline.	Mathematics, Applied Physics, Engineering Mechanics 1,2,3	on highways, Highways, Technology of construction of highways and airfields	
DB	SQ	Fundamentals of design of transport facilities				RO 4	Study of the basic rules (methods) for constructing and reading drawings, methods for solving metric and positional problems, rules for design documentation in accordance with the ESCD standards, mastering the skills of taking sketches, images of technical products, drawing drawings using graphical tools (AutoCAD, Compass 3D). Within the framework of the discipline, software training, computer modeling and practical analysis of the results are provided.	Engineering Mathematics, Applied Physics, Fundamentals of Computer Modeling, Building Structures	Bridges and tunnels on highways, Highways, Technology of construction of highways and airfields	SE
DB	SQ	Introduction to the design of transport infrastructure facilities	180	6	4	RO 4	Principles and methods of graphic and geometric modeling of engineering tasks, general requirements of the ESKD, SPDS and other regulatory documents for the execution and design of drawings, modern methods of automation of graphic works, the possibility of automated creation of geometric models of spatial objects and the execution of drawings. Creating 2D and 3D models within graphics systems (Compass 3D, Solidworks). The discipline provides software training, computer modeling and practical analysis of the results.	Engineering Mathematics, Applied Physics, Engineering Mechanics 1,2,3	Мосты и тоннели на автомобильных дорогах, Автомобильные дороги, Технология строительства автомобильных дорог и аэродромов	SE
DB	SQ	Road construction machinery and equipment				RO 7	Mastering students' knowledge in the field of nomenclature of road construction machinery and equipment, their purpose and principle of operation, optimization of operating modes under specified operating conditions to achieve maximum efficiency, compliance with safety requirements and environmental conservation. Within the framework of the discipline, interactive teaching methods, calculation and graphic works are used.	Ecology and life safety, Fundamentals of Computer modeling, Building Materials, Electrical Engineering and fundamentals of Electronics	Labor protection, Foundations and foundations, Technology of automobile and road construction, Organization of construction of transport infrastructure facilities	MV&LS
DB	SQ	Mechanization of the automobile and road economy	180	6	5	RO 7	Mastering students' knowledge in the field of nomenclature of machines and equipment for the automobile and road economy, their purpose and principle of operation, optimization of operating modes under specified operating conditions to achieve maximum efficiency, compliance with safety requirements and environmental	Ecology and life safety, Fundamentals of Computer modeling, Building Materials, Electrical Engineering and fundamentals of electronics	Labor protection, Foundations and foundations, Technology of automobile and road construction, Organization of construction of	MV&LS

							conservation. Within the framework of the discipline, interactive teaching methods, calculation and graphic works are used.		transport infrastructure facilities	
DB	SQ	Technology of construction of highways and airfields.				RO 7	Formation of knowledge in the field of the construction of the roadbed by the methods of filling embankments and the development of excavation, methods of distribution of earth masses, selection of basic and auxiliary machines, technology of excavation, calculation of the composition of specialized detachments for the production of works, the construction of a linear calendar schedule for each layer of pavement. Interactive teaching methods, computational and analytical method are used	Ecology and life safety, Engineering Geodesy, Road construction machinery and equipment, Construction materials, Highways, Airfields.	Organization of construction of transport infrastructure facilities in Russia, Operation of highways, Reconstruction of highways.	SE
DB	SQ	Technology of automobile and road construction	180	6	6	RO 7	To acquaint with the basic theoretical and practical provisions, technologies for the construction of highways and airfields, modern construction conditions with the use of new technologies for the production of works, methods of teaching problem solving and the formation of general competencies by performing tasks according to the variant. Interactive teaching methods, computational and analytical method are used.	Ecology and life safety, Engineering geodesy, Road construction machinery and equipment, Building materials, Highways, Airfields	Organization of construction of transport infrastructure facilities, Operation of highways, Reconstruction of highways	SE
DB	SQ	Organization of construction of transport infrastructure facilities				RO 7	Development of a systematic understanding of construction processes and types of work, the principles of their implementation, the requirements for the organization of work of the 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	Road construction machinery and equipment, Construction materials, Highways, Airfields	Reconstruction of highways	SE
DB	SQ	Organization and planning of the construction of transport facilities	180	6	7	RO 7	Development of a systematic understanding of the construction processes and types of work, the principles of their implementation, the requirements for the organization of work of the 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.	Road construction machinery and equipment, Construction materials, Highways, Airfields	Reconstruction of highways	SE
PD	SQ	Reconstruction of highways				RO 10	Apply various methods of assessing the condition of highways and reconstruction measures, technological solutions for earthworks, reconstruction of road coverings of all types for various categories of roads, taking into account the peculiarities of	Road construction machinery and equipment, Construction materials, Technology of construction of	Final certification	SE

							technology and mechanization of the regeneration of road coverings and coatings using modern materials. Interactive teaching methods, computational and analytical method are used.	highways and airfields, Organization of construction of transport infrastructure facilities		
PD	SQ	Modernization of highways	180	6	8	RO 10	To teach students to correctly evaluate possible options for the technology of work depending on the condition of individual elements of the highway, on local soil-geological and climatic conditions, to take into account the increasing requirements of ecology and safety, especially when jointly carrying out work on the transfer and restructuring of engineering communications with the reconstruction of highways. Interactive teaching methods, computational and analytical method are used.	Technology of construction of highways and airfields, Organization of construction of transport infrastructure facilities	Final certification	SE
PD	SQ	Managerial Economics (Minor)	90	3	5	RO 6,	Formation of the conceptual apparatus and development of skills of economic analysis using modern models and laws of economics, consideration of economic problems and tasks facing the head of the company. The study of this discipline will allow students to obtain and develop knowledge in the field of analytical studies of economic, technological and technical parameters of the enterprise, as well as will allow them to master the skills of applying special methods of economic justification of management decisions and assessing their consequences. Methods of active learning are used - situational tasks, case method. used - situational tasks, case method.	Fundamentals of Economics and Entrepreneurship, Fundamentals of law and anti-corruption culture	Final certification	TLM
PD	SQ	Time management	90	3	5	RO 6	Formation of general ideas about the essence and types of time management, principles and methods of time resource management for more successful implementation of professional activities. Methods of active learning are used - situational tasks, case method	Fundamentals of Economics and Entrepreneurship, Fundamentals of law and anti-corruption culture	Final certification	TLM
PD	SQ	Transport logistics (Minor)	90	3	6	RO 9	The 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 of products to the consumer, the principles of design and construction of logistics systems. Mastering the skills of optimization and organization of rational cargo flows, their processing in specialized logistics centers, ensuring an increase in their efficiency, reducing unproductive costs and expenses. The teaching methods are: solving problems,	Fundamentals of Economics and Entrepreneurship, Fundamentals of law and anti-corruption culture	Final certification	TLM

							conducting thematic colloquiums, seminars "brainstorming". Within the framework of the discipline, guest lectures are conducted by leading specialists of transport and logistics companies.			
PD	SQ	Digital diagnostics of construction objects	90	3	6	RO 8	Studies modern methods of diagnostics, monitoring and testing of construction objects using innovative technologies, modern geodetic means of periodic and automatic monitoring (GPS measurements, total station, leveling, laser scanning). Methods of active learning are used - situational tasks, case method.	Bridges and tunnels on highways, Highways	Technology of construction of highways and airfields, Organization of construction of transport infrastructure facilities	SE
PD	SQ	Resourcesaving in transport	90	3	6	RO 5	The study of the main types and characteristics of energy resources, regulatory and legal support for energy conservation, 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 conservation management. They are used to solve problems, conduct thematic colloquiums, debates. Guest lectures are being held by leading experts of the transport and communication industry.	Fundamentals of Economics and Entrepreneurship	Final certification	RS
PD	SQ	Power BI Business Analytics (Minor)	90	3	7	RO 6	Formation of students' skills and knowledge to collect, analyze and structure data in order to build interactive dashboards, program at the current level of development of the MDX multidimensional data analysis language, build models and algorithms of projects in relevant areas of BI technology, be able to analyze the essence of the subject field of the project and make decisions. Methods of active learning are used - brainstorming, working in small groups.	Fundamentals of economics and entrepreneurship, Fundamentals of law and anti-corruption culture	Final certification	ICT
			2580	86						

Head of the Department "Construction Engineering"

Ismagulova S.O.