

AGREED
Leading Researcher,
Candidate of Technical Sciences
KazdorNI JSC
Aitbayev K.A.
2023g.



I APPROVE
Director of the Institute
"Transport Engineering"
Chigambayev T.O.
2023 g.

«Логистика және көлік академиясы»
 «Көлік инженерия» институты
 АО «Академия логистики и инженерии»
 Институт «Транспортная инженерия»

CATALOG OF DISCIPLINES OF THE COMPONENT BY CHOICE

EDUCATIONAL PROGRAM 6B07130 – Highways and airfields

Education level:

bachelor course Duration of study: 4 years

Cycle	Component	Name of the discipline	Total labor intensity		Term	Results of the study	Brief description of the discipline	Prerequisites	Post-requirements	Depart time
			in academic hours	in academic credits						
1	2	3	4	5	6	7	8	9	10	11
ODD	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
ODD	SQ	Scientific research methods	150	5	3	RO10	Obtaining theoretical and applied knowledge by students on the methods of scientific research of problems in the field of study, training of specialists with the skills of cognitive activity in the field of science, the formation of 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
ODD	SQ	Basics of economics and entrepreneurship	150	5	3	RO6	He studies the activities of enterprises in various types of markets, the model of equilibrium and functioning of the market, state regulation of prices and tariffs. Considers the	History of Kazakhstan, Kazakh (Russian, foreign)	Final certification	TLM

							concept of entrepreneurship and the limits of its legal regulation, the conditions for the development of entrepreneurship, organizational and legal forms of doing business, business planning, entrepreneurial secrecy, social responsibility of. Active learning methods: case methods; business role-playing games, group work.	language, Professional foreign language, Sociology, Cultural Studies, Political Science, Psychology		
OD D	SQ	Basics of law and anti-corruption culture	150	5	3	RO 10	Improving the public and individual legal awareness and legal culture of students, as well as the formation of a system of knowledge and civil position to combat corruption as an anti-social 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 the 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	Finalcertification	TLM
DB	SQ	Theoreticalmechanics	180	6	3	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.	EngineeringMathematics, AppliedPhysics	Engineering mechanics 2,3, Geology and mechanics of soils, foundations and foundations, Artificial structures on highways,	SE
DB	SQ	EngineeringMechanics 1	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.	EngineeringMathematics, AppliedPhysics	Engineering mechanics 2,3, Geology and mechanics of soils, foundations and foundations, Artificial structures on highways,	SE

DB	SQ	Resistanceofmaterials	180	6	4	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, using methods of differential and integral calculus. 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	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	180	6	5	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	180	6	3	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	Engineering Mathematics, Applied Physics, Engineering Mechanics 1,2,3	Artificial structures on highways,, Construction of highways, Technology of automobile and road construction	SE

							both graphical and mathematical computational nature. Interactive teaching methods are used within the discipline.			
DB	SQ	Fundamentals of geoinformatics	180	6	3	RO 4	The study of general information about 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.	Engineering Mathematics, Applied Physics, Engineering Mechanics 1,2,3	Artificial structures on highways, Construction of highways, Technology of automobile and road construction	SE
DB	SQ	Fundamentals of design of transport facilities	180	6	4	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	Foundations and foundations, Geotechnics in foundation engineering, Aerodromes, Highways	SE
DB	SQ	Introduction to the design of transport infrastructure facilities	120	4	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	Artificial structures on highways, Construction of highways, Technology of automobile and road construction	SE
DB	SQ	Road construction machinery and equipment	180	6	5	RO 5, 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 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 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	Technology of automobile and road construction	180	6	6	RO 3, RO 7	To develop a "Technological scheme for the supply of materials of products" with the definition of service areas of factories, quarries, the technological sequence of processes with the calculation of the volume of work and required resources, the scheme of work of road construction flows, calculate the need for vehicles for the transportation of construction materials, the production standards of construction machines using ENiR. Methods of active training – to perform calculations of the roadbed with the construction of center drawings.	Road-building machinery and equipment, Construction materials, Construction highways, Construction airfields	Organization of construction of transport infrastructure facilities, Operation of highways, Modernization of highways	SE
DB	SQ	Technology of construction of highways and airfields	180	6	6	RO 3, RO 7	Studies the main provisions on the organization of the production process construction of highways and airfields, the order of material and technical support of construction objects, technical rules for the performance of preparatory work, the construction of the roadbed in various conditions, the performance of finishing and strengthening works, the construction of structural layers of road and airfield clothing from various materials. Interactive teaching methods, computational and analytical methods are used.	Road-building machinery and equipment, Construction materials, Construction highways, Construction airfields	Organization of construction of transport infrastructure facilities, Operation of highways, Modernization of highways	SE
DB	SQ	Organization of construction of transport infrastructure facilities	180	6	7	RO 5, 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 labor of a working unit or team, in compliance with the requirements of safety and environmental protection, the fundamental principles of planning, industrialism, integrated mechanization and automation of production, construction flow, all seasonality of work production.	Road-building machinery and equipment, Construction materials, Construction highways, Construction airfields	Modernization of highways	SE
DB	SQ	Organization and planning of the construction of transport facilities	180	6	7	RO 5, RO 7	Studying the use of advanced technologies and the organization of construction and installation works, ensuring the reduction of labor, material	Road-building machinery and equipment,	Modernization of highways	SE

							and energy costs in compliance with the requirements of state standards, the sequence of preparatory, main and final work on the construction of transport facilities and the commissioning of facilities, the need for materials, equipment, working strength and deadlines. Within the framework of the discipline, the calculation and analytical method is used.	Construction materials, Construction of highways, Construction of airfields		
PD	SQ	Modernizationofhighways	180	6	8	RO 8, RO 10	Formation of knowledge in the field of reconstruction of highways in terms of technology and organization of work, taking into account the basic principles: compatibility, compatibility, regeneration and improvement of the technical category of the reconstructed highway and evaluation of possible options for the technology of work depending on the condition of individual elements of the existing road. Interactiveteachingmethods, computationalandanalyticalmethodareused.	Technology of automobile and road construction, Organization of construction of transport infrastructure facilities	Finalcertification	SE
PD	SQ	Reconstructionofhighways	180	6	8	RO 5, 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. Interactiveteachingmethods, computationalandanalyticalmethodareused.	Road construction machinery and equipment, Construction materials, Technology of automobile and road construction, Organization of construction of transport infrastructure facilities	Finalcertification	TLM
PD	SQ	ManagerialEconomics (Minor)	90	3	5	RO 6, RO 11	Formation of the conceptual apparatus 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. The study of this discipline will allow students to gain and develop knowledge in the field of analytical research of economic, technological and technical parameters of an enterprise, and will also allow them to master the skills of applying special methods of economic justification of management decisions and assessing their consequences. Activelearningmethodsareused - situationaltasks, casemethod.	Fundamentals of Economics and Entrepreneurship, Fundamentals of law and anti-corruption culture	Finalcertification	TLM
PD	SQ	Transportlogistics (Minor)	90	3	6	RO 9, RO 10	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	Fundamentals of Economics and Entrepreneurship, Fundamentals of law	Finalcertification	TLM

							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, conducting thematic colloquiums, seminars "brainstorming". Within the framework of the discipline, guest lectures are conducted by leading specialists of transport and logistics companies.	and anti-corruption culture		
PD	SQ	Resource saving in transport (Minor)	90	3	7	RO 5, RO 10	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, Fundamentals of law and anti-corruption culture	Finalcertification	PS
PD	SQ	Time -management (Minor)	90	3	5	RO 6, RO 11	Formation of students' general ideas about the essence and types of time management, principles and methods of time resource management for more successful professional activities. Activelearningmethodsareused - situationaltasks, casemethod.	Fundamentals of Economics and Entrepreneurship, Fundamentals of law and anti-corruption culture	Finalcertification	TLM
PD	SQ	Digital diagnostics of construction objects (Minor)			6	RO 4, 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, tacheometry, leveling, laser scanning). Activelearningmethodsareused - situationaltasks, casemethod.	Fundamentals of economics and entrepreneurship, Fundamentals of law and anti-corruption culture	Finalcertification	SE
PD	SQ	PowerBIBusinessAnalytic s (Minor)			7	RO 4, RO 6	Formation of students' skills and knowledge to collect, analyze and structure data in order to build interactive dashboards, program at the modern 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 project subject field 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	Finalcertification	ICT
			2310	77						

Module 6 - Core competencies								tacheometry, leveling, laser scanning). Active learning methods are used - situational tasks, case method.	culture	
	PD	SQ	Power BI Business Analytics (Minor)			7	RO 4, RO 6	Formation of students' skills and knowledge to collect, analyze and structure data in order to build interactive dashboards, program at the modern 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 project subject field 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
Total				1830	61					

Head of the Department "Construction Engineering"



Ismagulova S.O.