School of transport engineering and logistics named after M. Tynyshpayev
«Transportation Engineering» Direction

EDUCATIONAL PROGRAM

7M07108 - «Transport, transport technique and technologies»

Code and classification of the field of education:	7M07 – Engineering, manufacturing and construction industries
Code and classification of training directions:	7M071 – Engineering and Engineering affairs
Group of educational programs:	M104 – Transport, transport equipment and technologies
Level based on NQF:	7
Level based on IQF:	7
Study period:	2 year
Amount of credits:	120

Almaty 2025

Educational program 7M07108 - «Transport, transport technique and technologies» was approved at the meeting of K.I. Satbayev KazNRTU Academic Council

Protocol № 10, dated March 6, 2025.

Was reviewed and recommended for approval at the meeting of K.I. Satbayev KazNRTU Educational and Methodological Council

Protocol № 3, dated December 20, 2024.

Educational program 7M07108 - «Transport, transport technique and technologies» was developed by Academic committee based on direction 7M071 – Engineering and Engineering affairs

Full name	Academic degree/ academic title	Position	Workplace	Signature
Chairperson of Academic Committee:				
Abdullaev S.S.	Doctor of Technical Sciences, Professor	Head of the School of Transport Engineering and Logistics	KazNRTU named after K.I. Satpayev	
Teaching staff:				
Kamzanov N.S.	Doctor of Philosophy (PhD)	Head of EP «TE»	KazNRTU named after K.I. Satpayev	
Akhmetova Sh.D.	Candidate of Technical Sciences	Associate Professor	KazNRTU named after K.I. Satpayev	
Tokmurzina-Kobernyak N.A.	Candidate of Technical Sciences	Associate Professor	KazNRTU named after K.I. Satpayev	
Employers:				
Beketov T.S.	Master of Technical Sciences	General manager	«Megadrive» LLP	
Students				
Kayratova A.Ye.	–	2-year Master's student	KazNRTU named after K.I. Satpayev	

Table of contents

List of abbreviations and designations

KazNRTU named after K.I. Satbayev – Kazakh national research technical university named after K.I. Satbayev;
EP – Educational program;
TE – Transport Engineering
WC – Working curricula
SDG – Sustainable Development Goals;
LO – Learning outcomes;
USDD – Unified System of Design Documentation;
ESG – Environmental, Social, Governance;
IP – intellectual property;
LTCRM- lifting-transport, constructive and road machines;
CES – catalog of elective subjects;
UC – university component;
CC – component of choice;
NQF – National Qualifications framework;
IQF – Industry qualifications framework.

1. Description of educational program

The program is designed to provide scientific and pedagogical training for students and has been developed within the framework of the «Engineering and Engineering affairs» field.

The educational program «Transport, Transport Equipment and Technologies» incorporates the core principles and objectives of sustainable development, implementing the concept of sustainable growth

The following key goals can be identified:

«Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all» (SDG 4).

The program is aimed at developing in-depth knowledge and research skills necessary to address technical and technological challenges in the field of sustainable land transport. Students enrolled in this educational program will be capable of taking advantage of lifelong learning opportunities and applying the acquired knowledge in everyday situations to contribute to sustainable development.

«Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation» (SDG 9).

The program fosters the development of the following competencies in students: the ability to motivate their environment to transition toward more sustainable and stable forms of transport infrastructure; the ability to implement innovative technologies to minimize environmental impact and enhance energy efficiency; and the ability to assess the impact of transport systems and technological processes on human health and the environment due to harmful emissions.

«Ensure sustainable consumption and production patterns» (SDG 12).

The program supports the development of competencies such as the ability to make technical, organizational, economic, and managerial decisions based on sustainable development goals, and the ability to promote sustainable production models.

«Take urgent action to combat climate change and its impacts» (SDG 13).

The program promotes the development of students' abilities to assess the climate safety of their daily and professional activities and adjust them accordingly if necessary; to act in the interests of people affected by climate change; and to forecast, evaluate, and calculate the long-term impact of decisions and measures taken at the individual, local, and national levels on people and regions across the globe.

The objects of professional activity of graduates include:

institutions of higher and secondary vocational education; research and design institutes; companies and organizations (enterprises) engaged in the design, production, and operation of ground transport systems and transport-technological complexes for agricultural, construction, transport, military-transport, and other transport-technological purposes; development of design and regulatory-technical documentation; automation of transport and transport systems; methods and tools for testing and quality control of transport equipment.

Students study various technologies and engineering methods for ensuring environmental, road, industrial, and anti-terrorist safety of road and transport facilities; the principles of sustainable development of transport systems; methods of monitoring, auditing, and safety management in the transport sector.

The educational program is aimed at training specialists in the field of ecotechnologies and integrated transport safety; assessing the impact of intelligent transport systems on the natural and social environment; managing and ensuring road, environmental, and industrial safety within the country's transport infrastructure, including during emergencies of natural, technological, or social (anti-terrorism) origin; and evaluating the effectiveness of protective measures for transport vehicles and infrastructure facilities using risk management methodologies.

2. Purpose and objectives of educational program

Purpose of EP:

The goal of the curriculum of the scientific and pedagogical direction (the program of the scientific and pedagogical magistracy) is to develop in the undergraduates educational, methodological and research competence, as well as the necessary knowledge and skills in the use of modern technical means of management in transport automation systems necessary to prepare specialists for scientific and pedagogical activities in the system of higher, postgraduate education and research sector.

Tasks of EP:

1. Training specialists for research and design activities in the field of development, manufacturing, operation, and maintenance of transport engineering machinery, with the aim of ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all.
2. Preparing specialists for scientific, informational, ideological, and problem-oriented communication within the professional environment, enabling them to engage in organizational, managerial, and service activities while recognizing their responsibility for professional decision-making.
3. Developing knowledge and practical skills for conducting scientific and pedagogical activities, including the use of computer-based and distance learning technologies.
4. Creating conditions for the academic mobility of master's students.
5. Organizing the educational process in accordance with international standards of postgraduate education.
6. Developing practical skills and competencies for implementing engineering solutions that contribute to the achievement of the Sustainable Development Goals (SDGs).

3. Requirements for evaluating the educational program learning outcomes

The educational program has been developed in accordance with the State Compulsory Standards of Higher and Postgraduate Education of the Republic of Kazakhstan, approved by Order No. 2 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 (registered in the Register of Regulatory Legal Acts under No. 28916). It includes learning outcomes that serve as the foundation for the development of curricula (working curricula, individual study plans of students) and course syllabi.

In the scientific and pedagogical master's program, it is required to complete at least 120 academic credits over the entire period of study, including all types of academic and research activities.

The qualification requirements for master's students are based on the Dublin Descriptors for the second cycle of higher education (master’s level) and reflect the acquired competencies described through learning outcomes. Learning outcomes are formulated at both the level of the educational program and the level of individual modules or academic disciplines.

4. Passport of educational program

4.1. General information

№	Field name	Comments
1	Code and classification of the field of education	7M07 – Engineering, manufacturing and construction industries
2	Code and classification of training directions	7M071 – Engineering and Engineering affairs
3	Educational program group	M104 – Transport, transport equipment and technologies
4	Educational program name	7M07108 – «Transport, transport technique and technologies»
5	Short description of educational program	The educational program 7M07108 – «Transport, transport technique and technologies» incorporates the fundamental principles and objectives of the Sustainable Development Goals (SDGs), thereby implementing the concept of sustainable development.
6	Purpose of EP	The goal of the curriculum of the scientific and pedagogical direction (the program of the scientific and pedagogical magistracy) is to develop in the undergraduates educational, methodological and research competence, as well as the necessary knowledge and skills in the use of modern technical means of management in transport automation systems necessary to prepare specialists for scientific and pedagogical activities in the system of higher, postgraduate education and research sector.
7	Type of EP	New EP
8	The level based on NQF	7
9	The level based on IQF	7
10	Distinctive features of EP	Double diploma EP
11	List of competencies of educational program	B – Basic Knowledge, Skills, and Abilities B1 – Possession of fundamental knowledge in the fields of natural sciences and pedagogy, contributing to the formation of a highly educated individual with broad outlook and culture of thinking; B2 – Proficiency in handling modern equipment and the ability to use information technologies in professional activities; B3 – Possession of skills to acquire new knowledge necessary for daily professional activities and for continuing education in doctoral studies; B4 – Proficiency in one of the foreign languages at a level above conversational. P – Professional Competencies P1 – Ability to generalize and critically evaluate the results obtained by domestic and international researchers, identify promising research directions, and design a research program;

№	Field name	Comments
		P2 – Ability to justify the relevance, theoretical and practical significance of the chosen research topic; P3 – Ability to conduct independent research in accordance with the developed program; P4 – Ability to present the results of conducted research to the scientific community in the form of an article or report; P5 – Ability to independently prepare tasks and develop project solutions under conditions of uncertainty, to draft corresponding methodological and regulatory documents, as well as proposals and measures for the implementation of developed projects and programs; P6 – Ability to assess the effectiveness of projects considering uncertainty factors; P7 – Ability to prepare analytical materials for evaluating economic policy measures and making strategic decisions at the micro- and macro-levels; P8 – Ability to analyze and utilize various information sources for performing technical calculations; P9 – Ability to forecast key socio-economic indicators of enterprise, industry, regional, and national economic performance; P10 – Ability to develop managerial decision-making options and justify their selection based on socio-economic efficiency criteria; P11 – Ability to apply modern teaching methods and techniques in vocational education institutions, higher education institutions, and institutions of additional professional education; P12 – Ability to design curricula, programs, and appropriate methodological support for teaching disciplines in vocational education institutions, higher education institutions, and institutions of additional professional education. G – General Human, Social and Ethical Competencies G1 – Knowledge of the traditions and culture of the peoples of Kazakhstan, compliance with the norms of business ethics, and mastery of ethical and legal standards of behavior. G2 – Tolerance toward the traditions and cultures of other peoples around the world. G3 – Knowledge of the basics of the legal system and legislation of the Republic of Kazakhstan. G4 – Understanding trends in the social development of society and the ability to navigate various social situations appropriately. G5 – Awareness of the social significance of one's future profession and possessing strong motivation to

№	Field name	Comments
		perform professional activities. G6 – Proficiency in basic methods for protecting production personnel and the population from the possible consequences of accidents, disasters, and natural hazards. M – Managerial and Specialized Competencies M1 – Ability to independently manage and control work and educational processes within the framework of an organization's strategy, policy, and objectives; ability to discuss problems, justify conclusions, and operate competently with information. M2 – Possession of basic economic knowledge and scientific understanding of management, marketing, finance, etc. M3 – Knowledge and understanding of the goals and methods of state economic regulation and the role of the public sector in the economy. M4 – Ability to search for, analyze, and evaluate information for preparing and making managerial decisions; readiness to take responsibility for such decisions, give instructions, and manage others, taking into account employees' abilities, capabilities, and motivation. M5 – Ability to navigate modern information flows and adapt to dynamically changing phenomena and processes in the global economy. M6 – Flexibility and adaptability in various conditions and situations related to professional activity. M7 – Knowledge of the purpose, classification, structure, and operational principles of transport machinery and equipment. M8 – Ability to assess the technical condition and residual life of equipment, organize preventive inspections, and conduct routine maintenance. M9 – Ability to perform strength calculations and power transmission calculations for machines, and to justify their selection based on specific conditions and production volumes. M10 – Ability to participate in the design and calculation of parts and assemblies of mechanical engineering structures in accordance with technical specifications and using standard CAD tools.
12	Learning outcomes of educational program	LO1 – Apply modern computer technologies in scientific research and in the manufacturing of automotive parts and assemblies. LO2 – Analyze the options for assessing the technical condition of ground transport vehicles and transport infrastructure facilities, identify the causes of malfunctions and deficiencies, and take measures to

№	Field name	Comments
		improve the efficiency of their elimination and operation. LO3 – Evaluate the capabilities of modern software products and the readiness to apply them for solving tasks related to the automation of technological processes in the manufacturing and maintenance of ground transport and technological machines, and the training of production and service personnel. LO4 – Study and analyze the required information, technical data, indicators, and performance results related to the improvement of technological processes in the operation, maintenance, repair, and servicing of automobiles, lifting and transport, construction, and road machinery and equipment, and perform necessary calculations using modern technical tools. LO5 – Possess a set of personal qualities, scientific-pedagogical and professional competencies sufficient to develop a modern operational and service industry and an advanced organizational structure of the transport sector in the country (region). LO6 – Solve technical tasks and scientific problems aimed at enhancing environmental safety. LO7 – Carry out planning, formulation, and implementation of theoretical and experimental scientific research aimed at searching for and validating new ideas for improving ground transport and technological machines, their technological equipment, and creating integrated systems based on them. LO8 – Evaluate the technical and technological equipment of transport communications and identify the causes of their malfunction in order to optimize the designs and improve environmental and techno-economic performance. LO9 – Assess the impact of transport systems and technological processes on human health and the environment due to the emission of harmful pollutants. LO10 – Apply innovative technologies for current repair and maintenance of ground transport and technological machines and equipment to minimize environmental impact and ensure energy-efficient consumption. LO11 – Evaluate the organization of effective interaction between different modes of transport within a unified transport system and the organization of efficient commercial operations at a transport facility. Recommend the development and implementation of effective customer engagement methods.

№	Field name	Comments
		LO12 – Determine the reliability level of transport equipment during its life cycle. Develop measures to increase the efficiency of equipment utilization. Organize production and operation processes of ground transport and technological machines and systems.
13	Education form	Full-time
14	Period of training	2 year
15	Amount of credits	120
16	Languages of instruction	English, Russian, Kazakh
17	Academic degree awarded	Master of Technical Sciences
18	Developers and authors	Abdullaev S.S., Kamzanov N.S., Tokmurizna-Kobernyak N.A. employer: Imentaeva S.G. student: Kayratova A.Ye.

4.2. Relationship between the achievability of the formed learning outcomes based on educational program and academic disciplines

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
Cycle of basic disciplines University component															
1	Foreign language (professional))	Mastering professional English at an advanced level (for non-linguistic areas). The study of grammatical characteristics of scientific style in its oral and written forms. Professional oral communication in monological and dialogical form according to the educational program. Ability to demonstrate the results of research in the form of reports, abstracts, publications and public discussions; interpret and present the results of scientific research in a foreign language.	**3**				**v**								
2	History and philosophy of science	Purpose: to explore the history and philosophy of science as a system of concepts of global and Kazakh science. Content: the subject of philosophy of science, dynamics of science, the main stages of the historical development of science, features of classical science, non-classical and post-non-classical science, philosophy of mathematics, physics, engineering and technology, specifics of engineering sciences, ethics of science, social and moral	**3**				**v**	**v**							

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		responsibility of a scientist and engineer.													
3	Higher school pedagogy	The course is aimed at mastering the methodological and theoretical foundations of higher education pedagogy. The discipline will help to master the skills of modern pedagogical technologies, technologies of pedagogical design, organization and control in higher education, skills of communicative competence. At the end of the course, undergraduates learn how to organize and conduct various forms of organizing training, apply active teaching methods, and select the content of training sessions. Organize the educational process on the basis of credit technology of education.	**3**						**v**	**v**					
4	Psychology of management	The course is aimed at mastering the tools for effective employee management, based on knowledge of the psychological mechanisms of the manager's activity. Discipline will help you master the skills of making decisions, creating a favorable psychological climate, motivating employees, setting goals, building a team and communicating with employees. At the end of the course, undergraduates will learn how to resolve managerial conflicts, create	**3**						**v**						

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		their own image, analyze situations in the field of managerial activity, as well as negotiate, be stress-resistant and effective leaders.													
Cycle of basic disciplines Component of choice															
5	Modern problems of transport science, engineering and technology	Purpose: formation of knowledge of the fundamentals of the conceptual apparatus of transport science, technology and technology from the point of view of modern processes of functioning and interaction of various organizational and production structures. Content: patterns, forms and technologies of cognitive activity. The basic concepts of the stages and forms of development of scientific knowledge. Stages of technical progress; development of transport science. The role of technology and technology in the development of modern society and the ability to use them in practice.	**5**				**v**								
6	Quality management of machines and technological processes	Purpose: formation of knowledge in the field of quality management of vehicles of transport equipment. Content: issues of quantitative assessment of product quality and process control; statistical methods for regulating technological processes, methods for calculating and selecting parameters that determine	**5**								**v**				

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		product quality; the relationship between quality indicators and the start of machine production.													
7	Research methodology	Purpose: to acquire knowledge of laws, principles, concepts, terminology, specific features of the organization and management of scientific research using modern methods of scientometry. Content: mechanisms of scientific research, analysis, conducting experiments, organizing surveys, compiling questionnaires, standards and regulations for the registration of scientific research results.	**5**				**v**			**v**					
8	Fundamentals of engineering creativity	Purpose: formation of technical creativity skills, including the theory of solving inventive tasks. Contents: trends in scientific and technical development and the basics of innovation; professional features of an engineer's activity, ways to develop a culture of engineering thinking based on the study of the laws of technology development and the creation of new and modernization of existing technical facilities of a transport profile.	**5**				**v**			**v**					
9	Information support systems for design, manufacture and maintenance of ground transport and technological machines	Purpose: formation of theoretical and practical knowledge about information systems for technological processes in the field of design, manufacture and maintenance of ground transport and	**5**	**v**		**v**									

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		technological machines. Contents: Existing information systems for the design, production and operation of machinery and equipment, information model of the life cycle of mechanical engineering products, information technology CALS, prospects for the development of information technology in the production and operation of transport and technological machines and complexes.													
10	Innovative technologies in the design of modern motor vehicles	Purpose: formation of a system of knowledge of theoretical and practical skills: theory, design, principles of operation of components, assemblies, mechanisms and systems of motor vehicles. Content: innovative technologies in the design of modern vehicles..	**5**										**v**		
11	Intellectual property and research	The purpose of this course is to provide undergraduates with the knowledge and skills necessary to understand, protect and manage intellectual property (IP) in the context of scientific research and innovation. The course is aimed at training specialists who can effectively work with IP, protect the results of scientific research and apply them in practice.	**5**			**v**	**v**					**v**			
12	Sustainable development strategies	Purpose: To train graduate students in sustainable development strategies to	**5**		**v**									**v**	

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		achieve a balance between economic growth, social responsibility, and environmental protection. Content: Graduate students will study the concepts and principles of sustainable development, the development and implementation of sustainable development strategies, the evaluation of their effectiveness, and international standards and best practices. Cases and examples of successful sustainable development strategies are included.													
Cycle of profile disciplines University component															
13	Ensuring reliability in the process of the life cycle of machines	Purpose: to develop skills and knowledge about ensuring the operability and reliability of machines. Content: issues of the functioning of complex technical systems characteristic of motor transport; the influence of technical condition on the reliability of cars, fleets and on integral indicators of their effectiveness; the application of methods of special sections of probability theory (queuing theory) to determine the parameters of complex systems.	**5**												**v**
14	Methods of creating innovations in technology	Purpose: formation of knowledge, skills and competencies for the use of methods of searching for new technical solutions that activate creative activity	**5**										**v**	**v**	

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		in the development of new equipment and technologies applicable in transport. Contents: the main directions and prospects for the further development of innovative activities in the field of transport and transport technology; scientific thoughts of inventors, outstanding engineers, affecting the issues of human creative activity.													
15	Examination of the technical condition of the machines	Purpose: to form knowledge in the field of principles underlying the expert analysis of the technical condition of motor vehicles. Contents: methods and means of monitoring the technical condition of machines; modern diagnostic systems and complexes that make up the instrumental base of expert diagnostic research of machines; requirements of standards for marking vehicles; methods of marking; assessment of residual life based on the results of diagnostics of motor vehicles.	**5**		**v**										
16	Technological processes of maintenance and repair of transport and transport-technological machines and equipment	Purpose: to form a system of competencies for solving professional tasks in the highly efficient use and technical operation of transport and technological machines and equipment. Contents: Technical condition and operability of transport and transport-technological machines and equipment.	**5**			**v**	**v**								

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		The concept of a technological process. Methods of development of technological processes of maintenance and repair. General characteristics of maintenance and repair work. Technological equipment. Regulatory and technological support. Forms of organization of technological processes.													
17	Automation systems for road transport	Purpose: implementation of the mathematical apparatus and theoretical schemes, the introduction and study of various modes in the management system; work with the main means of computer equipment and information technologies. Coordination: connection and role of the system of automation in the organization of transport services; attention and vision of the system and means of communication in transport, their characteristics; the sphere of application of different systems of communication in transport; as a tool for optimizing processes in transport systems: structure and levels of transportation of passes, their functions.	**5**	**v**		**v**									
18	Environmental safety of railway transport	Purpose: to obtain fundamental knowledge about ecological systems and the features of their functioning in conditions of increasing anthropogenic stress; the history of the emergence and development of ecology as a natural	**4**									**v**	**v**		

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		scientific and social discipline, its role in shaping the worldview, and methods of scientific cognition. Contents: basic principles of interaction of living organisms with the environment, ways of negative impact of vehicles affecting the environment, systems and means of environmental safety, as well as ways to minimize the negative impact of transport on the environment.													
Cycle of profile disciplines Component of choice															
19	Computer technologies in science and production	Purpose: to develop skills and the ability to apply packages of mathematical applications for theoretical research, for modeling problems of mathematical statistics, processing the results of scientific experiments and optimizing decision-making. Content: application of methods, methods and software packages of the highest level in the performance of tasks of design, modernization and production of machinery and equipment.	**5**	**v**		**v**									
20	Methods of evaluation and testing of operational properties of road vehicles	Purpose: to develop skills for evaluating and testing the performance properties of road vehicles. Content: improving the transport and operational condition of highways on the basis of visual and instrumental examination,	**5**												**v**

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		analysis of the results obtained and development of measures based on them and determining the timing of road repairs, formation of an information base on their condition.													
21	Innovative methods of machine repair and maintenance	Purpose: to master innovative methods of repair and maintenance of machines. Contents: advanced maintenance and repair systems, machine life cycle management; standards, patterns and their interrelation; methods of management of transport enterprises and organization of logistics.	**5**										**v**		
22	Environmentally friendly ways to restore machine parts	Purpose: to acquire skills in technological tasks related to ensuring environmental protection during the restoration of machine parts. Contents: modern technologies for the restoration of parts used in the performance of repair and restoration work; environmental assessment of design solutions.	**5**						**v**						
23	New technological methods and materials in transport equipment	Purpose: formation of knowledge on new technological methods and materials in transport equipment. Contents: technological properties of metals, modern methods of obtaining and manufacturing technologies of transport materials, their structure, properties, classifications, labeling and heat treatment of basic structural and	**5**										**v**		

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		instrumental materials.													
24	Application of polymer composite materials in the production and repair of transport equipment	Purpose: to form knowledge on polymer composite materials and the field of their practical application in the production and repair of transport equipment. Contents: fundamentals of technology for the production of initial components, processes and technologies for the manufacture of composite materials, technological methods for the production of machine parts from various types of polymer composite materials for mechanical engineering and transport equipment.	**5**										**v**		
25	Research and testing of transport and transport-technological machines	Purpose: to develop skills in the field of research and testing of ground-based transport and technological machines, allowing you to independently organize research and testing of machines taking into account technical, technological, economic and environmental factors. Content: Testing of machines of serial and experimental life cycles of transport systems. Test equipment and stands. Methods of testing machines. Research of starting properties, maneuverability, performance, thermal regime. Determination of dynamic and traction properties, durability and strength of machines and their elements. Tests of power plants and	**5**										**v**		

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)											
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12
		drives of machines. Testing of electric machines.													
26	Technical means of the transport system	Purpose: formation of knowledge about the object of management focused on road transport. Contents: general information from the theory of systems; freight and passenger transportation; freight science; freight forwarding services; general course of transport, etc.	**5**								**v**				**v**

NON-PROFIT JOINT STOCK COMPANY
"KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY NAMED AFTER K.I. SATBAYEV"

SATBAYEV UNIVERSITY

«APPROVED»
Decision of the Academic Council
NPJSC«KazNRTU
named after K.Satbayev»
dated 06.03.2025 Minutes № 10

WORKING CURRICULUM

Academic year	**2025-2026 (Spring, Autumn)**
Group of educational programs	**M104 - "Transport, transport equipment and technologies"**
Educational program	**7M07108 - "Transport, transport technique and technologies"**
The awarded academic degree	**Master of Technical Sciences**
Form and duration of study	**full time (scientific and pedagogical track) - 2 years**

Discipline code	Name of disciplines	Block	Cycle	Total ECTS credits	Total hours	lek/lab/pr Contact hours	in hours SIS (including TSIS)	Form of control	Allocation of face-to-face training based on courses and semesters				Prerequisites
									1 course		2 course		
									1 sem	2 sem	3 sem	4 sem	
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)													
CYCLE OF BASIC DISCIPLINES (BD)													
M-1. Module of basic training (university component)													
HUM212	History and philosophy of science		BD, UC	3	90	15/0/15	60	E	3				
HUM213	Higher school pedagogy		BD, UC	3	90	15/0/15	60	E	3				
LNG213	Foreign language (professional)		BD, UC	3	90	0/0/30	60	E		3			
HUM214	Psychology of management		BD, UC	3	90	15/0/15	60	E		3			
TRA258	Quality management of machines and technological processes	1	BD, CCH	5	150	30/0/15	105	E		5			
MNG781	Intellectual property and research	1	BD, CCH	5	150	30/0/15	105	E		5			
TRA203	Modern problems of transport science, engineering and technology	1	BD, CCH	5	150	30/0/15	105	E		5			
TRA239	Research methodology	2	BD, CCH	5	150	30/0/15	105	E		5			
TRA259	Fundamentals of engineering creativity	2	BD, CCH	5	150	30/0/15	105	E		5			
MNG782	Sustainable development strategies	2	BD, CCH	5	150	30/0/15	105	E		5			
TRA205	Information support systems for design, manufacture and maintenance of ground transport and technological machines	1	BD, CCH	5	150	30/15/0	105	E			5		
TRA261	Innovative technologies in the design of modern motor vehicles	1	BD, CCH	5	150	30/15/0	105	E			5		
M-3. Practice-oriented module													
AAP273	Pedagogical practice		BD, UC	8				R			8		
CYCLE OF PROFILE DISCIPLINES (PD)													
M-2. Module of professional activity (university component, component of choice)													
TRA262	Examination of the technical condition of the machines		PD, UC	5	150	30/0/15	105	E	5				
TRA266	Computer technologies in science and production	1	PD, CCH	5	150	30/0/15	105	E	5				
TRA267	Methods of evaluation and testing of operational properties of road vehicles	1	PD, CCH	5	150	30/0/15	105	E	5				
TRA268	Innovative methods of machine repair and maintenance	2	PD, CCH	5	150	30/0/15	105	E	5				
TRA269	Environmentally friendly ways to restore machine parts	2	PD, CCH	5	150	30/0/15	105	E	5				
TRA270	New technological methods and materials in transport equipment	3	PD, CCH	5	150	30/0/15	105	E	5				
TRA271	Application of polymer composite materials in the production and repair of transport equipment	3	PD, CCH	5	150	30/0/15	105	E	5				

MCH290	Ensuring reliability in the process of the life cycle of machines		PD, UC	5	150	30/0/15	105	E		5			
TRA260	Methods of creating innovations in technology		PD, UC	5	150	30/0/15	105	E		5			
TRA273	Technological processes of maintenance and repair of transport and transport-technological machines and equipment		PD, UC	5	150	30/0/15	105	E			5		
TRA207	Automation systems for road transport		PD, UC	5	150	30/0/15	105	E			5		
TRA272	Research and testing of transport and transport-technological machines	1	PD, CCH	5	150	30/0/15	105	E			5		
TRA217	Technical means of the transport system	1	PD, CCH	5	150	30/0/15	105	E			5		
TRA700	Environmental safety of railway transport		PD, UC	4	120	30/0/15	75	E				4	
M-3. Practice-oriented module													
AAP256	Research practice		PD, UC	4				R				4	
M-4. Experimental research module													
AAP268	Research work of a master's student, including internship and completion of a master's thesis		RWMS	4				R	4				
AAP268	Research work of a master's student, including internship and completion of a master's thesis		RWMS	4				R		4			
AAP251	Research work of a master's student, including internship and completion of a master's thesis		RWMS	2				R			2		
AAP255	Research work of a master's student, including internship and completion of a master's thesis		RWMS	14				R				14	
M-5. Module of final attestation													
ECA212	Registration and protection of the master thesis		FA	8								8	
Total based on UNIVERSITY:									30	30	30	30	
									60		**60**		

Number of credits for the entire period of study

Cycle code	Cycles of disciplines	Credits			
		Required component (RC)	University component (UC)	Component of choice (CCH)	Total
GED	Cycle of general education disciplines	0	0	0	0
BD	Cycle of basic disciplines	0	20	15	35
PD	Cycle of profile disciplines	0	33	20	53
Total for theoretical training:		**0**	**53**	**35**	**88**
RWMS	Research Work of Master's Student				24
ERWMS	Experimental Research Work of Master's Student				0
FA	Final attestation				8
TOTAL:					**120**

Decision of the Educational and Methodological Council of KazNRTU named after K.Satpayev. Minutes № 3 dated 20.12.2024

Decision of the Academic Council of the Institute. Minutes № 3 dated 29.11.2024

Signed:

Governing Board member - Vice-Rector for Academic Affairs — Uskenbayeva R. K.

Approved:

Vice Provost on academic development — Kalpeyeva Z. Б.

Head of Department - Department of Educational Program Management and Academic-Methodological Work — Zhumagaliyeva A. S.

Supervisor - School of Transport Engineering and Logistics — Abdullayev S. C.

Department Chair - Transport Engineering — Kamzanov N. .

Representative of the Academic Committee from Employers ____Acknowledged____ — Beketov T.