M. Tynyshpayev School of Transport Engineering and Logistics

Field "Transport Engineering"

THE EDUCATIONAL PROGRAM

8D07119 Ground Transport, Transport Equipment and Technologies

Code and classification of the field of education: 8D07 Engineering, manufacturing and construction industries
Code and classification of training directions: 8D071 Engineering and Engineering affairs
Group of educational programs: D104 Transport, transport equipment and technologies
Level based on NQF: 8
Level based on SQF: 8
Study period: 3 years
Amount of credits: 180

Almaty 2026

The Educational Program 8D07119 Ground Transport, Transport Equipment and Technologies was approved at the meeting of the Management Board of Satbayev University
Minutes No. 5 dated March 10, 2026.

Reviewed and recommended for approval at the meeting of the Educational and Academic Council of K.I. Satbayev Kazakh National Research Technical University
Minutes No. 8 dated February 26, 2026.

Reviewed and recommended for approval at the meeting of the Educational and Methodological Council of K.I. Satbayev Kazakh National Research Technical University
Minutes No. 3 dated December 25, 2025.

The Educational Program 8D07119 Ground Transport, Transport Equipment and Technologies was reviewed and developed at the meeting of the Academic Committee.
Minutes No. 2 dated November 29, 2025.

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List of abbreviations and designations

EP – Educational Program;
NQF – National Qualifications Framework;
SQF – Sectoral Qualifications Framework;
LO – learning outcome;
SDG – Sustainable Development Goal.

1. Description of educational program

The Doctoral Educational Program 8D07119 Ground Transport, Transport Equipment and Technologies is aimed at training highly qualified research and managerial personnel for the transport and communications sector.

The program develops competencies in conducting independent scientific research, developing and implementing innovative and digital solutions, designing, operating, maintaining and repairing transport equipment, managing the life cycle of technical systems, and assessing reliability, risks, resource efficiency, and energy efficiency.

Particular attention is paid to developing capacities for scientific and technological leadership, strategic management of complex production and research processes, creation of new knowledge and technologies, forecasting their long-term impact on society and the environment, as well as designing educational and teaching-methodological content based on modern engineering approaches, the principles of sustainable development, and SDGs 4, 9, 11, 12, 13 and 17.

2. Purpose and objectives of educational program

Purpose of EP: Training of doctors in the field of professional activity, capable of managing complex production processes and generating high-tech ideas based on innovative technologies in the field of land transport.

Tasks of EP:

1. To ensure the training of highly qualified academic, research and managerial professionals capable of solving complex scientific, engineering and production problems in the transport sector.
2. To develop skills in independently formulating scientific problems, proposing hypotheses, designing research methodology, and conducting theoretical, experimental and applied research.
3. To develop the ability to critically analyse scientific achievements, synthesise new knowledge, and create innovative technical and technological solutions in the field of land transport.
4. To develop competencies in substantiating strategic and technological decisions in the design, operation, maintenance and repair of transport equipment, taking into account the life cycle of technical systems.
5. To develop competencies in the application of digital and intelligent technologies for data analysis, modelling, forecasting, monitoring, diagnostics, risk assessment, reliability assessment and efficiency evaluation of transport systems; to ensure the mastery of artificial intelligence, machine learning, digital twin and predictive analytics methods, taking into account the requirements of inclusiveness, accessibility, safety, data ethics and sustainable development of transport infrastructure.
6. To develop the ability to create solutions aimed at improving the energy and resource efficiency, environmental sustainability and competitiveness of the

transport sector.

7. To develop competencies in scientific and technological leadership, management of innovation, research and production processes, and assessment of the long-term impacts of decisions on society and the environment.

3. Requirements for evaluating the educational program learning outcomes

The assessment of learning outcomes of the educational program shall ensure objective confirmation that the doctoral student has achieved the declared LO1– LO8 and shall correspond to the research, engineering and technological, innovative, digital, and scientific-pedagogical focus of the training. Assessment shall be based on the principles of validity, objectivity, transparency, academic integrity, measurability, and the cumulative nature of results.

The achievement of learning outcomes is assessed based on the doctoral student's completion of educational, research, project-based, and scientific-pedagogical activities, as well as the results of the dissertation research. Assessment should consider not only the amount of knowledge acquired, but primarily the doctoral student's ability to independently formulate scientific problems, select and justify research methods, obtain new results, develop innovative solutions, and evaluate the consequences of their application.

Main requirements for the assessment procedure:

1. Alignment of assessment methods with learning outcomes. For each LO, measurable criteria, achievement indicators, and appropriate control methods shall be defined.

2. Comprehensive assessment. To confirm complex doctoral-level outcomes, it is recommended to use a combination of several methods: scientific projects, publications, analytical reports, presentations, experimental studies, modeling, a pedagogical portfolio, and the dissertation.

3. Assessment of independence. A high level of LO achievement implies the doctoral student's ability to independently set research objectives, select methodology, make decisions, and take responsibility for the results obtained.

4. Assessment of scientific novelty. For LO2, LO3, LO6, and LO8, the doctoral student's ability to obtain or develop results containing elements of scientific, methodological, technological, or applied novelty shall be a mandatory criterion.

5. Assessment of the validity of decisions. When assessing LO4– LO6, the evidential basis of the decisions made, the correctness of initial data, applied methods, optimization criteria, and interpretation of results shall be taken into account.

6. Assessment of practical significance. For engineering and innovative learning outcomes, the possibility of applying the developed solutions in the design, operation, maintenance, repair, and development of transport equipment and technologies shall be assessed.

7. Digital verifiability. When assessing NO8, the results of modeling, forecasting, and data analysis shall be reproducible, based on correct initial data, and

accompanied by an assessment of the validity, reliability, and limitations of the applied methods.

8. Academic integrity. All results of educational and research activities shall comply with the requirements of academic ethics, proper citation, data reliability, and independent completion of work.

9. Cumulative nature of assessment. Achievement of LOs shall be confirmed at different stages of study: during the completion of courses, research work, pedagogical practice, preparation of publications, and dissertation work.

10. Final confirmation. The integrated achievement of the educational program LOs is confirmed by the results of the doctoral student's research work, publication activity, completion of the individual plan, and successful defense of the doctoral dissertation.

For the internal quality assurance system, it is advisable to use three levels:

- threshold level — the doctoral student performs activities according to a prescribed algorithm and demonstrates basic achievement of the NO;
- sufficient level — independently applies and justifies methods, analyzes results, and makes decisions;
- high level — independently formulates new scientific tasks, synthesizes knowledge, develops original solutions, and substantiates their scientific novelty and practical significance.

For doctoral studies, the target level of achievement for most LOs should be the high level, especially for LO2, LO3, LO4, LO6, and LO8, since these outcomes directly characterize the graduate's ability to conduct independent scientific and innovative activity.

4. Passport of educational program

4.1. General information

№	Field name	Comments
1	Code and classification of the field of education	8D07 Engineering, manufacturing and construction industries
2	Code and classification of training directions	8D071 Engineering and Engineering affairs
3	Educational program group	D104 Transport, transport equipment and technologies
4	Educational program name	8D07119 Ground Transport, Transport Equipment and Technologies
5	Short description of educational program	The doctoral educational program is aimed at training highly qualified research and managerial personnel for the transport sector. The program develops competencies in scientific research, the development of innovative and digital solutions, the operation of transport equipment, the management of technical systems, reliability and risk assessment, scientific and technological leadership, strategic management, and innovation-driven development.
6	Purpose of EP	Training of doctors in the field of professional activity, capable of managing complex production processes and generating high-tech ideas based on innovative technologies in the field of land transport.
7	Type of EP	New EP
8	The level based on NQF	8
9	The level based on SQF	8
10	Distinctive features of EP	None
11	List of competencies of educational program	К1 The ability to prepare and present academic and scientific texts of various genres, provide well-reasoned presentation of original research results, and engage in professional scientific communication.
		К2 The ability to independently formulate scientific problems and hypotheses, develop research methodology, and apply modern theoretical, experimental and applied methods to solve complex problems in the field of land transport, transport engineering and technologies.
		К3 The ability to synthesise new knowledge based on critical analysis of scientific achievements and to develop scientifically substantiated innovative technical and technological solutions.
		К4 The ability to develop, compare and substantiate optimal solutions in the design,

		manufacture, operation, maintenance and repair of land transport systems and transport equipment.
		K5 The ability to make scientifically substantiated strategic and technological decisions for managing complex operation, maintenance and repair processes, taking into account the life cycle, financial performance and resource efficiency of technical systems.
		K6 The ability to develop solutions aimed at improving the energy efficiency, environmental sustainability, technological level and industrial competitiveness of the transport sector, taking into account sustainable development and industrialisation priorities.
		K7 The ability to apply methods of data analysis, artificial intelligence, mathematical and computer modelling, machine learning, forecasting, diagnostics, monitoring, risk assessment, reliability assessment and efficiency evaluation to develop digital and intelligent solutions in the field of land transport and transport engineering.
		K8 The ability to conduct a comprehensive assessment and forecasting of the long-term consequences of engineering, scientific and managerial decisions for technical systems, the economy, society and the environment, taking into account the requirements of inclusive development, universal design, transport accessibility, social justice and environmental sustainability.
		K9 The ability to design educational programmes and teaching and learning content for technical education, apply modern pedagogical approaches, and integrate scientific achievements, engineering innovations and sustainable development principles into the educational process.
12	Learning outcomes of educational program	LO1 To formulate an academic and scientific text on different genres in performing original research works to publish in different technical journals.
		LO2 To solve theoretical, experimental and applied problems via modern methods of scientific research.
		LO3 Synthesize new knowledge and technologies based on the analysis, planning and evaluation of know-how and scientific achievements in the field of transport equipment and technologies.
		LO4 To justify strategic and technological decisions for managing the operation, maintenance, and repair processes of ground transport and machinery, taking into account financial performance, the life cycle of technical systems, resource efficiency, energy saving, and the sustainable development of the transport sector.

		LO5 To develop different options for solving urgent tasks in the field of design, manufacture, operation and repair of transport equipment.
		LO6 To develop new research methods through independent research activities while taking into account copyright compliance rules.
		LO7 To predict the long-term impact of the results of his scientific, pedagogical and professional activities on society and the environment.
		LO8 To develop scientifically grounded digital and innovative solutions for monitoring, diagnosing, and managing ground transport and machinery objects using methods of data analysis, modeling, forecasting, risk assessment, reliability assessment, and efficiency evaluation.
13	Education form	Full-time study
14	Period of training	3 years
15	Amount of credits	180
16	Languages of instruction	Kazakh, Russian, English
17	Academic degree awarded	Doctor of Industry
18	Developer(s) and authors	Kamzanov N.S., Abdullayev S.S., Tokmurzina-Kobernyak N.A., Bektilevov A.Yu.

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	LO7	LO8	
Cycle of basic disciplines University component												
1	Academic Writing	Course Objective: to develop learners' knowledge, skills, and practical competencies in academic writing for research activities. Course Description: the course is aimed at studying the foundations and principles of academic writing. It covers the structure and organization of scientific articles, academic integrity, plagiarism prevention, and the responsible use of artificial intelligence tools in academic writing and research. Methods, technologies, tools, and approaches used to solve professional tasks within the relevant subject area are also studied.	5	v								
2	Methods of Scientific Research	Course Objective: to acquire knowledge of the laws, principles, concepts, terminology, content, and specific features of organizing and managing scientific research using modern scientometric methods. Course Description: the course covers the structure of technical sciences, the application of general scientific, philosophical, and specialized research methods, and the principles of organizing scientific research. It examines the methodological features of modern science, the directions of scientific	5		v							

		and research development, and the role of technical sciences, computer science, and engineering research in both theory and practice.										
Cycle of basic disciplines Component of choice												
3	Intellectual Property and the Global Market	Purpose: to develop students' knowledge, skills, and practical competencies in the field of protection, management, and commercialization of intellectual property in the global market. Contents: the course is aimed at studying the theoretical and practical foundations of the intellectual property system and its role in the global market. The course covers issues related to the protection of intellectual property rights, technology transfer, licensing, and the entry of innovative products into international markets. Approaches to the valuation, commercialization, legal protection, and promotion of intellectual property objects in the global market are examined.	5						**V**			
4	Methods for Calculating Load-Bearing Structures of Transport Equipment	Purpose: to develop skills in calculating the load-bearing structures of transport equipment. Content: The structure of load-bearing structures of transport equipment; computer-aided design of transport equipment objects; software packages for calculating the load-bearing structures of vehicles; the structure of computer-aided design systems, including supporting and design subsystems; organizational and technological preparation for the design and	5		**V**			**V**	**V**			

		calculation of load-bearing structures of ground transport equipment.										
5	Sustainability Science	Course Objective: to develop students' knowledge, skills, and practical competencies in the field of sustainable development principles and the interrelationship between socio-economic and environmental systems. Course Description: the course is aimed at studying the theoretical and practical foundations of sustainable development and its role in ensuring a balance between society, the economy, and the environment. The course covers issues related to the Sustainable Development Goals, rational use of resources, climate change, social responsibility, and economic sustainability. Approaches to analyzing, assessing, and implementing sustainable development strategies, as well as tools for evaluating social, environmental, and economic impacts, are examined.	5				v			v		
Cycle of profile disciplines University component												
6	Methods of Experimental Research and Digital Data Analysis of Transport Systems	Purpose: to develop doctoral students' competencies in planning and conducting experimental research on transport systems using digital technologies and data analysis methods to assess the technical parameters, reliability, and operational efficiency of ground transport equipment. Content: experimental planning; digital measurement systems; processing and analysis of experimental data; statistical analysis methods; digital	5			v	v				v	

		modeling, interpretation of research results for transport systems.										
7	Industrial Practice	Industrial practice is aimed at developing doctoral students' professional skills in applying scientific knowledge in real production, engineering and managerial contexts. During the practice, doctoral students study the activities of specialized enterprises and organizations, analyze technological processes, production risks, and indicators of efficiency, reliability and safety, and participate in solving applied tasks related to their dissertation research. Particular attention is paid to the implementation of innovative, digital and sustainable solutions, interaction with the professional environment, and assessment of the practical significance of scientific results. The practice ensures doctoral students' readiness for expert, project-based and managerial activity.	20			v	v	v	v		v	
Cycle of profile disciplines Component of choice												
8	Methods for Assessing the Restoration of Operability of Units and Aggregates of Ground Transport Equipment	Purpose: to form theoretical and practical knowledge about ways to assess the restoration of operability of components and assemblies of ground transport equipment. Content: tasks of technological preparation of production for the restoration of parts and assemblies; technological design of the process of restoration of components and assemblies of ground transport equipment; selection and justification of restoration methods; assessment of the quality of mechanical processing	5			v	v	v				

		after the restoration of parts and assemblies; resource-saving technologies used during repair; economic efficiency of restoration of parts and assemblies of ground transport equipment.										
9	Traffic Control of Ground Transport Equipment	Purpose: to develop skills in solving issues of managing the processes of operation of ground transport equipment, developing optimal options for controlling the movement of ground transport equipment. Contents: modeling of the movement of ground transport equipment; analysis of indicators of optimal control of the movement of ground transport equipment; determination of energy-optimal control modes of ground transport equipment using numerical optimization methods.	5			v	v		v		v	
10	Experimental research work of doctoral student, including internships and doctoral dissertations	Experimental research work of a doctoral student, including internship and completion of the doctoral dissertation, is aimed at developing the ability to conduct experimental research, obtain, process and interpret scientific data. In the course of this work, the doctoral student develops an experimental program, selects research methods and tools, performs calculations and modelling, analyzes the reliability of the results and validates them in the scientific and professional environment. Particular attention is paid to scientific novelty, practical significance, research ethics and the use of digital technologies. The outcome is a doctoral dissertation containing substantiated experimental results and scientific	123	v	v	v	v	v	v	v	v	v	

		conclusions.										
11	Final examination (writing and defending a doctoral dissertation	Final attestation (writing and defending a doctoral dissertation) is aimed at a comprehensive assessment of a doctoral student's readiness for independent scientific, research and expert activity. During final attestation, the doctoral student presents a completed doctoral dissertation containing scientific novelty, theoretical and practical significance, a well-grounded methodology, reliable results and conclusions. The dissertation defense confirms the doctoral student's ability to solve relevant scientific problems, present research results in a well-argued manner, engage in scientific discussion, and demonstrate a high level of academic culture, research ethics and professional competence.	12	v	v	v	v	v	v	v	v	

5. Curriculum of educational program

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

SATBAYEV UNIVERSITY

«APPROVED»
at the meeting of the Management Board
NPJSC«KazNRTU
named after K.Satbayev»
dated 10.03.2026 Minutes №5

WORKING CURRICULUM

Academic year	**2026-2027 (Autumn, Spring)**
Group of educational programs	**D104 - "Transport, transport equipment and technologies"**
Educational program	**8D07119 - "Ground Transport, Transport Equipment and Technologies"**
The awarded academic degree	**Doctor of Engineering (Industry)**
Form and duration of study	**full time (professional track) - 3 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		3 course		
									1 sem	2 sem	3 sem	4 sem	5 sem	6 sem	
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)															
CYCLE OF BASIC DISCIPLINES (BD)															
M-1. Module of basic training															
MET322	Methods of Scientific Research		BD, UC	5	150	30/0/15	105	E	5						
LNG305	Academic Writing		BD, UC	5	150	0/0/45	105	E	5						
MNG350	Sustainability Science	1	BD, CCH	5	150	30/0/15	105	E	5						
MNG349	Intellectual Property and the Global Market	1	BD, CCH	5	150	30/0/15	105	E	5						
TRA306	Methods for Calculating Load-Bearing Structures of Transport Equipment	1	BD, CCH	5	150	30/0/15	105	E	5						
CYCLE OF PROFILE DISCIPLINES (PD)															
M-2. Profile training module															
TRA319	Methods of Experimental Research and Digital Data Analysis of Transport Systems		PD, UC	5	150	30/0/15	105	E	5						
TRA309	Methods for Assessing the Restoration of Operability of Units and Aggregates of Ground Transport Equipment	1	PD, CCH	5	150	30/0/15	105	E	5						
TRA310	Traffic Control of Ground Transport Equipment	1	PD, CCH	5	150	30/0/15	105	E	5						
AAP388	Industrial Practice		PD, UC	20	600	0/0/300	300	R		20					
M-3. Experimental research module															
AAP384	Experimental research work of doctoral student, including internships and doctoral dissertations		ERW/DS	5				R	5						
AAP385	Experimental research work of doctoral student, including internships and doctoral dissertations		ERW/DS	10				R		10					
AAP386	Experimental research work of doctoral student, including internships and doctoral dissertations		ERW/DS	30				R			30				
AAP386	Experimental research work of doctoral student, including internships and doctoral dissertations		ERW/DS	30				R				30			
AAP386	Experimental research work of doctoral student, including internships and doctoral dissertations		ERW/DS	30				R					30		
AAP387	Experimental research work of doctoral student, including internships and doctoral dissertations		ERW/DS	18				R						18	
M-4. Module of final attestation															
ECA303	Writing and defending a doctoral dissertation		FA	12										12	
Total based on UNIVERSITY:									30	30	30	30	30	30	
									60		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	10	5	15
PD	Cycle of profile disciplines	0	25	5	30
Total for theoretical training:		0	35	10	45

RWDS	Research Work of Doctoral Student				0
ERWDS	Experimental Research Work of Doctoral Student				123
FA	Final attestation				12
TOTAL:					180

Decision of the Academic Council of KazNRTU named after K.Satpayev. Minutes №8 dated 26.02.2026

Decision of the Educational and Methodological Council of KazNRTU named after K.Satpayev. Minutes №3 dated 25.12.2025

Decision of the Academic Council of the Institute. Minutes №3a dated 05.12.2025

Signed:

Governing Board member - Vice-Rector for Academic Affairs — Sherubay S. .

Approved:

Director — Mukasheva Z. .

Head of Department - - — Oljeyeva H. K.

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

Supervisor - School of Transport Engineering and Logistics named after M.Tynyshpaev — Kamzanov N. .

Representative of the Academic Committee from Employers ____Acknowledged____ — Akhmetov O.