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

EDUCATIONAL PROGRAM

8D07115 - «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 IQF:	8
Study period:	3 year
Amount of credits:	180

Almaty 2025

Educational program 8D07115 - «Ground transport, transport equipment 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 8D07115 - «Ground transport, transport equipment and technologies» was developed by Academic committee based on direction 8D071 – Engineering and Engineering affairs

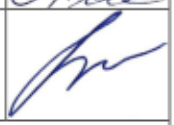
Full name	Academic degree/ academic title	Position	Workplace	Signature
Chairperson of Academic Committee:				
Abdullaev S.S.	Doctor of Technical Sciences, Professor	Head of the School of Transport Engineering and Logistics	KazNRTU named after K.I. Satpayev	
Teaching staff:				
Kamzanov N.S.	Doctor of 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				
Zhumagaliev E.R.	–	Doctoral student for 2 years of study	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;
DSRW – Doctoral Students' Research Work.

1. Description of educational program

In implementing the concept of sustainable development, this educational program has been designed in compliance with four key principles for achieving sustainable human development and incorporates the core Sustainable Development Goals (SDGs).

The following key goals can be identified:

«Quality Education. » The program is aimed at developing advanced knowledge and research skills necessary for conducting scientific research and solving complex problems in the field of sustainable transport engineering. The inclusion of international standards and a practice-oriented approach ensures high-quality education and contributes to the formation of competent specialists who are in demand in the labor market. (SDG 4)

«Industry, Innovation, and Infrastructure. » The program fosters the development of the following competencies among doctoral students: the ability to understand the risks associated with unsustainable industrialization, as well as familiarity with examples of stable, inclusive, and sustainable industrial development; awareness of the need for contingency planning; the ability to argue for the necessity of developing sustainable, stable, and inclusive infrastructure at the local level; the ability to motivate one's environment to transition toward more sustainable and stable forms of transport systems; the ability to find like-minded individuals in promoting the development of sustainable industries that take local contexts into account, meet new development challenges, and engage in cooperation when entering new markets; the ability to propose innovative solutions and formulate sustainable development initiatives that serve the interests of industrialization in one's country. (SDG 9)

One of the main learning outcomes for a doctoral student in the educational program 8D07115 – «Ground transport, transport equipment and technologies» is the ability to make decisions in the field of managing production processes related to the operation and maintenance of transport infrastructure facilities using innovative technologies, as well as the ability to synthesize new knowledge and technologies based on the analysis, planning, and evaluation of know-how and scientific achievements in the field of transport innovations.

One of the key competencies directly related to the professional activities of graduates of doctoral specialties is the ability to demonstrate personal and professional responsibility for the results of their professional activities, ethics, communication skills, and other relevant abilities.

A Doctor of Philosophy must be prepared for independent professional activities in the field of geospatial digital engineering, work in research institutions, and other related areas. They must combine deep theoretical training with practical skills and be aware of their responsibility to society, the environment, and future generations.

The uniqueness of the «Ground transport, transport equipment and technologies» educational program is determined by the competencies acquired by

doctoral students who have completed their education under this program.

The specialist model includes:

–competencies aimed at creating sustainable transport infrastructure, promoting inclusive and sustainable industrialization and innovation;

–competencies shaped by the development of modern science and technology;

–competencies dictated by the requirements of the profession and specialty;

–competencies determined by the socio-political structure of the country and its spiritual and moral system.

To acquire a set of professional, intercultural, and communicative competencies, the graduate must master the knowledge of a combination of basic (BD) and profiled (PD) disciplines — both as part of the mandatory component and the elective component — in accordance with the chosen educational trajectory, in the full scope established by the state standard.

In the modern world, an important skill is the ability to navigate the flow of information: the ability to find and systematize various information sources according to specific criteria; to use rational methods of obtaining, processing, systematizing, and storing information; to update it when necessary for intellectual and cognitive activities; and to possess modern technologies in the design, manufacturing, operation, and maintenance of ground transport engineering.

The planning of educational content, methods of organization, and the conduct of the learning process is carried out by the university and the scientific organization independently, based on the credit-based learning technology.

The content of the doctoral educational program consists of:

1. theoretical training, including the study of cycles of basic and specialized disciplines;

2. practical training of doctoral students: various types of internships, scientific or professional placements;

3. research work, including the completion of a doctoral dissertation;

4. final attestation.

The content of the Educational Program «Ground transport, transport equipment and technologies, » based on the development of a multi-level system of personnel training, the fundamentality and quality of education, the continuity and succession of education and science, and the unity of teaching, upbringing, research, and innovation activities aimed at maximally meeting consumer demands, shall ensure:

–synthesis of new knowledge and technologies based on the analysis, planning, and evaluation of know-how and scientific achievements in the field of transport infrastructure;

–solving theoretical, experimental, and applied problems using modern scientific research methods;

–minimizing the negative impact of innovative technologies on society, the environment, and future generations;

–development and implementation of transport projects in accordance with the relevant SDGs;

–ability to apply knowledge of mathematics, fundamental and technical sciences;

–use of methods for conducting analysis and evaluating experimental results.

List of Professional Standards on the basis of which this program was developed:

1. Educator (faculty members) of higher and/or postgraduate education institutions.

Field of Professional Activity:

Branches of science and technology studying the relationships and patterns in the theory of motion, calculations, design, testing, and operation of ground transportation with the aim of solving problems related to the creation of new and improvement of existing types of equipment; higher and secondary professional education.

Objects of Professional Activity:

Government and educational institutions, national and sectoral academies of sciences, scientific organizations, research institutes, research universities, scientific laboratories of higher educational institutions, experimental design bureaus, shared-use laboratories, research subdivisions of organizations for which scientific and/or scientific-technical activity is not the main type of activity; transportation, transport equipment, and enterprises of the transport and communication complex.

Types of Professional Activity:

–Research;

–Scientific and pedagogical;

–Production and technological;

–Organizational and managerial;

–Design and technological.

Functions of Professional Activity:

1. Planning of research and experimental-research works;

2. Conducting research and experimental-research works;

3. Educational: delivers instructional information, teaches how to acquire knowledge independently;

4. Educational-upbringing: engages learners in the system of social values;

5. Social and communicative: interacts with the professional community and all stakeholders in education.

List of Specialist Positions:

–Research Associate

–Professor, Associate Professor, Senior Lecturer;

–Education Manager;

–Researcher;

–Designer, Head of various departments of factories and production enterprises for the manufacture, repair, and operation of transport and transport equipment.

2. Purpose and objectives of educational program

Purpose of EP:

Is to train scientific, pedagogical and managerial specialists for transport and communication sphere who are able to manage complicated production and scientific processes to generate high-tech ideas based on research methods, forecasting and evaluation in the field of transport equipment and technologies.

1. Facilitation of the Graduate's Ability to:

Demonstrate advanced knowledge and understanding acquired at the level of higher and postgraduate education, which form the basis or opportunity for original development or application of ideas, often in the context of scientific research;

Apply knowledge, understanding, and problem-solving abilities in new or unfamiliar situations within broader or interdisciplinary contexts related to the field of study;

Integrate knowledge, deal with complexities, and make judgments based on incomplete or limited information, taking into account ethical and social responsibility for the application of such judgments and knowledge;

Communicate their conclusions, knowledge, and rationale clearly and unambiguously to both specialists and non-specialists;

Continue learning independently;

Plan, develop, implement, and adjust a comprehensive process of scientific research;

Demonstrate a systematic understanding of the field of study and mastery of the skills and research methods used in the field;

Critically analyze, evaluate, and synthesize new and complex ideas;

Conduct independent scientific inquiries and communicate their knowledge and achievements to colleagues, the scientific community, and the general public;

Develop practical skills and competencies for implementing engineering solutions that contribute to achieving the Sustainable Development Goals (SDGs).

2. Facilitation of the Graduate's Readiness to:

Independently develop professional and research competencies;

Independently perform research and professional tasks in accordance with the requirements of the professional standard and the educational program.

Research Practice

Research practice is a type of research activity aimed at deepening and systematizing the doctoral student's theoretical and methodological training, gaining practical mastery of research methodology, and acquiring and improving practical skills in conducting scientific and experimental work in accordance with the requirements for the PhD degree level of preparation.

Research practice is conducted to familiarize students with the latest theoretical, methodological, and technological achievements of domestic and international science, as well as with modern methods of scientific research, processing, and interpretation of experimental data. The content of the research

practice is determined by the topic of the dissertation research.

The doctoral student's research practice is carried out at the place of study or in scientific organizations that may serve as experimental sites for conducting research related to the topic of the doctoral dissertation. During the practice, doctoral students are given the opportunity to conduct experimental research according to a pre-developed program that takes into account the objectives of the doctoral dissertation.

Teaching Practice

The teaching practice of doctoral students serves as practical training for future educators and is conducted in conditions that are as close as possible to the professional activities of a teacher. The teaching practice is aimed at developing functional competencies and the ability to perform tasks in professional and educational spheres. During the teaching practice, the professional and personal development of future educators is activated. As part of the practice, doctoral students prepare and implement an educational activity plan with a group of students, design and conduct a system of classes that reflect a completed stage of the learning process based on the content of core disciplines, and demonstrate mastery of modern teaching technologies and methods.

The purpose of the teaching practice is to:

–consolidate and deepen knowledge in general scientific, psychological-pedagogical, methodological, core, and specialized disciplines;

–form pedagogical skills, abilities, and competencies based on theoretical knowledge.

The teaching practice program is developed by the department and approved by the Member of the Board – Vice-Rector for Academic Affairs.

The teaching practice program should be aimed at developing professionally significant skills and forming key competencies, including:

–planning, forecasting, and analyzing the main components of the teaching and educational process;

–using a variety of forms and methods for organizing and implementing students' educational-cognitive, labor, social, environmental, health-improving, recreational, and other types of activities;

–implementing an individual approach to students during teaching and educational work, taking into account their developmental characteristics;

–conducting pedagogical diagnostics of the state of the educational process.

The bases for teaching practice are educational organizations that provide secondary vocational education and higher education.

The duration of the teaching practice is determined by the Curriculum of the educational program for the field of training 8D071 – Engineering and Engineering affairs.

Doctoral Students' Research Work (DSRW)

The planning of the Doctoral Students' Research Work (DSRW) in weeks is determined based on the normative weekly working hours of the doctoral student. The number of credits allocated for DSRW in a specific academic period is determined by the working curriculum of the professional educational program in the field of training 8D071 – Engineering and Engineering affairs.

The DSRW must:

1. correspond to the main topics of the doctoral educational program under which the doctoral dissertation is defended;
2. be relevant and contain scientific novelty and practical significance;
3. be based on modern theoretical, methodological, and technological achievements of science and practice;
4. rely on modern methods of data processing and interpretation using computer technologies;
5. be carried out using modern scientific research methods;
6. contain research (methodological, practical) sections related to the main defended provisions.

The preparation of the doctoral dissertation is carried out during the DSRW period.

As part of the DSRW, the individual work plan of the doctoral student provides for mandatory international research internships in scientific organizations and/or organizations of relevant industries or fields of activity to gain familiarity with innovative technologies and new types of production.

The purpose of the research work is to prepare a doctoral student who possesses the methodology of scientific understanding of processes and is capable of applying scientific methods in studying the problems of modern production, with the final result of the research activity being the writing and successful defense of the doctoral dissertation.

Objectives of the Doctoral Students' Research Work (DSRW):

–to prepare highly qualified specialists of the modern generation, possessing extensive fundamental knowledge;

–to develop doctoral students' abilities and skills to critically analyze and master theoretical concepts, with the aim of implementing them in practice and subsequently testing them at the international level;

–to cultivate doctoral students' abilities for professional growth and self-development, as well as skills for independent and creative mastery of new knowledge throughout their active professional life.

Upon completion of the doctoral program, graduates should be prepared to perform the following types and tasks of professional research work:

–demonstrate a systematic understanding of the field of study and mastery of skills and research methods used in the field;

–plan, design, implement, and adjust a comprehensive scientific research process;

–contribute through original research to expanding the boundaries of the scientific field, with results potentially worthy of publication at the national or international level;

–critically analyze, evaluate, and synthesize new and complex ideas;

–communicate their knowledge and achievements to colleagues, the scientific community, and the broader public;

–contribute to the development of a knowledge-based society.

An international research internship is conducted in order to:

–fulfill the objectives of the doctoral dissertation;

–become acquainted with innovative technologies and new types of production;

–familiarize oneself with the latest theoretical, methodological, and technological achievements of domestic and international science;

–study modern methods of scientific research, processing, and interpretation of experimental data;

–consolidate the theoretical knowledge acquired during the learning process, gain practical skills, competencies, and professional experience in the trained specialty, as well as master advanced international best practices.

Requirements for Doctoral Students' Research Work (DSRW):

–correspondence to the main thematic area of the doctoral educational program under which the doctoral dissertation is defended;

–relevance, containing scientific novelty and practical significance;

–reliance on modern theoretical, methodological, and technological achievements of science and practice;

–application of modern methods of data processing and interpretation using computer technologies;

–implementation through modern methods of scientific research;

–inclusion of research (methodological, practical) sections on the main defended provisions.

The Academy establishes special requirements for the preparation of doctoral students in the research component of the program. These special requirements include:

–knowledge in the field of scientific and managerial activities in the context of continuous knowledge renewal and societal modernization;

–conducting independent research activities on relevant problems and disciplines;

–ability to process and transmit information in practice using modern technical tools;

–ability to forecast the directions of the country's technical and scientific

development;

–possession of modern specialized skills and methods necessary for making effective decisions in the field of engineering and technology.

The main content of the DSRW is reflected in the individual work plan of the doctoral student.

Content of the Doctoral Student's Research Work (DSRW)

The doctoral student's research work may be carried out in the following forms:

–performing assignments of the scientific supervisor in accordance with the approved research work plan;

–participating in the research activities of the department;

–participating in scientific and scientific-methodological seminars held by the Academy and the department;

–applying modern methods of data processing and interpretation using computer technologies;

–participating in the development of project documents and other provisions related to the subject area of the research;

–participating in scientific research, including joint scientific projects and programs;

–preparing and defending the doctoral dissertation.

The forms of conducting the doctoral student's research work may be specified and supplemented depending on the specifics of the doctoral program and dissertation topics.

The doctoral student's research work includes:

–research activities;

–scientific field trips (including participation in scientific conferences and seminars, internships at the base university of the foreign scientific supervisor);

–scientific publications;

–writing the doctoral dissertation.

Organization of International Scientific Internship within the Framework of Doctoral Research Work (DRW)

An international scientific internship is one of the most important components in the preparation of PhD doctors and is implemented in accordance with the Individual Plan of Research Work (IPRW) within the timeframes determined by the academic calendar and the individual work plan of the doctoral student.

The duration of the international scientific internship is determined independently by the Academy. As a rule, the international scientific internship is planned for the second year of doctoral studies.

The doctoral student's international scientific internship is carried out on the basis of agreements concluded with enterprises/organizations/institutions, universities, scientific organizations, and leading scientists from foreign countries

within the framework of Agreements and Memoranda of Understanding on cooperation in the field of education and science, as well as on the basis of personal invitations from educational and scientific organizations.

Participation in exchange programs, including double degree programs and joint educational programs with foreign universities and organizations, is considered equivalent to the completion of an international scientific internship.

The international internship of doctoral students is conducted within the framework of the dissertation research at a university and/or a large research center in a near or far-abroad country at the workplace of the foreign scientific supervisor, within the timeframes agreed upon with him/her.

If the doctoral student fails to complete the international scientific internship, he/she is not allowed to undergo the final attestation.

3. Requirements for evaluating the educational program learning outcomes

Individuals who have completed the doctoral educational program and successfully defended their doctoral dissertation, upon a positive decision of the Dissertation Councils of higher education institutions with special status or the Committee for Control in the Sphere of Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan, based on the results of an expert review, are awarded the degree of Doctor of Philosophy (PhD) or Doctor in a specific field. They are issued a state-standard diploma with an annex (transcript).

Holders of the PhD degree, in order to deepen their scientific knowledge and address scientific and applied problems on a specialized topic, undertake a postdoctoral program or carry out scientific research under the supervision of a leading scientist selected by the university.

Students have direct access to the Electronic Educational Resources (EER), curricula, and syllabi, which are posted on the university's website, as well as the opportunity to familiarize themselves with presentations of academic disciplines posted on the university and department websites (http://portal.kaznitu.kz/?q=ru/node/1442).

The cycle of basic disciplines forms the foundation of professional education.

The aim of the cycle of specialized disciplines is to ensure profound theoretical knowledge and the practical application of specialized engineering knowledge.

The final attestation of a doctoral student is conducted in the form of writing and defending a doctoral dissertation.

The purpose of the final attestation is to assess the doctoral student's scientific-theoretical and research-analytical level, the professional and managerial competencies acquired, readiness for the independent performance of professional tasks, and the compliance of their training with the requirements of the doctoral educational program.

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	8D07115 – « Ground transport, transport equipment and technologies»
5	Short description of educational program	The Doctor of Philosophy (PhD) program is oriented towards scientific and pedagogical activities and provides comprehensive training in education, methodology, and scientific research in line with the goals of sustainable development. It also involves in-depth study of disciplines related to the relevant scientific fields, with the aim of preparing specialists for higher and postgraduate education, as well as for the scientific sector.
6	Purpose of EP	Is to train scientific, pedagogical and managerial specialists for transport and communication sphere who are able to manage complicated production and scientific processes to generate high-tech ideas based on research methods, forecasting and evaluation in the field of transport equipment and technologies.
7	Type of EP	New EP
8	The level based on NQF	8
9	The level based on IQF	8
10	Distinctive features of EP	No
11	List of competencies of educational program	Key Competencies KC1 – Critically apply modern scientific methods and understand the fundamental principles and technologies of transport engineering, as well as current trends in the development of this field. KC2 – Conduct scientific research and apply innovative technologies in the design, operation, maintenance, and repair of transport equipment. KC3 – Organize the work of a production team and make organizational and managerial decisions in the development and implementation of technical projects aimed at improving transport equipment. KC4 – Carry out independent scientific research with academic integrity, applying knowledge of international standards in the field of transport and demonstrating the ability to interact at the global level to achieve common goals. KC5 – Conduct independent scientific research, analyze data, and generate new ideas in the field of innovative transport technologies.

№	Field name	Comments
		KC6 – Minimize the negative impact of innovative technologies on society, the environment, and future generations. KC7 – Develop and implement transport projects in accordance with the relevant Sustainable Development Goals (SDGs). KC8 – Forecast, calculate, and assess the long-term impact of decisions or measures—both personally made and at local and national levels—on other people and regions of the world. KC9 – Demonstrate readiness to take responsibility for the results of one's activities before the world, society, and future generations.
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 make decisions in the field of management of production processes in operation and repair of transport equipment on the basis of their financial performance, principles, resource and energy conservation. LO5 – To develop different options for solving urgent tasks in the field of design, manufacture, operation and repair of transport equipment LO6 – To propose innovative solutions and formulate initiatives in the field of sustainable development that meet the interests of the industrialization of their country LO7 – To predict the long-term impact of the results of his scientific, pedagogical and professional activities on society and the environment
13	Education form	Full-time
14	Period of training	3 year
15	Amount of credits	180
16	Languages of instruction	Russian, Kazakh
17	Academic degree awarded	Doctor of Philosophy PhD
18	Developers and authors	Abdullaev S.S., Kamzanov N.S., Tokmurizna-Kobernyak N.A. employer: Imentaeva S.G. student: Zhumagaliev E.R.

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)						
				LO1	LO2	LO3	LO4	LO5	LO6	LO7
Cycle of basic disciplines University component										
1	Methods of scientific research	Purpose: It consists in mastering knowledge about the laws, principles, concepts, terminology, content, specific features of the organization and management of scientific research using modern methods of scientometry. Contents: structure of technical sciences, application of general scientific, philosophical and special methods of scientific research, principles of organization of scientific research, methodological features of modern science, ways of development of science and scientific research, the role of technical sciences, computer science and engineering research in theory and practice.	**5**		**v**	**v**				
2	Academic writing	Objective: to develop academic writing skills and writing strategies for doctoral students in engineering and natural sciences. Content: fundamentals and general principles of academic writing, including: writing effective sentences and paragraphs, writing an abstract, introduction, conclusion, discussion, and references; in-text citation; preventing plagiarism; and preparing a	**5**	**v**						

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)						
				LO1	LO2	LO3	LO4	LO5	LO6	LO7
		conference presentation.								
Cycle of basic disciplines Component of choice										
3	Sustainability Science	Objective: to develop a deep understanding among doctoral students of the interactions between natural and social systems, as well as to develop skills for identifying and developing strategies for sustainable development that promote long-term human well-being and environmental preservation. Content: complex interconnections between ecosystems and societies, as well as an in-depth analysis of sustainability issues at local, national, and international levels.	**5**						**v**	**v**
4	Mathematical modeling and forecasting of dynamic processes of ground transport equipment	Objective: to develop research skills using mathematical modeling and forecasting of dynamic processes of land transport equipment. Contents: dynamics of transport equipment and the influence on it of vertical, longitudinal non-elasticity of a railway track and a highway; Classification of areas of instability of dynamic systems; Methods and methods for determining areas of parametric resonances, Qualitative study of vibrations of the crew body attributed to various planes of symmetry; Forced vibrations of the crew with a high center of gravity.	**5**			**v**	**v**	**v**		

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)						
				LO1	LO2	LO3	LO4	LO5	LO6	LO7
5	Science of sustainable transport	Purpose: to develop the ability to apply methods of planning, assessment, modeling and forecasting of the impact of transport on the environment and public health. Content: methods of planning sustainable transport systems; methods of assessment, modeling of transport on the state of the environment and public health; methods of technical and economic analysis of the effectiveness of measures and solutions to increase sustainability	**5**						**v**	**v**
6	Methods of calculation of load-bearing structures of transport equipment	Purpose: formation of skills for calculating load-bearing structures of transport equipment. Contents: structure of load-bearing structures of transport equipment; computer-aided design of transport equipment facilities; software complexes for calculating load-bearing structures of vehicles; structure of computer-aided design systems, providing and designing subsystems; organizational and technological preparation of design calculation of load-bearing structures of ground transport equipment.	**5**		**v**	**v**	**v**	**v**		
Cycle of profile disciplines Component of choice										
7	Methods of scientific experiments	Purpose: to develop skills in planning and conducting scientific experiments. Content: methods for evaluating the production of empirical mathematical	**5**		**v**	**v**				

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)						
				LO1	LO2	LO3	LO4	LO5	LO6	LO7
		models, assessing their adequacy, the basics of error theory and statistical processing of experimental studies in the design of transport equipment, processing experimental results using mathematical methods and an electronic computer.								
8	Basic principles of patenting and intellectual property protection	Purpose: to acquire knowledge of patenting and intellectual property protection. Content: general information about the results of intellectual activity, the process of obtaining knowledge: innovations and innovations, results of intellectual activity and patent strategies, methodology for obtaining new technical solutions, ensuring the completeness of protection of the results of intellectual activity, methods of preparing a patent application.	**5**	**v**	**v**					
9	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 after	**5**			**v**	**v**		**v**	**v**

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)						
				LO1	LO2	LO3	LO4	LO5	LO6	LO7
		the restoration of parts and assemblies; resource-saving technologies used during repair; economic efficiency of restoration of parts and assemblies of ground transport equipment.								
10	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**

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 (Autumn, Spring)**
Group of educational programs	**D104 - "Transport, transport equipment and technologies"**
Educational program	**8D07115 - "Ground transport, transport equipment and technologies"**
The awarded academic degree	**Doctor of Philosophy PhD**
Form and duration of study	**full time (scientific and pedagogical 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 (university component)															
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						
TRA317	Science of sustainable transport	1	BD, CCH	5	150	30/0/15	105	E	5						
TRA305	Mathematical modeling and forecasting of dynamic processes of ground transport equipment	1	BD, CCH	5	150	30/0/15	105	E	5						
TRA306	Methods of calculation of load-bearing structures of transport equipment	1	BD, CCH	5	150	30/0/15	105	E	5						
MNG350	Sustainability Science	1	BD, CCH	5	150	30/0/15	105	E	5						
M-3. Practice-oriented module															
AAP350	Pedagogical practice		BD, UC	10				R		10					
CYCLE OF PROFILE DISCIPLINES (PD)															
M-2. Module of professional activity (component of choice)															
TRA307	Basic principles of patenting and intellectual property protection	1	PD, CCH	5	150	30/0/15	105	E	5						
TRA308	Methods of scientific experiments	1	PD, CCH	5	150	30/0/15	105	E	5						
TRA309	Methods for assessing the restoration of operability of units and aggregates of ground transport equipment	2	PD, CCH	5	150	30/0/15	105	E	5						
TRA310	Traffic control of ground transport equipment	2	PD, CCH	5	150	30/0/15	105	E	5						
M-3. Practice-oriented module															
AAP355	Research practice		PD, UC	10				R			10				
M-4. Experimental research module															
AAP336	Research work of the doctoral student, including internships and doctoral dissertation		RWDS	5				R	5						
AAP347	Research work of the doctoral student, including internships and doctoral dissertation		RWDS	20				R		20					
AAP347	Research work of the doctoral student, including internships and doctoral dissertation		RWDS	20				R			20				
AAP356	Research work of the doctoral student, including internships and doctoral dissertation		RWDS	30				R				30			
AAP356	Research work of the doctoral student, including internships and doctoral dissertation		RWDS	30				R					30		
AAP348	Research work of the doctoral student, including internships and doctoral dissertation		RWDS	18				R						18	
M-5. Module of final attestation															
ECA325	Final examination (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	20	5	25
PD	Cycle of profile disciplines	0	10	10	20
Total for theoretical training:		**0**	**30**	**15**	**45**
RWDS	Research Work of Doctoral Student				123
ERWDS	Experimental Research Work of Doctoral Student				0
FA	Final attestation				12
TOTAL:					**180**

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____	Kaliyev E.