



**School of «Transport Engineering and Logistics»
The direction of «Transport engineering»**

**EDUCATIONAL PROGRAM
8D07115 – «LAND TRANSPORT, TRANSPORT EQUIPMENT
AND TECHNOLOGIES»**

The code and classification of the field of education:	8D07 – Engineering, manufacturing and construction industries
The code and classification of training areas:	8D071 – Engineering
Group of educational programs:	D104 - Transport, transport equipment and technologies
The level of the NQF:	8
The level of the IQF:	8
Study period:	3 years
Volume of loans:	180

Almaty 2023

NJSC KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY
named after K.I. SATBAYEV

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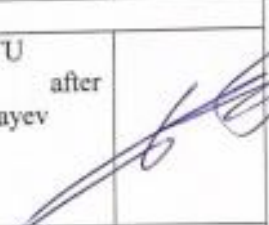



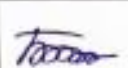
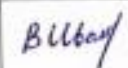
The educational program 8D07115 – «Land transport, transport equipment and technologies» was approved at a meeting of the Academic Council of KazNRTU named after K.I.Satbayev.

Protocol no. 13 from «28» 04 2022 year

Reviewed and recommended for approval at a meeting of the Educational and Methodological Council of KazNRTU named after K.I.Satbayev.

Protocol no. 7 from «26» 04 2022 year

The educational program 8D07115 – «Land transport, transport equipment and technologies» was developed by the Academic Committee in the field of «Engineering»

Full name	Academic degree/ academic title	Position	Place of work	Sign
Chairman of the Academic Committee:				
Yelemessov Kasym Koptleuevich	Candidate of Technical Sciences, Professor	Director of the Institute of Energy and Mechanical Engineering after A. Burkitbayev	KazNRTU named after K.I.Satbayev	
Teaching staff:				
Bortebaev Sayin Abilkhanovich	Candidate of Technical Sciences, associate professor	Head of the Department of Technological Machines and Transport, Institute of Energy and Mechanical Engineering	KazNRTU named after K.I.Satbayev	
Abdullayev Seidulla Seidemetovich	Doctor of Technical Sciences, Professor	Professor	KazNRTU named after K.I.Satbayev	
Akhmetova Sholpan Davletovna	Candidate of Technical Sciences	Associate Professor	KazNRTU named after K.I.Satbayev	
Employers:				
Beketov Tasbulat Sarsenbayevich	Master of Engineering and Technology	General manager	TOO «Mega Drive»	
Students:				
Voronin Ivan Valerievich	Bachelor	2nd year undergraduate student	KazNRTU named after K.I.Satbayev	

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List of abbreviations and designations

NJSC «K.I. Satpayev Kazakh National Research Technical University» – NJSC KazNRTU named after K.I. Satbayev;
SCSE – The State compulsory standard of education of the Republic of Kazakhstan;
EP – Educational program;
IWS – Independent work of a student (student, undergraduate, doctoral student);
IWST – Independent work of a student with a teacher (independent work of a student (undergraduate, doctoral student) with a teacher);
WC – Working curriculum;
CED – Catalog of elective disciplines;
UC – The university component;
CC – Component of choice;
NQF – National Qualification Framework;
IQF – Industry qualifications framework;
LO – Learning outcomes;
KC – Key competencies

1. Description of the educational program

The educational program for the preparation of a doctor of philosophy (PhD) has a scientific and pedagogical orientation and involves fundamental educational, methodological and research training and in-depth study of disciplines in relevant areas of science for the system of higher and postgraduate education and the scientific sphere.

The educational program for the preparation of a doctor in the profile involves fundamental educational, methodological and research training and in-depth study of disciplines in relevant areas of science for sectors of the national economy, the social sphere: education, medicine, law, art, economics, business administration and in the field of national security and military affairs.

The educational programs of doctoral studies in terms of professional training are developed based on the study of the experience of foreign universities and research centers that implement accredited PhD or doctoral training programs.

The content of the educational program of the profile doctoral program is determined by the university independently.

The main criterion for the completion of the educational process for the preparation of doctors of philosophy (PhD) (doctors in the profile) is the development of at least 180 academic credits by a doctoral student, including all types of educational and scientific activities.

The duration of doctoral studies is determined by the amount of academic credits acquired. Upon mastering the established amount of academic credits and achieving the expected learning outcomes for obtaining a Doctor of Philosophy (PhD) degree or a profile, the educational program of the doctoral program is considered fully mastered.

Doctoral training is carried out on the basis of master's degree educational programs in two directions:

- 1) scientific and pedagogical with a period of study of at least three years;
- 2) specialized with a period of study of at least three years.

Field of professional activity: Sections of science and technology that study connections and patterns in the theory of motion, calculations, design, testing and operation of land transport in order to solve problems of creating new and improving existing models of equipment; higher and secondary vocational education.

Objects of professional activity: bodies of state and educational institutions, national and branch academies of sciences, scientific organizations, research and design organizations, research universities, scientific laboratories of higher educational institutions, experimental design bureaus, laboratories for collective use, research units of organizations for which scientific and (or) scientific-technical activity is not the main activity; transport, transport equipment and enterprises of the transport and communication complex.

Functions of professional activity:

- 1) planning of scientific research and experimental research;
- 2) performing scientific research and experimental research;
- 3) educational: broadcasts educational information, teaches you to acquire

knowledge on your own;

- 4) educative: introduces students to the system of social values;
- 5) social and communicative: interacts with the professional community and with all interested parties of education.

2. The purpose and objectives of the educational program

The purpose of EP 8D07115 – "Land transport, transport equipment and technologies" are:

- training of scientific, pedagogical and managerial personnel for the transport complex, capable of managing complex industrial and scientific processes and generating innovative ideas based on research methods, forecasting and evaluation in the field of land transport equipment and technologies.

- creation of an effective training system for scientific, scientific and pedagogical personnel of a new formation based on the integration of education and science, capable of solving issues of improving society, economy, production, science and the development of new technologies;

- harmonization of domestic technologies for the training of highly qualified scientific and pedagogical personnel with international standards, as well as advanced solutions to issues of their scientific, methodological, legal, financial, economic, personnel and logistical support;

- implementation of the educational process in accordance with the principles of international practice of training highly qualified scientific and pedagogical personnel who are competitive in the modern labor market.

2. Types of professional activity:

Graduates of this EP can conduct the following types of professional activities:

- scientific and pedagogical;
- scientific research;
- organizational and managerial;
- production and technological;
- design and technological.

Tasks of EP 8D07115 – "Land transport, transport equipment and technologies":

1. Assistance in the formation of a graduate's ability:

- demonstrate the developing knowledge and understanding gained at the level of higher and postgraduate education, which are the basis or opportunity for the original development or application of ideas, often in the context of scientific research;

- apply knowledge, understanding, and the ability to solve problems in new or unfamiliar situations in contexts and within broader or interdisciplinary fields related to the field being studied;

- integrate knowledge, cope with difficulties and make judgments based on incomplete or limited information, considering the ethical and social responsibility for the application of these judgments and knowledge;

- clearly and clearly communicate your conclusions and knowledge and their

justification to specialists and non-specialists;

- continue studying on your own.
- plan, develop, implement and adjust a comprehensive research process;
- demonstrate a systematic understanding of the field of study, mastery of the skills and research methods used in this field;
- critically analyze, evaluate and synthesize new and complex ideas;
- conducting independent scientific research, the ability to communicate their knowledge and achievements to colleagues, the scientific community and the general public.

2. Assistance in the formation of graduate readiness:

- independently develop professional and research competencies;
- independently draw up projects and passports of mining and drilling and blasting operations;
- independently perform research and professional tasks in accordance with the requirements of the professional standard and the educational program.

3. Requirements for evaluating the learning outcomes of an educational program

Persons who have mastered the educational program of doctoral studies and defended their doctoral dissertation, with a positive decision of the dissertation councils of a university with a special status or the Committee for Control in the field of education and Science of the Ministry of Education and Science of the Republic of Kazakhstan, according to the results of the examination, are awarded the degree of Doctor of philosophy (PhD) or doctor in profile and a state-issued diploma with an appendix (transcript). Persons who have received a PhD degree, in order to deepen scientific knowledge, solve scientific and applied problems on a specialized topic, perform a postdoctoral program or conduct scientific research under the guidance of a leading scientist of the chosen university.

Students have direct access to the CED, curricula, syllabuses, which are posted on the university's website, and also have the opportunity to familiarize themselves with presentations of academic disciplines posted on the university's website and departments (<http://portal.kaznitu.kz/?q=ru/node/1442>)

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

The purpose of the cycle of specialized disciplines is to provide in-depth theoretical knowledge and practical application of special engineering knowledge.

1) *have an idea*:

- about the main stages of development and paradigm shift in the evolution of science;
- on the subject, ideological and methodological specifics of the natural (social, humanitarian, economic) sciences;
- about scientific schools of the relevant branch of knowledge, their theoretical and practical developments;
- about scientific concepts of world and Kazakh science in the relevant field;

- on the mechanism of implementation of scientific developments in practical activities;

- on the norms of interaction in the scientific community;
- on the pedagogical and scientific ethics of a research scientist;

2) *to know and understand:*

- modern trends, directions and patterns of development of Russian science in the context of globalization and internationalization;

- methodology of scientific knowledge;
- achievements of world and Kazakh science in the relevant field;
- (to realize and accept) the social responsibility of science and education;
- perfect foreign language for scientific communication and international cooperation;

3) *be able to:*

- to organize, plan and implement the process of scientific research;
- analyze, evaluate and compare various theoretical concepts in the field of research and draw conclusions;

- analyze and process information from various sources;
- to conduct independent scientific research, characterized by academic integrity, based on modern theories and methods of analysis;

- generate your own new scientific ideas, communicate your knowledge and ideas to the scientific community, expanding the boundaries of scientific knowledge;

- to choose and effectively use modern research methodology;
- plan and predict your further professional development;

4) *have skills:*

- critical analysis, evaluation and comparison of various scientific theories and ideas;

- analytical and experimental scientific activities;
- planning and forecasting of research results;
- public speaking and public speaking at international scientific forums, conferences and seminars;

- scientific writing and scientific communication;
- planning, coordination and implementation of scientific research processes;
- a systematic understanding of the field of study and demonstrate the quality and effectiveness of the selected scientific methods;

- participation in scientific events, fundamental scientific domestic and international projects;

- leadership management and team management;
- responsible and creative attitude to scientific and scientific-pedagogical activities;

- conducting patent search and experience in the transfer of scientific information using modern information and innovative technologies;

- protection of intellectual property rights to scientific discoveries and developments;

- free communication in a foreign language;

5) *be competent:*

- in the field of scientific and scientific-pedagogical activity in the context of rapid updating and growth of information flows;
- in conducting theoretical and experimental scientific research;
- in setting and solving theoretical and applied problems in scientific research;
- to conduct a professional and comprehensive analysis of problems in the relevant field;
- in matters of interpersonal communication and human resource management;
- in matters of university training of specialists;
- in carrying out the expertise of scientific projects and research;
- to ensure continuous professional growth.

Learning outcomes:

LO1 – To formulate academic and scientific texts of various genres when performing original research works in publications of various levels.

LO2 – To solve theoretical, experimental and applied problems using modern research methods.

LO3 – Synthesize new knowledge and technologies based on the analysis, forecasting and evaluation of innovations and scientific achievements in the field of transport equipment and technologies.

LO4 – To make decisions in the field of management of production processes of operation and repair of transport equipment on the basis of their economic efficiency and principles of resource and energy saving.

LO5 – To develop optimal solutions to current problems in the field of design, production, operation and repair of transport equipment.

4. Passport of the educational program

4.1. General information

№	Field name	Note
1	2	3
1	Registration number	8D07100088
2	The code and classification of the field of education	8D07 – Engineering, manufacturing and construction industries
3	The code and classification of training areas	8D071 – Engineering
4	Group of educational programs	D104 - Transport, transport equipment and technologies
5	Name of the educational program	«Land transport, transport equipment and technologies»
6	A brief description of the educational program	The program of study aimed at obtaining the degree of Doctor of Philosophy (PhD) is focused on scientific and pedagogical activities and includes thorough training in the field of education, methodology and scientific research. It also provides for in-depth study of disciplines related to relevant scientific fields in order to train specialists for higher and postgraduate education, as well as the scientific field.
7	The purpose of the EP	Training of scientific, pedagogical and managerial personnel for the transport and communication sphere, capable of managing complex industrial and scientific processes and generating high-tech ideas based on research methods, forecasting and evaluation in the field of transport equipment and technologies.
8	Type of EP	new
9	Software level NQF	8
10	Software level IQF	8
11	Distinctive features of the EP	no
12	The list of competencies of the educational program:	<ul style="list-style-type: none"> - Critically apply modern scientific methods and understand the basic principles and technologies in land transport, as well as current development trends in this area. - Conduct scientific research and apply the latest technologies such as autonomous vehicles, electric transport systems, smart cities and other innovations. - Organization of the work of the production group, making organizational and managerial decisions in the development and implementation of technical projects aimed at improving land transport technologies. - Conducting independent scientific research with academic integrity, using knowledge of international standards in the field of transport and the ability to interact at a global level to achieve common goals. - The ability to conduct independent scientific research, analyze data and put forward new ideas in the field of transport and transport technologies.
13	Learning outcomes of the educational program:	LO1 – To formulate academic and scientific texts of various genres when performing original research

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		<p>works in publications of various levels.</p> <p>LO2 is to solve theoretical, experimental and applied problems using modern research methods.</p> <p>LO3 – Synthesize new knowledge and technologies based on the analysis, forecasting and evaluation of innovations and scientific achievements in the field of transport equipment and technologies.</p> <p>LO4 – To make decisions in the field of management of production processes of operation and repair of transport equipment based on their economic efficiency and principles of resource and energy conservation.</p> <p>LO5 – To develop optimal solutions to current problems in the field of design, production, operation and repair of transport equipment.</p>
14	The form of education	Daytime
15	The duration of the training	3 years
16	Volume of loans	180
17	Languages of instruction	Russian
18	Academic degree awarded	Doctor of Philosophy (PhD) in the educational program "8D07115 – Land transport, transport equipment and technologies"
19	Developer(s) and authors:	<ol style="list-style-type: none"> 1. Professor, head of STEaL, Abdullayev S.S. 2. Head of the department TE, ass. professor, Kamzanov N. S. 3. Associate professor, Bektilevov A.Y. 4. Associate professor, Akhmetova S.D. 5. General Director of Mega Drive LLP Beketov T.S. 6. Undergraduate, Voronin I.V.

4.2. The relationship between the achievability of the formed learning outcomes according to the educational program and academic disciplines

№	Name of the discipline	A brief description of the discipline	Number of credits	Generated learning outcomes (codes)				
				L01	L02	L03	L04	L05
The cycle of basic disciplines The university component								
1	Methods of scientific research	It includes the following modules: Methodological foundations of scientific knowledge and engineering creativity; Selection of the direction of scientific research and stages of scientific research; Search, accumulation and processing of scientific information; Theoretical, experimental research and modeling; Implementation and effectiveness of scientific research.	5		v	v		
2	Academic Writing	"Academic writing" is a methodology for writing academic and scientific texts of various genres. The objectives of mastering the discipline "Academic writing" are: mastering the structural features and requirements for the design of academic and scientific texts. To improve the skills of abstracting and concise presentation of information, writing a bibliographic review. The ability to communicate scientific achievements to the general public and write scientific articles for publication in international publications.	5	v				
The cycle of basic disciplines Component of choice								
3	Mathematical modeling of dynamic processes of transport equipment	It consists of the following modules: Dynamics of the unsprung mass of rolling stock and the influence of vertical, longitudinal non-elasticity of the railway track on it; Modeling of the movement of a crew wheelset along an uneven path in a vertical plane; 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	5			v		v

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		planes of symmetry; Forced vibrations of the crew with a high center of gravity.						
4	Methods of calculation of load-bearing structures of transport equipment	The discipline consists of the following modules: the structure of load-bearing structures of transport equipment; computer-aided design of transport equipment facilities; software complexes for calculating load-bearing structures of vehicles; the structure of computer-aided design systems, providing and designing subsystems; organizational and technological preparation of the design calculation of load-bearing structures of ground transport equipment.	5				v	v
The cycle of core disciplines Component of choice								
5	Methods for assessing the restoration of operability of components and assemblies of ground transport equipment	The discipline consists of the following modules: 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 restoration of parts and assemblies; resource-saving technologies used during repair; economic efficiency of restoration of parts and assemblies of ground transport equipment.	5				v	v
6	Traffic control of ground transport equipment	The purpose of mastering the discipline is to develop doctoral students' 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. It consists of the following modules: modeling 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
7	The basic principles of patenting and	The discipline reflects the practical issues of creation, maintenance and inclusion of intellectual property objects	5		v	v		

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	intellectual property protection	in the economic turnover. It consists of the following modules: 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.						
8	Methods of scientific experiments	The discipline consists of modules: mathematical modeling and experimental planning; analysis of experimental studies and experimental results; statistical analysis of experimental results. The discipline studies methods for evaluating the production of empirical mathematical models, evaluating 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.	5				v	v

5. The curriculum of the educational program



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CURRICULUM
of Educational Program on enrollment for 2023-2024 academic year

Educational program 8D07115 - "Ground transport, transport equipment and technologies."
Group of educational programs D104 - "Transport, transport equipment and technologies"

		Form of study: full-time	Duration of study: 3 year					Academic degree: Doctor of Philosophy						
Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	Classroom amount lec/lab/pr	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training based on courses and semesters						
								1 course		2 course		3 course		
								1 semester	2 semester	3 semester	4 semester	5 semester	6 semester	
CYCLE OF BASIC DISCIPLINES (BD)														
M-1. Module of basic training (university component)														
MET322	Scientific research methods	BD UC	5	150	2/0/1	105	E	5						
LNG305	Academic writing	BD UC	5	150	0/0/3	105	E	5						

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component of choice												
TRA305	Mathematical modeling and forecasting of dynamic processes of ground transport equipment	BD CCHBD CCH	5	150	2/0/1	105	E	5				
TRA306	Methods of calculation of load-bearing structures of transport equipment	BD CCHBD CCH	5	150	2/0/1	105	E					
CYCLE OF PROFILE DISCIPLINES (PD)												
M-2. Module of professional activity (component of choice)												
TRA309	Methods for assessing the restoration of operability of units and aggregates of ground transport equipment	PD, CCH	5	150	2/0/1	105	E	5				
TRA310	Traffic control of ground transport equipment	PD, CCH	5	150	2/0/1	105	E					
TRA307	Basic principles of patenting and intellectual property protection	PD, CCH	5	150	2/0/1	105	E	5				
TRA308	Methods of scientific experiments	PD, CCH	5	150	2/0/1	105	E					
M-3. Practice-oriented module												
AAP350	Pedagogical practice	BD UC	10						10			
AAP355	Research practice	PD UC	10							10		

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M-4. Experimental research module												
AAP336	Research work of a doctoral candidate, including internships and completion of a doctoral dissertation	RWDS UC	5					5				
AAP347	Research work of a doctoral candidate, including internships and completion of a doctoral dissertation	RWDS UC	40						20	20		
AAP356	Research work of a doctoral candidate, including internships and completion of a doctoral dissertation	RWDS UC	60								30	30
AAP348	Research work of a doctoral candidate, including internships and completion of a doctoral dissertation	RWDS UC	18									18

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M-5. 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			
			university component (UC)	component of choice (CCH)	Total
BD	Cycle of basic disciplines		20	5	25
PD	Cycle of profile disciplines		10	10	20
	<i>Total for theoretical training:</i>	0	30	15	45
	RWDS				123
FA	Final attestation	12			12
	TOTAL:	12	30	15	180

Decision of the Academic Council of Kazntu named after K.Satpayev. Protocol No 3 or "17" 10 2022y.

Decision of the Educational and Methodological Council of Kazntu named after K.Satpayev. Protocol No 3 or "21" 10 2022y.

Decision of the Academic Council of the Institute E&ME. Protocol No 2 or "4" 10 2022y.

Vice-Rector for Academic Affairs



B.A. Zhautikov

Director of Institute of E&ME



K.K. Yelemessov

Head of department TM&T



S.A. Bortebayev

Representative of the Council from



B.M. Ospanov

