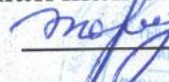


JSC «ALT Mukhametzhan Tynyshbayev University»

APPROVE

Chairman of the ALT University AC

 **M. Zharmrgambetova**

Decision of the Academic Council of

ALT University

«__» _____ **2026 year (protocol № __)**

**THE PROGRAM
OF THE ENTRANCE EXAM TO THE DOCTORAL PROGRAM
scientific and pedagogical direction**

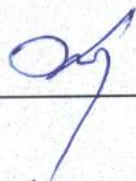
Group of educational programs: «D104 Transport, transport equipment and technologies»

Educational program: «8D07159 Transport, transport equipment and technologies»

Almaty 2026

The program of the entrance examination was discussed and received a positive decision at the meeting of the department «Motor Vehicles and Life Safety», Protocol No.7, 11th of March, 2026.

Head of the Department
«Motor Vehicles and Life Safety»



A.E. Toilybayev

The program of the entrance examination was discussed and received a positive decision at the meeting of the Department of «Rolling Stock», Protocol No. 7, 13th of March, 2026.

Head of the Department
« Rolling Stock »



G.K. Ashirbayev

The program of the entrance exam was reviewed and recommended at the meeting of the Council of the Institute of «Transport and construction», Protocol No.5, 17th of March, 2026.

Chairman of the CI
«Transport and construction»



N.Z. Suleyeva

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1. PURPOSE OF THE ENTRANCE EXAM

The purpose of the entrance exam is to determine the level of theoretical and practical readiness of the applicant for doctoral studies and to assess the compliance of his knowledge, skills and abilities with the requirements of training in the direction of training.

The PhD Doctoral Entrance Examination consists of the following blocks:

- 1) interview with the applicant, conducted by the examination committee;
- 2) essay writing;
- 3) answers to examination questions on the profile of the educational program group.

2. FORMAT AND PROCEDURE FOR THE ENTRANCE EXAMINATION

The duration of the entrance exam is 3 hours 30 minutes, during which the applicant is interviewed, writes an essay, answers an electronic examination ticket consisting of 3 questions. The list of questions and the topic of the essay are formed in a random order. The maximum score for the entrance exam is - 100 marks, of which the essay is 20 marks, the GOP profile exam is 50 marks, the interview is 30 marks.

3. Types and criteria of assessment

3.1 Essay Evaluation Types and Criteria

Types of essays	Description	The volume of the essay
Motivational	The applicant's argumentation about the motivations for research activities (research statement)	At least 250 words
Scientific and analytical	Substantiation by applicants of the relevance and methodology of the proposed research (research proposal)	
Problem-themed	Presentation of the author's position on relevant aspects of subject knowledge	

Criteria	Descriptors	Scores
Depth of disclosure of the topic	the problem is disclosed at the theoretical level, with the correct use of scientific terms and concepts	4
	the author presents his own point of view (position, attitude) when revealing the problem	4
Argumentation, evidence base	the presence of arguments from scientific literature and sources corresponding to the topic of the essay	4
Compositional integrity and logic of presentation	the presence of compositional integrity, the structural components of the essay are logically connected	4
Speech culture	demonstration of a high level of academic writing (vocabulary, knowledge of scientific terminology, grammar, stylistics)	4
	Maximum number of points	20

3.2 Criteria for evaluating the answers to the questions of the electronic examination card

The exam in the profile of the group of educational programs includes 3 blocks of questions, of which: the 1st question determines the level and consistency of theoretical knowledge; the 2nd question reveals the degree of formation of functional competencies; the 3rd question is aimed at determining systemic competencies. The maximum number of points is 50.

The electronic exam ticket consists of 3 questions:

Blocks	The nature of the question	Number of points
1st question	theoretical – determines the level and consistency of theoretical knowledge	10
2nd question	practical – reveals the degree of formation of functional competencies (the ability to apply techniques, technologies and techniques in the subject area)	20
3rd question	reveals a systematic understanding of the subject area under study, specialized knowledge in the field of research methodology (system competencies)	20
TOTAL		50

Criteria for evaluating the answers to the questions of the electronic examination card:

Question	Evaluation criteria	Number of points
1st question	demonstrates knowledge of the main processes of the studied subject area; the depth and completeness of the disclosure of the issue	5
	logically and consistently expresses his own opinion on the issue under discussion	3
	has a conceptual and categorical apparatus, scientific terminology	2
	Total	10
2nd question	applies methods, techniques, technologies to solve problems in the subject area	7
	argues, compares, classifies phenomena, events, processes; draws conclusions and generalizations based on practical skills	7
	analyzes information from various sources	6
	Total	20
3rd question	critically analyzes and evaluates theoretical and practical developments, scientific concepts and current trends in the development of science	7
	synthesizes methodological approaches in the interpretation of the main problems of subject knowledge	7
	identifies causal relationships in the analysis of processes, phenomena, events	6
	Total	20
	IN TOTAL	50 points

3.3 Interview evaluation criteria

№	Criteria	Descriptors	Scores
1.	Motivation	Argumentation of motives for studying for a doctoral degree in a selected OP and admission to a certain university. Vision of the prospects for professional and personal growth upon completion of training.	5
2	Research competence	Possession of research skills and experience necessary for research activities in a specific subject area.	10
3.	Creativity	Non-standard thinking, creative and alternative approaches to solving problems, situational tasks.	10
4.	Communicativeness	The ability to briefly, representatively, logically, argumentatively state your point of view, make generalizations and conclusions. Language proficiency.	5
Maximum number of points			30

4. Content of examination materials

4.1 Content of the Essay topic

№	The topic of the essay
1	The methodology of experimental tests of the operational reliability of freight wagons
2	The methodology of experimental tests of operational reliability of passenger and high-speed railcars
3	Reliability and operational safety of railway rolling stock
4	The main operational indicators of enterprises for the maintenance and repair of wagons and locomotives
5	Maintenance management of rolling stock in railway transport
6	Modern rolling stock of foreign countries
7	Modern methods in assessing the operational reliability of road construction and track machines
8	Maintenance of road construction and track machinery and prospects for the development of a maintenance and repair system
9	The basic concepts of reliability in the operation of transport equipment and ways to improve reliability
10	Prospects for the development of motor vehicles, taking into account automation and the development of artificial intelligence systems
11	Modern methods for diagnosing the technical condition of freight and passenger cars.
12	Improving the operational reliability of rolling stock based on digital monitoring technologies.
13	Organization of maintenance and repair of railway rolling stock in modern conditions.
14	Methods for predicting the residual life of elements of railway rolling stock.
15	Intelligent control systems for the technical condition of transport equipment.
16	Assessment of the efficiency of service maintenance of locomotives and wagons using

	digital technologies.
17	Promising technologies for maintenance of road-building and track machines.
18	Modern approaches to ensuring the reliability and safety of vehicles.
19	Automation of technical diagnostics and repair of transport equipment.
20	Development of artificial intelligence technologies in life cycle management of vehicles and railway rolling stock.

4.2 The content of the sections on the blocks submitted for the entrance exam

Examination materials for the entrance exams to the doctoral program for groups of educational programs, including the subject of essays, examination questions on the profile are made in three languages: Kazakh, Russian and English.

The topics of the examination questions correspond to the selected sections from the curricula of the cycles provided for by the groups of educational programs «**D104 – Transport, transport equipment and technologies**»:

№	Name of disciplines
1	Modern railway rolling stock
2	Promising types of motor vehicles
3	Promising types of working bodies of road construction and track machines
4	Interaction of track and rolling stock
5	Design, calculation of road construction machines and cars
6	Methodology and methods of scientific research

4.3 The content of sections by blocks submitted for the entrance exam

Block 1

1. Modern railway rolling stock
2. Promising types of motor vehicles
3. Promising types of working bodies of road construction and track machines
4. Interaction of track and rolling stock
5. Design, calculation of road construction machines and cars
6. Methodology and methods of scientific research

Block 2

1. Modern railway rolling stock
2. Promising types of motor vehicles
3. Promising types of working bodies of road construction and track machines
4. Interaction of track and rolling stock
5. Design, calculation of road construction machines and cars
6. Methodology and methods of scientific research

Block 3

1. Modern railway rolling stock
2. Promising types of motor vehicles
3. Promising types of working bodies of road construction and track machines
4. Interaction of track and rolling stock
5. Design, calculation of road construction machines and cars
6. Methodology and methods of scientific research

4.4 Content of interview questions

1. Classification of modern rolling stock of railways and its main design features.
2. Modern locomotives and motor-car rolling stock: development trends and technical characteristics.
3. Innovative technologies used in the design and operation of railway rolling stock.
4. Prospects for the development of high-speed and freight railway transport.
5. The main directions of development of modern vehicles.
6. Autonomous vehicles: operating principles, advantages and implementation problems.
7. Modern environmental requirements for motor vehicles and ways of their implementation.
8. Classification of working bodies of construction and road and track machines.
9. Promising designs of working bodies to increase the productivity and durability of machines.
10. Influence of the working tool design on the efficiency of technological processes.
11. Basic laws of interaction between railway track and rolling stock.
12. Dynamic forces arising from the movement of rolling stock and their impact on the condition of the track.
13. The influence of the technical condition of the track and wheelsets on the safety and smooth movement of trains.
14. Main stages of design of road-building machines and automobiles.
15. Methods for calculating the strength and durability of machine structural elements.
16. Modern computer-aided design (CAD/CAE) systems in mechanical engineering.
17. Optimization of structures of construction and road machines and cars according to the criteria of reliability, weight and cost.
18. The concept of scientific research, its goals, objectives and main stages.
19. Experiment planning, processing and analysis of scientific research results.
20. Requirements for registration and presentation of the results of scientific research, publications and final qualification works.
21. Vehicle Life Cycle Milestones: Quality Prediction
22. Efficiency of the Dalember method in solving vertical oscillation equations
23. Possibility of using the Dalember method when performing vibration calculations of a two-wheeled vehicle
24. Solution of the speed of movement using the Lyapunov stability criterion.
25. Possibilities of solving the equations of oscillations of transport equipment using the frequency method.

5. Recommended literature

5.1 Basic literature

1. Кадыров А.С. Основы научных исследований. Монография / А.С. Кадыров, И.А. Кадырова. — Караганда: Изд-во КарГТУ, 2015.

2. Методы обеспечения работоспособного технического состояния автотранспортных средств: Учебник / С.М. Мороз. – М.: МАДИ, 2015.
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4. Солоненко В.Г. и др. Грузовые и пассажирские вагоны: Учебник для ВУЗов ж.д. транспорта. – Алматы: Эверо, 2012.
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6. Мусаев Ж.С. Высокоскоростной подвижной состав: Учебное пособие. – Алматы: Эверо, 2012.
7. Баубеков Е.Е. Технологическое проектирование предприятий автомобильного транспорта: учебное пособие. – Алматы: КазАТК, 2020. – 193 с.
8. Таран М.В., Кульгильдинов М.С. и др. Транспорт и транспортная техника: Учебно-методическое пособие. – Алматы: КазАТК, 2014.
9. Мусаев Ж.С., Нурмамбетов С.М., Ивановцева Н.В., Бекмамбет К.М. Динамика транспортной техники: Учебник. – Алматы: КазАТК, 2014.
10. Надежность транспортной техники: учебник / Под ред. Ж.О.Кульсеитова. – Алматы: Ассоциация вузов РК, 2012.
11. Баубеков Е.Е. Техническая эксплуатация автомобилей: учебное пособие – Алматы: КазАТК, 2020. – 120 с.
12. Энергетические установки транспортной техники: справочное пособие / М.О. Мусабеков, Ф.Б. Бакыт, А.М. Өмірбек. – Алматы: КазАТК, 2018.

5.2 Additional literature

1. Основы технической эксплуатации транспортной техники: учебник для студентов, магистрантов и докторантов / С. Ж. Кабикенов [и др.]. – Алматы : Эверо, 2018. – 311 с.
2. Основы технической эксплуатации транспортной техники/С.Ж. Кабикенов, М.М. Кириевский, В.В.Шалаев; Карагандинский государственный технический университет. Караганда: Издательство КарГТУ, 2014. –261 с.
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