JSC "ALT University named after Mukhamedzhan Tynyshpayev"

APPROVING IT
Chairmanof the Management Board of ALT University JSC
_____ M. S. Zharmagambetova
Decision of the Academic Councilof ALT University JSC
from "30" 05 2025 year (protocol no. 10)

PROGRAM
THE ENTRANCE EXAM TO THE DOCTORAL (PROFILE) PROGRAM

Gruppe of educational programs
D210-Backbone networks and infrastructure

Almaty, 2025

The program of the entrance exam was discussed and received a positive decision at the meeting of the Department ofTransport Construction, Protocol No. 10 of 13 June 13, 2025.

Head of the Department
"Transport construction " _____ **G. B. Karibayeva**

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.6 of 23 June 23, 2025.

Chairman of the Institute of
Transport and Construction _____ **Sh. A. Abdreshov**

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1. The purpose of the entrance exam for a group of educational programs

The objectives of the entrance examination for groups of educational programs are to assess the theoretical and practical readiness of applicants for doctoral studies, as well as the level of their knowledge, skills, and competencies in accordance with the requirements of the chosen field of study.
The doctoral entrance examination consists of an interview and an exam on the profile of the educational program group.

2. Regulations for conducting the entrance exam for doctoral studies in a group of educational programs

The duration of the entrance examination is 2 hours and 30 minutes, during which the applicant answers an electronic exam ticket consisting of 3 questions. The list of questions is generated randomly. The maximum score for the entrance examination is 80 points, distributed as follows: exam on the profile of the educational program group – 50 points, interview – 25 points, and a recommendation letter from enterprises or organizations (if available) – 5 points.

3. Types and evaluation criteria

3.1 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
The 3rd question	it 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 subject area under study; the depth and completeness of the disclosure of the issue	5
	logically and consistently expresses his own opinion on the issue under discussion	3
	knows the conceptual and categorical apparatus, scientific terminology	2
TOTAL		10

2nd question	applies methods, techniques, and 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
The 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 cause-and-effect relationships in the analysis of processes, phenomena, events	6
TOTAL		20
In total		50 points

3.2 Interview evaluation criteria

№	Criteria	Descriptors	Points
1.	**Motivation**	Argumentation of motives for studying for a doctoral degree in a selected OP and admission to a certain university. Vision of 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.	5
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			**25**

4. Content of examination materials

4.1 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 D210-«Backbone networks and infrastructure».

№	Name of disciplines
1	Improving the reliability of transport infrastructure elements
2	Problems and prospects for servicing main facilities
3	Digital technologies in the management of trunk infrastructure

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

Block 1

1.1. Theoretical and constructive foundations of the path structure.

General information about the railway track. Purpose and classification of a railway track. Basic elements of the upper structure of the path. Rails and rail fasteners. Rail types, markings, and their main parameters. Rail connection: linings, welding, bolted connections. Intermediate and butt joints: purposes, structures. Sleepers and bars. Sleeper materials: wooden, reinforced concrete, plastic. Design, dimensions and service life.

1.2. Track technology and operation

Ballast layer and roadbed. Purpose, ballast materials, stowage. Roadbed construction, drainage and reinforcement. Construction and maintenance of a railway track.

Block 2

2.1. Engineering surveys for artificial structures

Goals and objectives of engineering surveys in the design of bridges and tunnels. Geodetic and geological surveys for structures. Analysis of the terrain and engineering and geological features of the site. Assessment of the stability of foundations and selection of the location of structures. Feasibility study of options for placing objects. Design of survey documentation for artificial structures

2.2. Design of artificial railway structures

Classification and purpose of artificial structures (bridges, tunnels, culverts, retaining walls, etc.). Basic calculation of bridges: spans, supports, load. Structures and materials used in bridge construction. Design of tunnels and engineering crossings. Consideration of seismic and climatic conditions in the design process.

Block 3

3.1. Railway track maintenance and repair

Purpose and tasks of the path content. Classification of the technical condition of the track. Frequency of inspections and diagnostics of the route. Organization and types of current path content. Maintenance of rails, sleepers and the ballast layer. Prevention of path deformations. Use of track equipment for current content. Traffic safety and content requirements.

3.2. Railway track repairs

Types of track repairs: capital, medium, alignment. Technology of repair work production. Machines and mechanisms used for repairs. Planning and organization of repair work. Improve repair efficiency and save resources. Modern technologies and materials in track repair. Quality control and acceptance after repairs.

4 Interview questions

1. What are your academic strengths?
2. What are your academic shortcomings and how did you deal with them?
3. What are your most significant scientific achievements to date?
4. What are your research interests?
5. What are your professional goals?
6. What attracted you to this area in the first place?
7. What is your motivation for obtaining this degree (PhD)?
8. What do you think are the most significant trends in your field of research?
9. What interests you if you want to participate in our program?
10. What do you consider your most significant achievement?
11. What are the goals and objectives of the railway industry?
12. What is the main purpose of railway infrastructure?
13. What are the criteria for the reliability of railway infrastructure?
14. What are the main engineering network design features?
15. What is the role of engineering surveys in the design of backbone networks?

5. Recommended literature

5.1.1 Basic literature

1. Tsytovich N. A. Soil mechanics. Moscow: Librocom Publishing House, 2013, 272 p.
2. Unaibaev B. Zh., Arsenin V. A., Mardenov Zh. A. and others. Foundation construction on saline soils. Ekibastuz : EITI Publ., 2012, 184 p.
3. Bokarev, S. A. Maintenance of artificial structures using information technologies. textbook / S. A. Bokarev, S. S. Pribytkov, A. N. Yashnov. - Moscow: UMTS po obrazovaniyu na zh / d transport, 2008. - 195s. - (Higher professional education).
4. G. M. Borovik. Textbook. Artificial structures on railways. Khabarovsk. 2013 DVGUPS Publishing House
5. Khasenov S. S., Kvashnin M. Ya., Abiev B. A., Bondar I. S. "Rules for the construction and maintenance of artificial structures in the railway transport of the Republic of Kazakhstan". 2015 No. 1288.
6. Ashpiz E. S. "Railway way". Moscow: 2013

5.2.1 Additional literature

1. Fundamentals of technical operation of transport equipment: a textbook for students, undergraduates and doctoral students / S. Zh. Kabikenov [et al.]. - Almaty : Evero, 2018. - 311 p.
2. Fundamentals of technical operation of transport equipment / S. Zh. Kabikenov, M. M. Kirievsky, V. V. Shalaev; Karaganda State Technical University. Karaganda: KSTU Publishing House, 2014. -261 p.
3. Көлік техникасын техникалық пайдалану негіздері. Оқу құралы/Kopenov B. T.- Almaty, 2011. - 110 p.
4. NTD "Rules for the construction and maintenance of artificial structures in railway transport of the Republic of Kazakhstan". 2015 No. 1288. Khasenov S. S., Kvashnin M. Ya., Abiev B. A., Bondar I. S.
5. Kadyrov A. S. Fundamentals of scientific research. Monograph / A. S. Kadyrov, I. A. Kadyrova. - Karaganda: KSTU Publishing House, 2015.