AGREED
Chief Engineer of the project,
LLP «Kazakh Promtransproject»
Musaev M.T.
«17» 03 2025 г.

APPROVING
Director of the Institute
«Transport and Construction»
Abdreshov S.A.
«19» 03 2025 г.

THE CATALOG OF DISCIPLINES OF THE COMPONENT OF CHOICE

EDUCATIONAL PROGRAM 7M07170 Transport structures (profile)

Education level: Master **Duration: 1 year** **Admission year: 2025 y.**

№	Cycle	Component	Name of the discipline	Total labor intensity		Term	Learning outcomes	Brief description of the discipline	Prerequisites	Post-requirements
				in academic hours	in academic loans					
1	2	3	4	5	6	7	8	9	10	11
1	BD	EC	Lean manufacturing	120	4	1	LO3	Methods of minimizing losses and increasing production efficiency are being mastered. Managerial competencies are being developed in process analysis, decision-making, and the implementation of lean approaches. The ability to develop productivity improvement projects based on the rational use of resources is being formed. The principles of lean thinking focused on sustainable development, automation and improvement of all levels of production and management activities are studied.	Ecology and safety lifelife safety	Final certification
2	BD	EC	SMART technologies in transport				LO4	The discipline reveals intelligent technologies of digital monitoring, automation and management of transport infrastructure facilities based on modern IT solutions. Develops competencies in the application of the Internet of Things, predictive analytics, artificial intelligence systems and digital twins to improve operational safety, reliability and efficiency. The methods of building SMART systems, digital	Information and communication technologies	Final certification

								modeling, data analysis and forecasting are being mastered to ensure the sustainable development of transport.		
3	PD	EC	The use of artificial intelligence and automation in the construction of highways and airfields	150	5	1	LO9	The discipline studies the implementation of artificial intelligence and automation in the design, construction and maintenance of highways and airfields. Machine learning algorithms, construction process management systems, and resource optimization are considered. The goal is to improve the efficiency, safety and quality of infrastructure projects while minimizing costs and time to complete the work.	Within the framework of the Bachelor's degree program	Final certification
4	PD	EC	Sustainable construction and smart roads				LO8	Sustainable construction and smart roads focus on developing environmentally friendly, energy efficient and safe transportation systems. The use of innovative technologies such as sensors and IT solutions makes it possible to optimize traffic management, minimize the impact on nature and improve the quality of road infrastructure, ensuring comfort and safety for users.	Within the framework of the Bachelor's degree program	Research work, final certification
5	PD	EC	Innovative technologies in the construction of highways and airfields	150	5	1	LO10	Innovative technologies in the construction of highways and airfields include the use of modern materials, computer-aided design systems, 3D printing, drones for monitoring and analysis, and intelligent transport systems. These technologies improve the efficiency, safety and sustainability of infrastructure while minimizing costs and environmental impacts.	As part of the Bachelor's degree program	Final certification
6	PD	EC	Digitalization of the transport system infrastructure				LO10	Digitalization of the transport system infrastructure includes the introduction of modern information technologies to optimize the design, construction and operation of facilities. This ensures an increase in the efficiency, safety and sustainability of transport networks. The use of real-time data, process automation, and integration with smart management systems contribute to improved service quality and lower costs.	In the framework of the Bachelor's degree program	Final certification

Head of the department «Architectural and construction Engineering» **Kulmanov K.S.**