

AGREED

Deputy Head of production of the Almaty operational locomotive depot of the branch of LLP "KTZ-Freight transportation" - "Almaty branch of FT"
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**APPROVED**

Director of the Institute
"Transport and construction"
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«18» 03 2025 y.

CATALOG OF ELECTIVE COMPONENT DISCIPLINES**EDUCATIONAL PROGRAM****7M07163 - TRANSPORT ENGINEERING****Level of education: master's degree profile****Time of study: 1 years****Year of admission: 2025 y.**

Module	Cycle	Component	Name of discipline	Total labor input		Semester	Learning outcomes	Brief description of the discipline	Prerequisites	Post requisites	Department
				in academic hours	in academic credits						
1	2	3	4	5	6	7	8	9	10	11	12
Module 3 - Professional Competencies	BD	EC1	Lean manufacturing	120	4	1	ON1, ON4, ON6	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.	Undergraduate courses	ERWMS, FC.	RS
		EC2	SMART technologies in transport				ON4, ON6, ON7	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 modeling, data analysis and forecasting are being mastered to ensure the sustainable development of transport.	Undergraduate courses	ERWMS, FC.	RS

1	2	3	4	5	6	7	8	9	10	11	12
Module 3 - Professional Competencies	PD	EC1	Modern technologies of railway rolling stock operation	150	5	1	ON3, ON4, ON5, ON7	Development of skills in planning, organizing and managing the operation of railway rolling stock, including assessment of its technical condition for compliance with established safety requirements. The methods of diagnostics, reliability forecasting, risk analysis, digital modeling, and engineering analytics are being studied. The ability is being formed to design effective maintenance and repair systems taking into account the principles of sustainable development, optimize operational parameters and compile technical documentation to ensure high-quality and safe operation of rolling stock.	Undergraduate courses	ERWMS, FC.	RS
		EC2	Technical operation and maintenance of motor vehicles				ON3, ON4, ON5, ON7	Modern approaches to preparing vehicles for operation, ensuring operability and maintenance using IT solutions are being studied. Competencies are being formed in the design of maintenance and repair systems, digitalization of diagnostics, development of regulatory and technical documentation, forecasting reliability and safety, and evaluating vehicles to determine their compliance with specified requirements, taking into account type approval and component certification procedures. The methods of risk analysis, digital modeling and engineering analytics are being mastered.	Undergraduate courses	ERWMS, FC.	MV&LS

1	2	3	4	5	6	7	8	9	10	11	12
Module 3 - Professional Competencies	PD	EC1	Resource- and energy-saving technologies in transport	150	5	1	ON1, ON5, ON6	Study of methods for reducing energy consumption and rational use of resources in the operation, maintenance and repair of transport equipment and mastering the practice of using appropriate methods for analyzing and solving industry problems. Skills development: development and analysis of energy-saving technologies; creation of environmentally safe innovative energy efficiency improvement projects; preparation of regulatory and technical documentation; development of management solutions in the field of transport engineering, ensuring compliance of processes with international standards of quality, safety and sustainable development.	Undergraduate courses	ERWMS, FC.	RS
		EC2	Environmental safety of motor vehicles				ON1, ON6	A set of knowledge and skills is being developed to analyze, evaluate and minimize the negative impact of motor vehicles on the environment and human health. Methods of ensuring environmental safety and developing measures to improve the environmental characteristics of transport are being mastered, including the use of innovative technologies and their subsequent conformity assessment to environmental standards. Interactive learning technologies, case studies, computational and analytical methods that meet the requirements of sustainable development, environmental efficiency and innovative development of the transport industry are used.	Undergraduate courses	ERWMS, FC.	MV&LS

1	2	3	4	5	6	7	8	9	10	11	12
Module 3 - Professional Competencies	PD	EC1	Optimization and management of railway repair facilities	150	5	1	ON1, ON4, ON5	Mastering modern methods of analysis, planning, optimization and automation of production processes of railway repair enterprises. Development of skills in using digital technologies to increase productivity, economic efficiency and quality of work of enterprises. The ability to develop innovative projects and documentation is being formed, and to make effective management decisions, ensuring that repair companies comply with international standards of quality, safety and sustainability of railway transport.	Undergraduate courses	ERWMS, FC.	RS
		EC2	Ensuring competitiveness in transport: quality, innovation and standards				ON1, ON4, ON7	The discipline forms competencies for ensuring competitiveness in transport through the introduction of innovative engineering approaches and digital technologies into processes and services. The methods of quality assessment and management, confirmation of compliance of transport services and equipment with the requirements of international standards are being studied. The development of effective management solutions and the design of systems aimed at improving the safety, efficiency and sustainable development of transport enterprises is being mastered.	Undergraduate courses	ERWMS, FC.	MV&LS
Total				570	19						