MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
KARAGANDA STATE UNIVERSITY
NAMED AFTER ACADEMICIAN E. A. BUKETOV

«AGREED»
Director of "Bus Park No. 2" LLP, Karaganda»

G. M. Zhaksybaev
«30» 03 2022

«AFFIRM»
Chairman of the Management Board-Rector

Dulatbekov N. O.
«30» 03 2022

EDUCATIONAL PROGRAM
«7M07107-Transport, transport equipment and technologies»
Level: Master's Degree

Karaganda, 2022

The educational program in the direction of training " 7M07107-Transport, transport equipment and technologies is developed on the basis of:

- * The Law of the Republic of Kazakhstan dated July 27, 2007 No. 319-III "On Education"
- * Law of the Republic of Kazakhstan No. 151-I of 11 July 1997. "On languages in the Republic of Kazakhstan"
- • State Mandatory Standard of Higher Education No. 604 of October 31, 2018
- * The National Qualifications Framework of March 16, 2016 by the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations
- * Order of the Ministry of Education and Science of the Republic of Kazakhstan "On Approval of the Rules for organizing the educational process in credit Technology" dated October 2, 2018 No. 152
- * Classifier of training directions for personnel with higher and postgraduate education No. 569 of October 13, 2018.

* Professional standard "Control over the technical condition of road transport" (Appendix No. 3 to the Order of the Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated September 6, 2018 No. 239).

1. Passport of the educational program

1.1 General information about the educational program

1. Code and name of the educational program: 7M07107- Transport, transport equipment and technologies

2. Code and classification of the field of education, training areas: 7M07 Engineering, manufacturing and construction industries 7M071 – Engineering and Engineering

3. Group of educational programs: M104- Transport, transport equipment and technologies

4. The amount of credits – 120

5. Form of study: full-time

6. Language of instruction: Kazakh, Russian, English

7. Degree awarded: Master of Technical Sciences

8. Type of EP: current

9. ISCED level (International Standard Classification of Education) – Level 7

10. Level of NQF (National Qualifications Framework) – Level 7

11. ORC level (Industry Qualifications Framework) – Level 7

12. Distinctive features of EP: no

13. Number of the appendix to the license for the direction of training: KZ83LAA00018495 dated 07/28/2020, appendix 016

14. The name of the accreditation body and the validity period of the EP accreditation:

15. Objectives of the EP: Preparation of masters with in-depth knowledge in new directions of the transport industry, who possess methods of conducting fundamental and applied scientific research in the field of transport operation

16. Qualification characteristics of the graduate

a) List of graduate positions

The graduate of the Master's degree is awarded the degree: Master of Technical Sciences in the educational program "7M07107 - Transport, transport equipment and technologies". Qualifications and positions: researcher; designer, mechanic, site manager, repair engineer, head of the management bodies of industrial enterprises, researcher and teacher in organizations of higher and professional education.

b) The scope and objects of professional activity of the graduate

Scientific-research, scientific-production, design organizations; educational institutions of higher and vocational education

c) Types of professional activity of the graduate:

- educational (educational, pedagogical);
- scientific research;
- organizational and managerial;
- production and management;
- project.

d) Functions of the graduate's professional activity:

- pedagogical;
- research;
- social and communicative.

17. Formulation of learning outcomes based on the competencies of the EP "7M07107- Transport, transport equipment and technologies"

Types of competencies	Learning result code	Learning outcomes (according to Bloom's taxonomy)
1. Behavioral skills and personal qualities: (Soft skills)	RO1	Analyzes professional technical and technological information in a foreign language, methodological problems, the results of a scientific experiment in solving research problems and organizing higher education.
	RO 2	Uses socio-humanitarian, natural science, pedagogical and psychological knowledge, modern methods and methods of planning, management, taking into account psychological aspects that contribute to the implementation of the main directions of modernization of public consciousness.
	RO 3	Analyzes the state of transport equipment and technological equipment, owns methods for assessing their reliability. Uses methods of technical and economic analysis and conditions for making engineering and management decisions.
	RO 4	Applies procedures for patenting inventions, technologies for intellectual property protection and commercialization of scientific research results.
2. Digital competencies: (Digital skills):	RO 5	Uses software, hardware components of intelligent transport systems and methods of analysis of technical, technological, material science components in the organization of transportation and operation of transport.
	RO 6	Conducts research and technical tests using modern digital technologies and research methods. Applies automated control systems in the modeling of transport processes and logistics systems.
3. Professional competencies:	RO 7	Solves the problems of designing transport infrastructure, structures; interaction of modes of transport in the organization of transportation and documentation support of professional activity.
	RO 8	Knows the methods of modeling and calculating the reliability of vehicle parts; operation, conditions of diagnosis and maintenance of transport equipment.
	RO 9	Applies interstate, international and national standards, documents on standardization, metrology, certification, technical regulations and conditions in professional activity.
	RO 10	Applies methods of modeling transport and logistics systems, transport processes; methods of testing, quality control of structural, composite and operational materials.

18. Determination of discipline modules in accordance with the results of the training of the EP "7M07107- Transport, transport equipment and technologies"

Learning result code	Module Name	Discipline Name	Volume (ECTS)
1	2	4	
RO 1, RO 2	Philosophical and historical aspects of teaching in higher education	History and philosophy of science	4
		Higher school pedagogy	4
		Management Psychology	4
		Pedagogical practice	4
RO1,	Professional languages	Foreign language (non-professional)	**4**
RO1, RO4, RO6, RO7	Current issues of research activity	Foreign terminology in the transport system Documentation support of transport activities	4 6
		Commercialization of the results of scientific and scientific-technical activities Design of transport devices and structures	5
		Methods of research activity Experiment planning	
RO3, RO5, RO8	Technical and technological components of the transport process	Methods of evaluation and testing of transport equipment	4
		Operation and maintenance of transport equipment	6
RO5, RO6, RO8, RO9, RO10	Modeling in the transport system	Digitalization of the transport industry Intelligent transport systems	4
		Patenting Technical regulation and ensuring the uniformity of measurement	5 5
		Promising structural and operational materials Methods and means of diagnosing transport equipment	6
		The relationship of modes of transport Organization of the transportation process	5
		Design and organization of transport and logistics systems Modeling of transport processes	
RO5, RO6, RO8, RO9, RO10	Research practice	Research practice	14
RO5, RO6, RO8, RO9, RO10	Research work	Research work of a master's student, including internship and completion of a master's thesis (NIRM)	24
RO1 RO5, RO6, RO8, RO9, RO10	Final certification	Preparation and defense of a master's thesis	12

19.Matrix of achievability of learning outcomes

NN п/п	Discipline Name	Brief description of the discipline (30-50 words)	Number of credits	Generated learning outcomes (codes)									
				RO1	RO2	RO3	RO4	RO5	RO6	RO7	RO8	RO9	RO10
D1	History and philosophy of science	The course is aimed at mastering knowledge in order to formulate and solve problems that arise in the course of research activities and require deep professional knowledge. The course deals with issues based on the methods of socio-humanitarian, natural science, pedagogical and psychological knowledge.	4	+									
D2	Pedagogy of higher education	Knowledge of the main provisions of the content of higher education, modern didactic concepts in higher education; features of the design and organization of the pedagogical process at the university, modern educational technologies; fundamentals of pedagogical skills and pedagogical techniques, management in education, management of the process of formation and development of the personality of students.	4	+									
D3	Psychology of management	The discipline examines the basics of the organizational structure of management and understanding of the nature of management processes, ways to improve management efficiency and means of communication, selection and training of specialists capable of implementing management functions.	4		+	+							
D4	Foreign language (professional)	The academic discipline implements the basic part of the general scientific curriculum of the Master's degree program and is an organizational part of the process of training highly qualified specialists who actively speak a foreign language as a means of intercultural and communication in the field of professional interests. To study the discipline, students must have the language knowledge provided by the bachelor's degree program.		+									
D5	Documentation support of transport activities	The subject, tasks and structure of the discipline. Basic concepts and definitions in the field of documentation support of transport activities. Regulatory and legal bases of documentation support of transport activities. The purpose and role of the regulatory and methodological framework. Functions of management documents (providing, special, technological). Unification and standardization of documentation in transport activities. Automation of documentation support of transport activities. Information and reference documents.	4							+			
	Foreign terminology in the transport system	Foreign terminology in the transport system is the term and definition of terminological concepts. The concept of the structure of terminology. The concept, the essence of foreign terminology in the transport system. Functions and features of foreign terminology in the transport system. Terminology dictionary. Foreign terminological systems. Terminology with professional vocabulary. Information and reference documents in a foreign language		+									

D6	Design of transport devices and structures	Structural features of structures; the main loads and impacts on the structure, the principles of using different types of foundations depending on loads and natural conditions; small artificial structures. Designing the mutual arrangement of transport devices and structures in the professional AutoCAD program. Technological processes of projected and reconstructed stations and nodes; highways; cities.	6						+					
	Commercialization results of scientific and technical activities	A course regulating the sphere of commercialization of scientific and scientific-technical activities, contributing to the unification of institutes of education, science, production and innovative development.							+	+				
D7	Experiment planning	Basic concepts of experiment planning. Processing of the experiment results. Evaluation of the exact results of the experiment. Regression analysis. Fundamentals of the theory of experiment planning. The plan of a complete factorial experiment (PFE). Complete factorial experiment: planning matrix, experiment properties, estimates of response function coefficients. Fractional factorial experiment. Robust experiment planning.	5				+		+					
	Methods of research activity	Science and other forms of mastering reality. Goals and objectives of science. Science and its classification. Scientific research and its methodology. Research work: complex problems, topics, questions. Types and stages of research work. Forms of expression of scientific novelty and its elements. Economic efficiency and forms of its expression. Master's thesis: goals, objectives, compliance criteria, requirements for content and design. Organization of scientific research in the Republic of Kazakhstan.					+		+					
D8	Methods of evaluation and testing of transport equipment	Fundamentals of dynamic calculations, theoretical and experimental studies of stability, patency, smoothness, comfort of vehicles. Criteria for comparison and evaluation of transport equipment; construction of transport equipment; methods of engineering calculations of dynamic systems of transport equipment; standard methods of testing transport equipment and its elements for reliability; necessary methods and means of diagnostics of the state of dynamics of technological processes and equipment.	4			+			+					
D9	Operation and maintenance of transport equipment	Technologies of technical maintenance and current repair of the vehicle; methods of organization of engineering and technical service for maintenance and current repair of the vehicle; features of technical operation of the vehicle in special climatic, production and road conditions; fundamentals of regulatory and technical documentation; requirements for service products; quality of service and its products; capacity of the transport equipment market; prices and pricing policy of the service; operational production management; personnel management issues.	6			+					+			
D10	Digitalization of the transport industry	Fundamentals of digitalization of economy and transport: terminology, state, prospects. Regulatory and legal regulation of the process of digitalization of the economy and transport. Modern software and hardware means of digitalization. Digital technologies in transport. Key directions of the process of digitalization of the transport sector: digitalization of transport infrastructure and logistics chains (including warehousing and service centers); robotization of production processes; large-scale automation, including management processes; introduction of autopilot systems.	4					+						
	Intelligent transport systems	Architecture of intelligent transport systems. The current level of development of ITS regions, cities. World experience of ITS formation and development. Modern software and hardware components of ITS. Features						+						

		of modern traffic management systems. ITS in ensuring the organization and safety of road traffic, road condition monitoring, information technology complexes												
D11	Patenting	Exclusive rights and their development. Intellectual property law. The subject, system and sources of patent law. Sources of domestic, foreign, and international patent law: laws, regulations of government bodies, administrative and judicial practice. Patent law of the Republic of Kazakhstan. Registration of patent rights. Protection of patent rights.	5									+	
	Technical regulation and ensuring the uniformity of measurement	Legislative and regulatory framework. Meaning. Types and categories of documents. Technical regulations, their status and application procedure. The procedure for the application of interstate, international and national standards, documents on standardization, metrology, certification. Certification of quality systems. Product quality management systems, their development and application. State control and supervision of compliance with the requirements.										+	
D12	Promising structural and operational materials	Development of technologies for obtaining materials for innovative areas. Information technologies in materials science. Machine learning technologies. Using the possibilities of digitalization when creating, managing properties, predicting the operability of a new material and ensuring reliable operation of products and technologies. Nanostructured materials and coatings. Methods of obtaining structural materials. Innovative construction materials.	5					+					+	
	Methods and means of diagnosing transport equipment	The process of diagnosis. Diagnostic standards. Requirements for the technical condition of cars. Purpose, device, equipment, organization of the technological process of diagnostics. Mobile diagnostic stations. Diagnostic scanners, probes. Computer motor testers. Diagnosis of a gasoline engine. Diagnostics of brake systems with hydraulic brake drive. Diagnostics of brake systems with pneumatic brake drive. Equipment and methods for diagnosing steering, tires and wheels.									+			
D13	Organization of the transportation process	Transport and the transport process: basic concepts. Characteristics of the main modes of transport. The technological process of transportation, the cycle of the transport process. Progressive technologies of cargo transportation. Transportation management: strategic planning and operational management. Automated production and process control systems. Information systems and automated control systems. General provisions on transportation planning. Optimization tasks for transportation planning.	6					+						
	The relationship of modes of transport	Unified transport system. Types of transport. Structural and functional characteristics of modes of transport Transport networks. Financial and economic aspects of the relationship of modes of transport. The main governing documents regulating the forms of relationships. Technical and operational characteristics of various types of transport. Interactions of different modes of transport in nodes. Methods of selecting modes of transport for transportation. Prospects for the development of the transport system of the Republic of Kazakhstan.						+						
D14	Design and organization of transport and logistics systems	Methodology of designing transport and logistics systems. Principles of design and organization of transport and logistics systems. A systematic approach to the design and organization of transport and logistics systems. Efficiency of functioning of transport and logistics systems. Design and organization of transport and logistics systems. Evaluation of the effectiveness of design and organization.	5											+

	Modeling of transport processes	General concepts of the transport process during the transportation of goods. Road transport process and cargo transportation routes. Methods of planning and organization of cargo transportation by road. Theories of road freight transport and mathematical models for calculating the output of cars. System of technical and operational indicators and operation of rolling stock									+		+

20. Coordination of planned learning outcomes with teaching methods

Learning outcomes	Planned learning outcomes for the module	Learning methods	Assessment methods
RO1	Analyzes professional technical and technological information in a foreign language, methodological problems, the results of a scientific experiment in solving research problems and organizing higher education.	Interactive lecture	test
RO2	Uses socio-humanitarian, natural science, pedagogical and psychological knowledge, modern methods and methods of planning, management, taking into account psychological aspects that contribute to the implementation of the main directions of modernization of public consciousness.	Interactive lecture	test
RO3	Analyzes the state of transport equipment and technological equipment, owns methods for assessing their reliability. Uses methods of technical and economic analysis and conditions for making engineering and management decisions.	Case methods	Project preparation
RO4	Applies procedures for patenting inventions, technologies for intellectual property protection and commercialization of scientific research results.	Interactive lecture, Case methods	Test, presentations
RO5	Uses software, hardware components of intelligent transport systems and methods of analysis of technical, technological, material science components in the organization of transportation and operation of transport.	Discussions	Project preparation
RO6	Conducts research and technical tests using modern digital technologies and research methods. Applies automated control systems in the modeling of transport processes and logistics systems.	Case methods	Test, presentations
RO7	Solves the problems of designing transport infrastructure, structures; interaction of modes of transport in the organization of transportation and documentation support of professional activity.	Case methods	Test, presentations
RO8	Knows the methods of modeling and calculating the reliability of vehicle parts; operation, conditions of diagnosis and maintenance of transport equipment.	Interactive lecture, Case methods	Test, project preparation
RO9	Applies interstate, international and national standards, documents on standardization, metrology, certification, technical regulations and conditions in professional activity.	Interactive lecture	Test, project preparation
RO10	Applies methods of modeling transport and logistics systems, transport processes; methods of testing, quality control of structural, composite and operational materials.	Case methods	Test, presentations

21. Graduate model

Attributes of the graduate:
- has deep scientific knowledge in the field of solving transport and technological problems;
- emotional intelligence;
- adaptability to global challenges;
- leadership;
- organizational skills;
- understanding the importance of the principles and culture of academic integrity.

Types of competencies	Description of competencies
1. Behavioral skills and personal qualities: (Soft skills)	Understands scientific and philosophical, socio-economic, organizational and managerial aspects of the organization of activities in transport. He is able to scientifically organize professional activities and effectively focus on results. Ready for innovation, self-education and professional activity in a foreign language environment
2. Digital competencies: (Digital skills):	Understands the conditions of integration of digital technologies and the transport process; the essence and structure of intelligent transport systems. Demonstrates the ability to solve the tasks of organizing monitoring of transport and transport and logistics systems
3. Professional competencies:	Has a scientific approach to solving design and technological and transport-technological tasks. A scientific approach and logical thinking have been formed in solving the problems of operation, diagnostic maintenance, repair and selection of vehicles, operational, composite materials; skills in using methods and means of determining the reliability, safety and durability of transport

Developers:
Members of the working group:
Professor, Ph.D. _____ G.O.Tazhigulova
Director of Bus Park No. 2 LLP, Karaganda" _____ G.M. Zhaksybaev
Senior lecturer, Candidate of Technical Sciences _____ G.E.Abdullayeva
Senior lecturer, M.Sc. _____ I.M.Kamzabekov
1st year Master's student _____ P.U. Baigozhina

The educational program was reviewed and recommended by the Faculty Council from 30.05 Protocol No. 8
The educational program was reviewed at the meeting of the Academic Council from 29.04.22 Protocol No. 5
The educational program was reviewed and approved at the meeting of the University Board from 16.05 Protocol No. 12

Member of the Board - Vice-Rector for Academic Affairs T.Z.Zhusipbek

Director of the Department for Academic Work G.S.Akybayeva

Dean of the Faculty of Physics and Technology A.K.Zeinidenov

Criteria for assessing the achievability of learning outcomes7M07107- Transport, transport equipment and technologies

Codes of LO	Planned learning outcomes for the module
LO1	Knows: methodological problems of scientific experiment and conditions of the organization of the educational process in higher education
	Can: analyze, process, generalize and reproduce technical and technological information in a foreign language and solve research problems.
	Owns: critical thinking skills and the ability to apply it to the field of professional activity
LO 2	Knows: Knows the basic concepts, theories and approaches of planning, management, taking into account psychological aspects;
	Can: Is able to use socio-humanitarian, natural science, pedagogical and psychological knowledge in planning and management
	Owns: methods and methods of planning, management in accordance with modern requirements
LO 3	Knows fundamentals of modeling, calculation of reliability of vehicle parts; requirements for transport equipment, its diagnostics, maintenance and operation
	Can: use the methods of technical and economic analysis and conditions for making engineering and management decisions
	Owns: methods of assessing the reliability of transport equipment and technological equipment
LO 4	Knows: fundamentals of patenting, conditions for the organization of intellectual property protection;
	Can: use search methods for patent information sources
	Can: to prepare materials for patenting inventions and for commercialization of the results of scientific research.
LO 5	Knows: structural elements of intelligent transport systems;
	Can: uses software and hardware components of intelligent transport systems in the organization of transportation processes.
	Owns: methods of analysis of technical, technological, material science components in the organization of transportation processes
LO 6	Knows: conditions for research work and technical tests with the use of digital technologies and automated control systems;
	Can: design and model transport systems and structures, conduct technical tests
	Owns: methods of analyzing research and test results
LO 7	Knows: the basics of interaction of modes of transport in the organization of transportation and documentation support of professional activity
	Can: design and model transport infrastructure
	Owns: technology of documentation support of professional activity.
LO 8	Knows: fundamentals of modeling, calculation of reliability of vehicle parts; requirements for transport equipment, its diagnostics and maintenance and operation
	Can: determine the conditions for the diagnosis and maintenance of transport equipment.
	Owns: methods of modeling, calculating the reliability of vehicle parts and ways to determine their effectiveness
LO 9	Knows: interstate, international and national standards, fundamentals of standardization, metrology, certification
	Can: determine the conditions for the application of standards, technical regulations, permits
	Owns: modern measuring technologies and methods of determining the quality of products
LO 10	Knows: fundamentals of the organization of transport and logistics systems; structure and conditions of use of structural, composite and operational materials
	Can: use methods of testing and quality control of structural, composite and operational materials.
	Owns: methods of mathematical modeling of transport processes

EDUCATIONAL PROGRAM DEVELOPMENT PLAN
7M07107- Transport, transport equipment and technologies

The purpose of the Plan is to contribute to improving the quality of the conditions for the implementation of the educational program, taking into account the current requirements of the labor market and the achievements of modern science.

Target indicators

№	Indicators	Unit of measurement	2021-2022 (in fact)	2022-2023 (plan)	2023-2024 (plan)	2024-2025 (plan)
1	**Human resources development**					
1.1	Increase in the number of teachers with academic degrees	Number of people	7	1	1	1
1.2	Advanced training in the teaching profile	Number of people	18	5	5	5
1.3	Involvement of practitioners in teaching	Number of people	1	1	1	1
1.4	Other	Number of people				
2	**Promotion of the EP in the ratings**					
2.1	IQAA	Position		3	2	1
2.2	IAAR	Position		3	2	1
2.3	Atameken	Position		3	2	1
3.	**Development of educational and scientific-methodical literature, electronic resources**					
3.1	Textbooks	Number				
3.2	Training manuals	Number	1	2	3	3
3.3	Methodological recommendations/instructions	Number	1	3	3	3
3.4	Electronic textbook	Number	3	4	4	4
3.5	Video/audio lectures	Number	2	3	3	3
3.6	Other	Number				
4.	**Development of educational and laboratory facilities**	Number				
4.1	Purchase of software products	Number	1	1	1	1
4.2	Purchase of equipment	Number	1	1	1	1

4.3	Other	Number				
5.	**Updating the content of the EP**					
5.1	Updating the learning outcomes and the list of disciplines taking into account the requirements of the labor market, scientific achievements, professional standards	Year	2	-	-	-
5.2	Introduction to the EP of academic disciplines in foreign languages*	Year			+	
5.3	Introduction of new teaching methods	Year	+	+	+	+
5.4	Opening of joint/two-degree program on the basis of the EP	Year		+		
5.5	Other	Year				

Head of the Department of Transport and Logistics Systems **G.O.Tazhigulova**