



CATALOG OF ELECTIVE COMPONENT DISCIPLINES

EDUCATIONAL PROGRAM

7M07146 - RAILROAD ROLLING STOCK

Level of education: Master's degree in science and pedagogy

Time of study: 2 years

Year of admission: 2023 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 2 - Economic and managerial competencies	BD	EC1	Strategic management	180	6	2	ON1	Formation of undergraduates' basic theoretical knowledge and basic practical skills in the field of strategic management of enterprises and organizations, strategic analysis of the external and internal environment of the company, the company's competitive strategy and corporate management strategy. Active learning methods are used - brainstorming, group work.	Undergraduate courses	Optimization of the management of enterprises for the operation and repair of rolling stock/Risk management	TLM
		EC2	Business research				ON1	Mastering theory by undergraduates, as well as developing practical skills in business research and analytics, life cycle analysis of the development of promising technologies. The scientific and technical aspects of the project are being studied. Active teaching methods used in the discipline - individual task	Undergraduate courses	Optimization of the management of enterprises for the operation and repair of rolling stock/Risk management	TLM

1	2	3	4	5	6	7	8	9	10	11	12
Module 5 - Professional Competencies	BD	EC1	Optimization of the management of enterprises for the operation and repair of rolling stock	270	9	3	ON1, ON8	Studies the optimal management of an organization based on the principles of lean production: minimizing all types of losses in the course of activity, achieving the maximum possible result in the shortest possible period of time, rational use of all types of resources, improving aspects of the organization's activities. Formation of the ability to: calculate quantitative and qualitative indicators of the company's activity; make decisions on planning, optimization and organization of production processes; compile technical documentation.	Strategic management/ Business research, Resource and energy saving in transport / Rolling stock life cycle cost estimation, Technical operation and service of a rolling stock	RWMS, FC.	RS
		EC2	Risk management				ON1	Learning of general issues of risk management. Various approaches to the classification of risk factors, characteristics of risk types, methods of risk management and assessment, the study of risk management programs at the enterprise and the risk management system at the enterprise are described. As part of the study of the discipline, guest lectures are given by leading top managers of transport companies, solving and analyzing situational problems.	Strategic management/ Business research, Resource and energy saving in transport / Rolling stock life cycle cost estimation, Technical operation and service of a rolling stock/ High-Speed Railway Infrastructure.	RWMS, FC.	OTTOT

1	2	3	4	5	6	7	8	9	10	11	12
Module 5 - Professional Competencies	PD	EC1	Resource and energy saving in transport	180	6	1	ON6, ON7	Analysis of the types and characteristics of various energy resources; regulatory and legal support for energy saving; improving the energy efficiency of the transportation process; energy-saving technologies in the repair production and operation of railway infrastructure facilities; organization and methods of energy saving management. The discipline forms the ability to: analyze the structure of energy consumption of the object; make decisions in the field of professional activity based on the principles of resource and energy conservation.	Undergraduate courses	Technical operation and service of a rolling stock, High-Speed Railway Infrastructure, Reliability theory and quality management in transport, Optimization of the management of enterprises for the operation and repair of rolling stock /Risk management, RWMS, FC.	RS
		EC2	Rolling stock life cycle cost estimation				ON6, ON8	Classification of innovative projects; methods of assessment of efficiency of investment projects on zheleznodorozhny transport; life cycle of the rolling stock and calculation of its cost; definition of technical and operational indicators of use of the rolling stock; calculation of operating costs in locomotive and carriage farms; calculation of single account rates and prime cost; payback period, net income, internal share of profitability; determination of useful effect of introduction of the new rolling stock.	Undergraduate courses	Reliability theory and quality management in transport, Optimization of the management of enterprises for the operation and repair of rolling stock/Risk management, RWMS, FC.	RS

1	2	3	4	5	6	7	8	9	10	11	12
Module 5 - Professional Competencies	PD	EC1	Reliability theory and quality management in transport	180	6	2	ON7, ON8	Analysis of the reliability of complex technical systems such as locomotives / wagons; calculation and evaluation of qualitative and quantitative indicators that determine the reliability of rolling stock as a system; application of structural and logical analysis and methods for improving the reliability of technical systems; application of methods for collecting and analyzing information about reliability; analysis of the content of reliability requirements; application of methodological foundations of quality management in railway transport; calculation and evaluation of production quality indicators in railway transport.	Modern railway rolling stock, Organization and planning of scientific research (English), Resource and energy saving in transport / Rolling stock life cycle cost estimation.	Methods of testing of rolling stock/ Construction and calculation of rolling stock, Interaction of track and rolling stock, Modern methods of diagnostics of rolling stock, RWMS, FC.	RS
		EC2	High speed rolling stock				ON5, ON7	The discipline allows you to study the world concepts of the development of the design of modern rolling stock, safety and environmental friendliness of the operation of high-speed railway rolling stock. Develops skills and abilities in the creation, design, operation, diagnostics, identification of reserves, identification of the causes of malfunctions and shortcomings in the work, as well as taking measures to eliminate them and improve the efficiency of using modern high-speed railway rolling stock.	Modern railway rolling stock	Methods of testing of rolling stock/ Construction and calculation of rolling stock, Modern methods of diagnostics of rolling stock, Interaction of track and rolling stock, RWMS, FC.	RS

1	2	3	4	5	6	7	8	9	10	11	12
Module 5 - Professional Competencies	PD	EC1	Technical operation and service of a rolling stock	180	6	2	ON4, ON7, ON8	Analysis of requirements for the organization of maintenance of railway rolling stock; formation and improvement of the system of maintenance of locomotives and wagons; information technologies, automated control systems and diagnostic systems for monitoring the technical condition used in the operation of railway rolling stock. The discipline forms the ability to: plan and organize the processes related to the technical operation and maintenance of rolling stock; prepare instructions and other technical documentation.	Modern railway rolling stock, Resource and energy saving in transport / Rolling stock life cycle cost estimation.	Modern methods of diagnostics of rolling stock, Optimization of the management of enterprises for the operation and repair of rolling stock/Risk management, RWMS, FC.	RS
		EC2	High-Speed Railway Infrastructure				ON5, ON7	The discipline allows you to gain fundamental knowledge in the design, construction, operation and repair of high-speed rail infrastructure facilities. Acquire skills in solving practical problems related to ensuring the security of infrastructure facilities. To form professional competencies in the issues of diagnostics, testing and inspection of building structures, examination of technical documentation, supervision, control of the state of infrastructure facilities of high-speed highways.	Resource and energy saving in transport.	Interaction of track and rolling stock, Risk management, RWMS, FC.	RS

1	2	3	4	5	6	7	8	9	10	11	12
Module 5 - Professional Competencies	PD	EC1	Methods of testing of rolling stock	180	6	3	ON3, ON5	It consists of the following modules: the regulatory and technical base for testing wagon; equipment used for testing wagon; dynamic, static and vibration tests of wagon components; automation of experimental research and processing of experiment. The discipline develops practical skills in planning, setting up and conducting experimental scientific research, searching for and testing new ideas for improving railway rolling stock.	Organization and planning of scientific research (English), Modern railway rolling stock, Reliability theory and quality management in transport, Подвижной состав ВСМ	RWMS, FC.	RS
		EC2	Construction and calculation of rolling stock				ON5	The discipline includes: tasks and technical and economic bases of design; rules and methods of design; basic provisions of methods of calculation of railway rolling stock. The discipline forms: the skills of designing / modeling rolling stock systems; the ability to apply methods for calculating and evaluating the strength of structural elements of railway rolling stock; the ability to plan, formulate and conduct scientific research to find and test new ideas for improving the design of railway rolling stock.	Modern railway rolling stock, Reliability theory and quality management in transport, Подвижной состав ВСМ	RWMS, FC.	RS

1	2	3	4	5	6	7	8	9	10	11	12
Module 5 - Professional Competencies	PD	EC1	Interaction of track and rolling stock	270	9	3	ON3, ON5	The study of the structural features of the railway track, mechanical processes occurring in the rolling stock and in the railway track when they are exposed to each other, deformations and mechanical stresses that occur in interacting structures. Formation of professional competencies in the application of methods for calculating and evaluating the strength of rolling stock and track based on knowledge of the laws of statics and dynamics of solids.	Modern railway rolling stock, Подвижной состав ВСМ, Reliability theory and quality management in transport, High-Speed Railway Infrastructure, Organization and planning of scientific research (English)	RWMS, FC.	RS
		EC2	Modern methods of diagnostics of rolling stock				ON4, ON8	Basic provisions of technical diagnostics; general information about railway rolling stock diagnostics systems; innovative methods, technologies and equipment for rolling stock diagnostics. The discipline forms the ability to: plan and organize technological processes, using modern diagnostic methods, and train production personnel to do this; collect and analyze diagnostic information data; prepare instructions and other technical documentation for the diagnosis of railway rolling stock.	Modern railway rolling stock, Подвижной состав ВСМ, Reliability theory and quality management in transport, Technical operation and service of a rolling stock.	RWMS, FC.	RS
Total				1440	48						

Head of the Department "Rolling stock"

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