APPROVED:
Candidate of Technical Sciences,
Director of «GEO TRACK»
Nusupov D. K.
«30» 03 2023

APPROVED:
Director of the Institute
«Transport Engineering»
Chigambayev T.O.
«30» 03 2023

CATALOG OF DISCIPLINES OF THE COMPONENT BY CHOICE

EDUCATIONAL PROGRAM **7M07159 – Transport structures**

Education level: **Master s degreeDuration of study: 2-yearYear of admission: 2023**

Module	Cycle	Component	Nameofthediscipline	Totallabor		Term	intensity SemesterResults of training of training	Shortdescription	ofthediscipline	Prerequisites	PostrequirementsDepartment
				academichours	academiccredits						
1	2	3	4	5	6	7	8	9	10	11	12
Module 1-		KV	Elasticityandplasticity	270	9	1	LO 3	Apply modern analytical and engineering methods for analyzing the stress-strain state of transport industry facilities, as well as complexes of software packages designed to study the stress-strain state of transport structures for various purposes, analyze stresses and deformations, solve elementary two-dimensional problems in rectangular and polar coordinates and three-dimensional problems of the theory of elasticity, using experimental methods of solutions.	Undergraduatedisciplines	Solving engineering problems using the finite element method Research practice Strategic management Design and estimate documentation for the construction of linear structures	PS
			Mechanics of elastic				LO 3	Mechanics of an elastic deformable solid. Mastery of modern methods and approaches in	Undergraduatedisciplines	Solving engineering	PS

			deformable solid					in the study of elastoplastic deformation based on the general laws on which the unified connected structure of the theory of the continuum model of matter and the basic equations of continuum mechanics is built allows one to demonstrate solutions to the problem of elastoplastic deformation of solids and rocks, the problem of deformation of bulk and powder, and also composite materials.		problems using the finite element method Research practice Inspection and testing of transport structures Strengthening the infrastructure of linear structures Integrated design solutions for the reconstruction of linear structures	PS
Module 2-Device, operation and monitoring of transport infrastructure	PD	KV	Strategic management	180	6	2	LO 4	Formation of 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, competitive strategy of the company and corporate management strategy. Active learning methods are used - brainstorming, group work	Undergraduate disciplines	Solving engineering problems using the finite element method Research practice Inspection and testing of transport structures Technical diagnostics of transport structures	SI

			Business research				LO 4	Mastering the theory by master's students, 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 learning methods used in the discipline - individual assignment	Undergraduate disciplines	Design and estimate documentation for the construction of linear structures Strengthening the infrastructure of linear structures Integrated design solutions for the reconstruction of linear structures Solving engineering problems using the finite element method	SI
	PD	KV	Linear structures in transport	180	6	1	LO 6	Studies the understanding of geodetic work at all stages of the maintenance of structures, namely surveying, design, carrying out alignment work, executive surveys, geodetic support of operation, preparation of engineering and graphic documentation, during surveying, alignment grids, alignment elements of the route, profile, plan, executive surveys , deformation of the subgrade, on technical operation and basics of design of linear structures, methods of increasing reliability, theoretical foundations and principles of construction of linear structures.	Undergraduate disciplines	Solving engineering problems using the finite element method Innovative technologies in transport construction Digital infrastructure NIRM, IA.	SI

Module 2-Construction, operation and monitoring of transport infrastructure			Operation of linear structures				LO 6	It studies the assessment of the transport and operational condition of a structure, according to the degree of compliance with regulatory requirements of the main transport and operational indicators of a linear facility, taken for its consumer properties, and is used when assessing the quality of a project for the construction, reconstruction or repair of infrastructure of their quality at the time of its commissioning after reconstruction or repair , as well as the transport and operational state of the transport facility in operation.	Undergraduate disciplines	Soiving engineering problems using the finite element method Innovative technologies in transport construction Digital infrastructure NIRM, IA.	SI
	PD	KV	Design and estimate is in transport construction	180	6	2	LO 7	Studies the functional and operational requirements of transport construction, the requirements of regulatory and legislative acts and documents, design output data, the procedure for developing, forming and making design decisions, assessing the quality of design solutions and the development of design and estimate documentation with the preparation of design and estimate documentation, general information about design - survey work and estimate documentation for transport construction.	Undergraduate disciplines	Solving engineering problems using the finite element method Inspection and testing of transport structures Technical diagnostics of transport structures NIRM, IA.	SI

Module 4-Design and estimate documentation			Design and estimate documentation for constructions of linear structures				LO 7	Studies the preparation of a set of documents that reveal the essence of the project and contain justification for its feasibility and further implementation, carried out to ensure the reliability and durability of transport structures, using the theoretical foundations of soil compaction of the roadbed and standardization of the degree of compaction, basic provisions on methods and means of ensuring the required degree of compaction transport facilities.	Undergraduate disciplines	Solving engineering problems using the finite element method Inspection and testing of transport structures Technical diagnostics of transport structures NIRM, IA.	SI
Module 3-IT Innovative	PD	KV	Innovative technologies in transport construction	180	6	2	LO 8	Study of the essence, principles and directions of digital activities of organizations (enterprises). Information policy of the Republic of Kazakhstan. State management of digital development. Legislative regulation in the field of digital technologies in the Republic of Kazakhstan. Information Security. Principles of constructing digital measuring devices. Digital technologies used in the transport industries of the Republic of Kazakhstan, types of information and analytical automated systems for managing operational activities.	Undergraduate disciplines	Solving engineering problems using the finite element method Research practice Strengthening the infrastructure of linear structures Integrated design solutions for the reconstruction of linear structures	SI
			Digital infrastructure				LO 8	The purpose of mastering the discipline is to develop theoretical knowledge in the field of digital technologies used in production, as well as to become familiar with the main trends in the field of production development caused by the introduction of digital technologies, to study the principles of	Undergraduate disciplines	Solving engineering problems using the finite element method Research practice	SI

								operation of the main components of digital systems, to acquire theoretical knowledge in the field of development and implementation of a digital strategy. transformation of production activities.		Strengthening the infrastructure of linear structures Integrated design solutions for the reconstruction of linear structures	
			Inspection and testing of transport structures	270	9	3	LO 9	Apply the skills of analyzing the technical condition of transport infrastructure facilities based on the results of surveys, developing methodological materials, proposals and activities on effective and safe methods of inspection and testing of transport infrastructure facilities, fundamental methods and methods of inspection and testing of transport structures necessary for solving practical assessment problems and their technical condition.	Undergraduate disciplines	NIRM, IA.	
			Technical diagnostics of transport structures				LO 9	Assess the logical correspondence between the various requirements of regulatory literature when diagnosing transport infrastructure facilities (calculation of carrying capacity, load and impact, bearing capacity, deformations and displacements, technical and economic indicators, development of inspection and testing programs, proposals and measures for effective and safe diagnostic methods) for making the most optimal decisions on assessment and their technical condition.	Undergraduate disciplines	NIRM, IA.	
			Strengthening the infrastructure of linear structures	180	6	6	LO 10	Apply the skills of analyzing the technical compliance of the infrastructure parameters of linear structures with industry standards, technical equipment, methods of their operation, changing the category of structures to solve special problems of selecting new technical parameters and conditions for the	Undergraduate disciplines	NIRM, IA.	

								modernization of linear structures by assigning and justifying stages for improving technical and economic indicators during continuous operation objects and increasing loads			
			Integrated design solutions for the reconstruction of linear structures				LO 10	Assess the technical condition and equipment of linear structures (state of constant parameters, compliance with their design standards, operational indicators) to solve problems of changing parameters, in preparing complex design solutions for infrastructure in general that meet the requirements for increasing throughput and carrying capacity that are optimal in terms of timing and volume operational and economic measures for the reconstruction of linear structures	Undergraduate disciplines	NIRM, IA.	
	Total			**1440**	**48**						

Head of the Department of "Construction Engineering" **Ismagulova S. O.**