**COORDINATED**

**The Director of TLP “KaragandyTechnoServis”**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ A.A.Shvedov**

**«\_\_\_\_\_»\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2014у.**

**Major 5B074500 "Transport construction" (collection 2013y.)**

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| **№**  | **Number of** **ECTS/****number of credits** | **List of electives** |
| **Educational program «Construction of railways»** | **Educational program «Construction of automobile roads and airdromes»** |
| **1** | **2** | **3** | **4** |
|  |  | **The cycle of basic discihlines** |
| **8** | **5/3** | **Module EGC 19****EG 1208 «Engineering graphics» 1-2-0-1** **Prerequisites:****Mat 1201 1-2-0-1****Postquisites:****CG 3218 1-0-2-5****Objectives of the course are:** making of construction drawings, basics of descriptive geometry**Contents of main partitions of the course:** Geometrical drawing. Basics of descriptive geometry. Technical drawing and elements of technical constructing. Basics of making construction drawings.**Results of learning:** Using drawing skills in designing | **Module EGC 19****EG 1208 «Engineering graphics» 1-2-0-1** **Prerequisites:****Mat 1201 1-2-0-1****Postquisites:****CG 3218 1-0-2-5****Objectives of the course are:** making of construction drawings, basics of descriptive geometry**Contents of main partitions of the course:** Geometrical drawing. Basics of descriptive geometry. Technical drawing and elements of technical constructing. Basics of making construction drawings.**Results of learning:** Using drawing skills in designing |
| **9** | **3/2** | **Module EGC 19****Chem 1209 «Chemistry» 1-0-1-1****Prerequisites:****Mat 1201 1-2-0-1****Postquisites:** **RP 2211 1-2-0-4****Objectives of the course are:** studying the structure of matter, structure of atom,  chemical bond. **Contents of main partitions of the course:** Chemical systems, chemical conversion, their characteristics,kinetics and mechanisms of chemical reactions.**Results of learning:** knowing the chemical properties of building materials choosing and using them.  | **Module EGC 19****Chem 1209 «Chemistry» 1-0-1-1****Prerequisites:****Mat 1201 1-2-0-1****Postquisites:** **RP 2211 1-2-0-4****Objectives of the course are:** studying the structure of matter, structure of atom,  chemical bond. **Contents of main partitions of the course:** Chemical systems, chemical conversion, their characteristics,kinetics and mechanisms of chemical reactions.**Results of learning:** knowing the chemical properties of building materials choosing and using them. |
| **10** | **5/3** | **Module BTRPSM 20****BT 2210 «Buildings on transport» 1-2-0-4****Prerequisites:****EG 1208 1-2-0-1****Postquisites:****TOC 3302 1-2-0-5****Objectives of the course are:** study of basic designing of industrial buildings, requirements for industrial buildings. **Contents of main partitions of the course:** Unification of industrial buildings and structures. Typification of structural elements of buildings. Construction of industrial buildings.**Results of learning:** skill of designing buildings and facilities | **Module BTRPSM 20****BT 2210 «Buildings on transport» 1-2-0-4****Prerequisites:****EG 1208 1-2-0-1****Postquisites:****TOC 3302 1-2-0-5****Objectives of the course are:** study of basic designing of industrial buildings, requirements for industrial buildings. **Contents of main partitions of the course:** Unification of industrial buildings and structures. Typification of structural elements of buildings. Construction of industrial buildings.**Results of learning:** skill of designing buildings and facilities |
| **11** | **5/3** | **Module BTRPSM 20**DP 2211 «Roadway pavings» 1-2-0-3**Prerequisites:****Chem 1209 1-0-1-1****Postquisites:****AR 3220 2-4-0-5****Objectives of the course are:** studying the structure of pavings.**Contents of main partitions of the course: Typical designs of pavements. Asphaltic pavings. Cement-concrete pavings.****Результаты обучения:** Using roadway pavings according to the conditions exploitation. | **Module BTRPSM 20**DP 2211 «Roadway pavings» 1-2-0-3**Prerequisites:****Chem 1209 1-0-1-1****Postquisites:****AR 3220 2-4-0-5****Objectives of the course are:** studying the structure of pavings.**Contents of main partitions of the course: Typical designs of pavements. Asphaltic pavings. Cement-concrete pavings.****Результаты обучения:** Using roadway pavings according to the conditions exploitation. |
| **12** | **5/3** | **Module BTRPSM 20****SMBF 2212 «Soil mechanics, bases and foundations»** **1-1-1-4****Prerequisites:** **CM 2204 1-0-2-3****Postquisites:** **CG 3218 1-2-0-6****Objectives of the course are:** the study of basic regularities of soil mechanicscalculation of bases and foundations.**Contents of main partitions of the course:** The nature of soils. Features of the physical and mechanical properties of soils. Deformation of the soils. Dynamics of the fine-grained soil. Types of foundations. Foundations of low inception. Deep foundations.**Results of learning:** Know the classification of soils and bases of calculation of yielding of foundation. | **Module BTRPSM 20****SMBF 2212 «Soil mechanics, bases and foundations»** **1-1-1-4****Prerequisites:** **CM 2204 1-0-2-3****Postquisites:** **CG 3218 1-2-0-6****Objectives of the course are:** the study of basic regularities of soil mechanicscalculation of bases and foundations.**Contents of main partitions of the course:** The nature of soils. Features of the physical and mechanical properties of soils. Deformation of the soils. Dynamics of the fine-grained soil. Types of foundations. Foundations of low inception. Deep foundations.**Results of learning:** Know the classification of soils and bases of calculation of yielding of foundation. |
| **13** | **5/3** |  **Module RSAGM 21** **MSCTC 2213 «Metrology, standardization and certification in transport construction» 1-2-0-4****Prerequisites:****CM 2204 1-0-2-3****Postquisites:****TCARA 3303 2-4-0-5****Objectives of the course are:** study of basic standardization and certification.**Contents of main partitions of the course:** International organizations on metrology. Regional organizations on metrology. Basis of standardization. The organization of works on standardization in Kazakhstan. Standardization in road construction. Certificate basics. The nature and content of certification. Law bases of certification in Kazakhstan. certification practice.**Results of learning:** Ability to organize certification works |  **Module RSAGM 21** **MSCTC 2213 «Metrology, standardization and certification in transport construction» 1-2-0-4****Prerequisites:****CM 2204 1-0-2-3****Postquisites:****TCARA 3303 2-4-0-5****Objectives of the course are:** study of basic standardization and certification.**Contents of main partitions of the course:** International organizations on metrology. Regional organizations on metrology. Basis of standardization. The organization of works on standardization in Kazakhstan. Standardization in road construction. Certificate basics. The nature and content of certification. Law bases of certification in Kazakhstan. certification practice.**Results of learning:** Ability to organize certification works |
| **14** | **5/3** | **Module RSAGM 21** **RS 2214 «Road surveying» 1-2-0-4****Prerequisites:****Geo 1203 1-0-2-2****Postquisites:****AR 3220 2-4-0-5****Objectives of the course are:** Mastering the theoretical knowledge and practical skills to perform exploration work at the level of the modern production requirements.**Contents of main partitions of the course:** perform exploration work at the level of the modern production requirements.**Results of learning:** Organization of works of the prospecting party; technology of geodetic works. | **Module RSAGM 21** **RS 2214 «Road surveying» 1-2-0-4****Prerequisites:****Geo 1203 1-0-2-2****Postquisites:****AR 3220 2-4-0-5****Objectives of the course are:** Mastering the theoretical knowledge and practical skills to perform exploration work at the level of the modern production requirements.**Contents of main partitions of the course:** perform exploration work at the level of the modern production requirements.**Results of learning:** Organization of works of the prospecting party; technology of geodetic works. |
| **15** | **5/3** | **Module IDPGM 21**AG 2215 «Applied geodesy» 1-0-2-3**Prerequisites:****Geo 1203 1-0-2-2****Postquisites:****RS 2214 1-2-0-4****Objectives of the course are:** Research of properties of different geometric shapes using the formulas of trigonometry and their applications. **Contents of main partitions of the course:** Solution of various tasks on the ground. Develop methods to topographic surveys; making maps and plans, construction of necessary equipment.**Results of learning:** Practical use of methods and ways for constructing topographic maps when constructing roads. | **Module IDPGM 21**AG 2215 «Applied geodesy» 1-0-2-3**Prerequisites:****Geo 1203 1-0-2-2****Postquisites:****RS 2214 1-2-0-4****Objectives of the course are:** Research of properties of different geometric shapes using the formulas of trigonometry and their applications. **Contents of main partitions of the course:** Solution of various tasks on the ground. Develop methods to topographic surveys; making maps and plans, construction of necessary equipment.**Results of learning:** Practical use of methods and ways for constructing topographic maps when constructing roads. |
| **16** | **5/3** | **Module HHHES 22****HHH 3216 «Hydraulics, hydrology, hydrometry» 1-2-0-5****Prerequisites:** **RS 2214 1-2-0-4****Postquisites:** **AR 3220 2-4-0-6** **Objectives of the course are:** studying the laws of motion of liquids and their application to solving engineering problems.**Contents of main partitions of the course:** Hydrostatics. Basics of hydrodynamics. Hydraulic resistance. Expiry of liquid through the holes and nozzles. Uniform fluid motion in open channels.**Results of learning:** ability to perform hydraulic calculations of even, uneven and unsteady fluid motion. | **Module HHHES 22****HHH 3216 «Hydraulics, hydrology, hydrometry» 1-2-0-5****Prerequisites:** **RS 2214 1-2-0-4****Postquisites:** **AR 3220 2-4-0-6** **Objectives of the course are:** studying the laws of motion of liquids and their application to solving engineering problems.**Contents of main partitions of the course:** Hydrostatics. Basics of hydrodynamics. Hydraulic resistance. Expiry of liquid through the holes and nozzles. Uniform fluid motion in open channels.**Results of learning:** ability to perform hydraulic calculations of even, uneven and unsteady fluid motion. |
| **17** | **5/3** | **Module HHHES 22****ES 3217 «Engineering systems» 1-2-0-6****Prerequisites:** **Geo 1203 1-0-2-2****Postquisites:** **CES 4221 1-1-1-7****Objectives of the course are:** study of the elements of open and closed drainage system of pavements and subsoil areas of subgrade and studying requirements for constructing drain and drainage on bridges and overpasses public roads.**Contents of main partitions of the course:** Main characteristics of artificial lighting roads. Requirements for artificial lighting. Main characteristics of drainage systems of roads. Basic constructive and circuits principles of designing. Technology of constructing drainage highways.**Results of learning:** Skill to perform the calculation of the cross section of drainage systems of roads. |  **Module HHHES 22****ES 3217 «Engineering systems» 1-2-0-6****Prerequisites:** **Geo 1203 1-0-2-2****Postquisites:** **CES 4221 1-1-1-7****Objectives of the course are:** study of the elements of open and closed drainage system of pavements and subsoil areas of subgrade and studying requirements for constructing drain and drainage on bridges and overpasses public roads.**Contents of main partitions of the course:** Main characteristics of artificial lighting roads. Requirements for artificial lighting. Main characteristics of drainage systems of roads. Basic constructive and circuits principles of designing. Technology of constructing drainage highways.**Results of learning:** Skill to perform the calculation of the cross section of drainage systems of roads. |
| **18** | **5/3** | MODULE APTC 23CG 3218 «Computer graphics» 1-0-2-5Prerequisites: EG 1208 1-2-0-1Postquisites: BC 2301 1-1-0-4**Objectives of the course are:** acquiring knowledge of program AutoCad.**Contents of main partitions of the course:** General information about AutoCAD. User interface. Editor commands, controls of basic functions of AutoCAD. Creating and opening drawings, boundaries of drawing. Format of the units. Dividing drawing by layers. Using colors and types of lines.**Results of learning:** student should be able to create and draw technical drawings. | MODULE APTC 23CG 3218 «Computer graphics» 1-0-2-5Prerequisites: EG 1208 1-2-0-1Postquisites: BC 2301 1-1-0-4**Objectives of the course are:** acquiring knowledge of program AutoCad.**Contents of main partitions of the course:** General information about AutoCAD. User interface. Editor commands, controls of basic functions of AutoCAD. Creating and opening drawings, boundaries of drawing. Format of the units. Dividing drawing by layers. Using colors and types of lines.**Results of learning:** student should be able to create and draw technical drawings. |
| **19** | **5/3** | Module APTC 23APTC 3219 «Applied programs in transport constructiom» 1-0-2-6**Prerequisites:** **CG 3218 1-0-2-5** **Postquisites:** **CES 4221 1-1-1-7****Objectives of the course are:** instill skills of working with desingning and calculating soft.**Contents of main partitions of the course:** Formation of surface models. Building solid models in different ways. Editing solids.**Results of learning**:execution on a computer course projects | Module APTC 23APTC 3219 «Applied programs in transport constructiom» 1-0-2-6**Prerequisites:** **CG 3218 1-0-2-5** **Postquisites:** **CES 4221 1-1-1-7****Objectives of the course are:** instill skills of working with desingning and calculating soft.**Contents of main partitions of the course:** Formation of surface models. Building solid models in different ways. Editing solids.**Results of learning**:execution on a computer course projects |
| **20** | **9/6** | **Module AR 3220** **AR 3220 «Железнодорожный путь» 2-4-0-5,6****Prerequisites:** **RS 2214 1-2-0-4****Postquisites:** **DARA 43051-2-0-7****Objectives of the course are:** constructions of railways rolling path.**Contents of main partitions of the course:** Construction railway line and their interaction with the rolling stock. Ensuring the safe movement of trains at a preset speed. Railway track as a complex engineering structure.**Results of learning:** To know constructions of railways. | **Module AR 3220** **AR 3220 «Automobile roads» 2-4-0-5,6****Prerequisites:** **RS 2214 1-2-0-4****Postquisites:** **DARA 43051-2-0-7****Objectives of the course are:** elements of the road. **Contents of main partitions of the course**: Buildings and road trucking services. The cross-section. Roadway lanes. Structural elements of the road. ROW. Road capacity. **Results of learning:**: To know constructions of highways. |
| **21** | **5/3** | **Module CES 25** **CES 4221 «Calculation of engineering structures» 1-1-1-7****Prerequisites:** **TM 1205 2-2-0-2****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:** Engineering structures: tanks, silos, pipelines.**Contents of main partitions of the course:** High rise buildings: towers; mast. Retaining walls. Chimneys.**Results of learning:** Calculation skills of engineering structures. | **Module CES 25** **CES 4221 «Calculation of engineering structures» 1-1-1-7****Prerequisites:** **TM 1205 2-2-0-2****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:** Engineering structures: tanks, silos, pipelines.**Contents of main partitions of the course:** High rise buildings: towers; mast. Retaining walls. Chimneys.**Results of learning:** Calculation skills of engineering structures. |
| **Cycle of major course** |
| **3** | **9/6** | **Module DRBTQC 29****TCARA 3303 « Технология строительства железных дорог » 2-4-0-5,6****Prerequisites:** **RS 22141-2-0-4****Postquisites:** **TOARA 4310 1-2-0-7****Objectives of the course are:**  studying the theoretical foundations of technology of railway construction.**Contents of main partitions of the course:** Erection of of subgrade. Manufacturing enterprises railroad construction. Bases of technology of of railway construction.**Results of learning:** Preparation and construction of the railway line bases. | **Module DRBTQC 29****TCARA 3303 «Technology of construction of automobile roads and aerodromes» 2-4-0-5,6****Prerequisites:** **RS 22141-2-0-4****Postquisites:** **TOARA 4310 1-2-0-7****Objectives of the course are:** the study of theoretical foundations of road building. **Contents of main partitions of the course**: Construction of of subgrade. Production companies road construction. Bases of technology of road construction. **Results of learning**: Preparing of the roadway and construction foundations. |
| **4** | **5/3** | **Module TCARCRP 28****АТС 3310 «Автоматика, телемеханика и связь» 1-2-0-6****Prerequisites:** **Phys 12021-1-1-2****Postquisites:** **TOARA 43101-2-0-7****Objectives of the course are:**  know the basic automation and communication devices. **Contents of main partitions of the course:** Basic equipment Automated and remotely controlled various communications used in rail transport.**Results of learning:** ability to use basic automation and communication devices in the operation of railways.. | **Модуль TCARCRP 28****MMCRP 3304 «Modern methods of calculation of road pavements» 1-2-0-6****Prerequisites:** **RS 2214 1-2-0-4****Postquisites:** **TOARA 4310 1-2-0-7****Objectives of the course are:**  Principles of designing of road pavements.**Contents of main partitions of the course:** Calculated load. Estimated reduced traffic. Calculation of non-rigid of road pavements by allowing the resilient deflection. Calculation of the intermediate layers of weak binding materials for resistance to shear. Calculation tensile bending. Techno-economic comparison of variants of the pavement.**Results of learning:** Construction and calculation of road pavements. |
| **5** | **5/3** | **Module DRBTQC 29****DR 4305 «Design of railroads» 1-2-0-7****Prerequisites:** **RS 2214 1-2-0-4****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:** designing of railways in top view and profile.**Contents of main partitions of the course:** Engineering research methods to gather information about the area of design and development on its basis of complex science-based projects for the construction of new and reconstruction of existing railways. Theory and practice of development and decision-making when choosing the main technical parameters of the project.**Results of learning:** skills in designing railways. | **Module DRBTQC 29** **DARA 4305 «Design of automobile roads and aerodromes» 1-2-0-7****Prerequisites:** **RS 2214 1-2-0-4****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:** designing of automobile roads in top view and profile.**Contents of main partitions of the course:** Perspective traffic. Design drainage, of subgrade and pavement. Designing traffic intersections and bridges. Design of road networks and techno-economic comparison of options.**Results of learning:** skills in designing automobile roads. |
| **6** | **5/3** | **Module DRBTQC 29****QCRCW 4306 « Неразрушающий контроль** **рельсов » 1-0-2-7****Prerequisites:** **TCARA 3303 2-4-0-6****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:**  studying of methods of nondestructive testing rails of railways. **Contents of main partitions of the course:** Methods for assessing the quality of products in road construction. Ensuring the quality of road construction products. **Results of learning:** Diagnosis and assessment of rail of railways nondestructive testing methods. | **Module PAMTKK 29**  **QCRCW 4306 «Quality control of road-construction works» 1-0-2-7****Prerequisites:** **TCARA 3303 2-4-0-6****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:**  studying of quality control and management of roads.**Contents of main partitions of the course:** Methods for assessing the quality of products in road construction. Ensuring the quality of road construction products.**Results of learning:** Diagnosis and assessment of the state roads. Maintaining the required level of quality of roads. |
| **7** | **5/3** | **Module PDMNKR 29****SEM 4307 «Сооружение и эксплуатация мостов» 1-2-0-7****Prerequisites:** **TCARA 3303 2-4-0-6****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:**  studying design features arch, beam, cable-stayed bridges.**Contents of main partitions of the course:** Wooden bridges. Concrete bridges. Metal bridges. Pontoon bridges. Operation, strengthening and reconstruction of bridges.**Results of learning:** know the basic methods of erecting arch, beam, cable-stayed and suspension bridges. | **Module DRBTQC 29****BT 4307 «Bridges and tunnels» 1-2-0-7****Prerequisites:** **TCARA 3303 2-4-0-6****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:**  studying design features arch, beam, cable-stayed bridges, tunnels. **Contents of main partitions of the course:** Wooden bridges. Concrete bridges. Metal bridges. Pontoon bridges. Operation, strengthening and reconstruction of bridges. **Results of learning:** know the basic methods of erecting arch, beam, cable-stayed and suspension bridges. Technology construction of tunnels. |
| **8** | **3/2** | **Module SMOT 30****SMO 3308 «Строительные машины****и оборудования» 1-0-1-6****Prerequisites:** **TCARA 3303 2-4-0-6****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:** know the basic construction machines and equipment during the construction of the railway.**Contents of main partitions of the course:** earthworks, technological properties of soils. Classification of building machines for the production of excavation. Technical and technological parameters of construction machinery.**Results of learning:** to be able to make the right choice set of machines for construction of the railway of subgrade and track structure devices depending on the design of earthworks | **Module SMOT 30****SMO 3308 «Строительные машины****и оборудования» 1-0-1-6****Prerequisites:** **TCARA 3303 2-4-0-6****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:** know the basic construction machines and equipment during the construction of the railway.**Contents of main partitions of the course:** earthworks, technological properties of soils. Classification of building machines for the production of excavation. Technical and technological parameters of construction machinery.**Results of learning:** to be able to make the right choice set of machines for construction of the railway of subgrade and track structure devices depending on the design of earthworks |
| **9** | **3/2** | **Module SMOT 30****OTTS 3309 «Охрана труда в транспортном строительстве» 1-0-1-5****Prerequisites:** **RS 2214 1-2-0-4****Postquisites:** **AP 3220 2-4-0-6****Objectives of the course are:**  study of basic labor protection measures in transport construction.**Contents of main partitions of the course:** analysis of dangerous and harmful factors in transportation construction and measures to reduce them. Fire safety measures.**Results of learning:** know basic labor protection measures in transport construction. | **Module SMOT 30****OTTS 3309 «Охрана труда в транспортном строительстве» 1-0-1-5****Prerequisites:** **RS 2214 1-2-0-4****Postquisites:** **AP 3220 2-4-0-6****Objectives of the course are:**  study of basic labor protection measures in transport construction.**Contents of main partitions of the course:** analysis of dangerous and harmful factors in transportation construction and measures to reduce them. Fire safety measures.**Results of learning:** know basic labor protection measures in transport construction. |
| **10** | **5/3** | **Module ТЕЕТS 31****РТЕZhD 4310 «Правила технической эксплуатации железных дорог» 1-2-0-7****Prerequisites:** **TSZhD 3303 2-4-0-6****Postquisites:** **NZDR(P)4501 0-0-0-8****Objectives of the course are:**  learning the rules of technical operation of railways.**Contents of main partitions of the course:** Key provisions and operation of railways and railway employees, transport. Main dimensions, the most important standards for levels of structures, devices, and requirements to them, the system organization trains and signaling principles. **Results of learning:** know the basic rules of technical operation of of railways. | **Module TORETC 31****TOARA 4310 «Technical operation of roads, economics of transport construction» 1-2-0-7****Prerequisites:** **TCARA 3303 2-4-0-6****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:**  learning the rules of technical operation of roads and airfields.**Contents of main partitions of the course:** Basics the theory of operation of roads and traffic. Evaluation of transport and operational indicators and state highways. Technology and organization of road maintenance and repair. Organization and ensuring the safety and convenience of traffic on the roads. Organization of and operation of road management.**Results of learning:** know the basic rules of technical operation of roads and airfields. |
| **11** | **3/2** | **Module TORETC 31****ETC 4311 «Economics in transport construction» 1-1-0-7****Prerequisites:** **TCARA 3303 2-4-0-6****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:** Organization, planning and management of transport construction.**Contents of main partitions of the course:** Results of the study methods used in road construction technology. Development of object and local budgets, summary estimate of construction of transport facilities.**Results of learning:** to be able to develop a local object and estimates summary estimate of construction of transport facilities. | **Module TORETC 31****ETC 4311 «Economics in transport construction» 1-1-0-7****Prerequisites:** **TCARA 3303 2-4-0-6****Postquisites:** **EDDW(P) 4501 0-0-0-8****Objectives of the course are:** Organization, planning and management of transport construction.**Contents of main partitions of the course:** Results of the study methods used in road construction technology. Development of object and local budgets, summary estimate of construction of transport facilities.**Results of learning:** to be able to develop a local object and estimates summary estimate of construction of transport facilities. |

**Зав. Кафедрой Утенов Е. С.**