

## CATALOG OF ELECTIVE DISCIPLINES

**6B07 - Engineering, Manufacturing and Civil engineering**  
(Code and classification of the field of education)

**6B073 - Architecture and Civil engineering**  
(Code and classification of the direction of training)

**0730**  
(Code in the International Standard Classification of Education)

**B074 - Urban planning, construction works and civil engineering**  
(Code and classification of the educational program group)

**6B07302 - Civil engineering**  
(Code and name of the educational program)

**bachelor**  
(Level of preparation)

**set of 2023**

**Developed**

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Chairman of the Academic Council Oralkanova I.A.

## Pre-diploma practice

Discipline cycle	Profiling discipline
Course	4
Credits count	15
Knowledge control form	Total mark on practice

### Short description of discipline

*Pre-diploma practice of students is a stage of training, and made after the development of the program of theoretical and practical courses of delivery by students of all types of intermediate certification provided by the state requirements to the minimum content and level of training of graduates.*

### Purpose of studying of the discipline

*The purpose of the pre-graduate practice is to prepare the student for solving design and production and technological problems in production and to collect the initial data for working on the diploma project.*

### Learning Outcomes

*ON 5 Design and calculate building structures .*

*ON 6 Analyze geo research and design foundations.*

*ON 7 Design energy efficient and information modeling of buildings.*

*ON 8 Determine the cost of production costs and the efficiency of construction according to regulatory and economic bases.*

*ON 9 Plan the organization and technology of construction production of buildings and structures.*

### Learning outcomes by discipline

*Develops technology for testing and reconstruction of buildings*

### Prerequisites

*Industrial practice II Production practice III*

### Postrequisites

*Final examination*

## Production practice III

Discipline cycle	Profiling discipline
Course	4
Credits count	15
Knowledge control form	Total mark on practice

### Short description of discipline

*This course is necessary to collect materials for the diploma project on the basis of practical experience in the current production (production facility). The course is conducted after studying theory blocks, practice and passing the intermediate certification. The information obtained as a result of collecting data for the diploma project, helps students to gain initial professional experience, to test themselves in professional readiness as a future specialist.*

### Purpose of studying of the discipline

*The purpose of Industrial practice III is to prepare students to solve geodetic tasks to ensure the effectiveness of the required quality required for engineering and geodetic works of buildings and structures*

### Learning Outcomes

*ON 8 Determine the cost of production costs and the efficiency of construction according to regulatory and economic bases.*

*ON 9 Plan the organization and technology of construction production of buildings and structures.*

### Learning outcomes by discipline

*1) solve problems in the field of automation of new technologies in geodesic production*

*2) search, analyze and evaluate information necessary for the graduation project*

*3) apply the acquired theoretical and practical skills and knowledge*

### Prerequisites

*Industrial practice II*

### Postrequisites

*Production practice III*

## Computer drawing in design

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline is devoted to the study and practical development of computer technology in graphics application packages, develops spatial imagination of students. In addition, the study of State Standards Unified system of design documentation, the basic principles and rules of design documentation. Students study ways of graphic representations, fulfillment of sketches of details, drawing up of design and technical documentation creation of volume models with the help of AutoCAD computer program.*

### Purpose of studying of the discipline

*The purpose of teaching the discipline "Computer drawing in design" is computer engineering training: for students of builders. The tasks include providing the student with a minimum of fundamental engineering and geometric knowledge and knowledge in the field of drawing and modeling.*

### Learning Outcomes

*ON 3 Distinguish the types and properties of building materials and structures used.*

*ON 5 Design and calculate building structures .*

*ON 7 Design energy efficient and information modeling of buildings.*

## Learning outcomes by discipline

- 1) Distinguish methods for depicting spatial forms on a plane;
- 2) explore the geometric properties of various objects using given images;
- 3) demonstrate computer design skills in the AutoCad graphics program

### Prerequisites

Construction drawing

### Postrequisites

The architecture BIM-technology in building design

## Autocad in pojecting

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is devoted to the study of AutoCAD program, mastering the interface of AutoCAD, tools for mastering 2D modeling: drawing, editing, forming image formats, the formation of orthogonal projections of parts with a section, the formation of images of diagrams by means of AutoCAD. 3D modeling in AutoCAD: the basic elements of 3D modeling, building 3 D models, building orthogonal projections. Construction of 2D and 3D objects in AutoCAD.

### Purpose of studying of the discipline

The study of the basic principles of computer-aided design fundamentals of drawing in AutoCAD

### Learning Outcomes

ON 3 Distinguish the types and properties of building materials and structures used.

ON 7 Design energy efficient and information modeling of buildings.

### Learning outcomes by discipline

ON3 Use the fundamentals of cartography and geodesy to solve various problems on the ground.

ON4 Demonstrate the ability to draw plans and maps of the terrain using traditional and modern methods.

- 1) choose suitable methods and means of solving engineering and geodetic problems using AutoCAD;
- 2) create projects in AutoCAD and work with them;
- 3) import data into AutoCAD and create digital terrain models and route plans based on them;
- 4) calculate the volume of earthworks by various methods and perform other 3D modeling work.
- 5) apply AutoCAD software in solving tasks of automated 2D and 3D design.

### Prerequisites

Introduction to construction Construction drawing

### Postrequisites

The architecture BIM-technology in building design

## Computer graphics in construction

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is devoted to the study and practical development of methods for the development of text and drawing. Design documentation using modern graphic editors, as well as the development of students` ability to spatial imagination. In the course students study the application of computer technology in the system AutoCAD in the construction of graphic models: drawings, objects in construction. Construction of drawing elements: walls, window blocks, doors, sizing, symbols.

### Purpose of studying of the discipline

The purpose of teaching the discipline "Computer graphics in construction": preparing students for independent, creative work, performing which they must demonstrate basic knowledge when working with the computer-aided design program AutoCAD.

### Learning Outcomes

ON 5 Design and calculate building structures .

ON 7 Design energy efficient and information modeling of buildings.

### Learning outcomes by discipline

1) Apply standards, GOST standards, Unified system of design documentation.

2) know the basic principles of computer-aided design systems; three-dimensional surfaces and bodies; the basics of building drawings in the system

### Prerequisites

Construction drawing

### Postrequisites

The architecture BIM-technology in building design

## Geodetic works in the construction of structures

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is aimed at studying road transport structures, surveys and breakdown of roads, bridge crossings, pipelines. As well as the

removal of planning and building projects in kind. The study of geodetic support of urban construction, geodetic works in the construction of industrial, hydraulic structures. During the construction of pits, the task of geodetic works is the breakdown of the contour of the pit from the main axes of the structure fixed on the rag, high-altitude control of excavation, executive survey of the pit.

### **Purpose of studying of the discipline**

The purpose of the discipline is to train specialists who have the necessary theoretical knowledge and practical skills of conducting geodetic works, which would allow them to master and implement all the progressive achievements of training and modern geodetic technologies in the future of their professional activities.

### **Learning Outcomes**

ON 6 Analyze geo research and design foundations.

### **Learning outcomes by discipline**

1 to form the ability to solve problems related to the breakdown of geometric elements of designed structures and objects on the ground

2 develop skills of working with regulatory, instructional and project documents

3 to study the methods of production of geodetic measurements on the earth`s surface and in mine workings

### **Prerequisites**

School course

### **Postrequisites**

Geodesic control in construction

## **Geodesy**

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The purpose of this discipline is to form a general idea of the means and methods of geodetic works in topographic and geodetic surveys, the use of ready-made planning and cartographic materials in operational exploration, mining and processing of minerals, construction and operation of industrial and civil facilities, as well as mining enterprises, in the production and technological sphere and design and survey organizations, organizational, managerial and research activities.

### **Purpose of studying of the discipline**

The purpose of the discipline "Geodesy" is to master the basic information about geodetic measurements performed on the Earth`s surface, their

mathematical processing, methods of drawing up maps and plans and vertical profiles, training in the implementation of planned and high-altitude ground

geodetic surveys, the product of mathematical processing of the results of field measurements, the solution of individual engineering tasks necessary for the

construction of buildings and structures.

### **Learning Outcomes**

ON 6 Analyze geo research and design foundations.

### **Learning outcomes by discipline**

1 perform various types of geodetic works on the construction site

2 to draw up projects of geodetic works and engineering and geodetic surveys

3 solve technical problems in the design and engineering-geodetic surveys

### **Prerequisites**

Introduction to construction

### **Postrequisites**

Geodesic control in construction

## **Systems of coordinates and altitudes in geodesy**

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline studies the performance of high-precision measurements using global navigation satellite systems (GNSS) GLONASS and GPS are closely related to coordinate systems in which satellite measurements are performed. The discipline is part of space geodesy, where geocentric rectangular spatial coordinate systems are mainly used to determine the coordinates of points on the earth`s surface, and spherical coordinate systems are used to describe the movement of satellites.

### **Purpose of studying of the discipline**

The purpose of the discipline "Coordinate systems and heights in geodesy" is to master the basic information about geodetic measurements performed on the Earth`s surface.

### **Learning Outcomes**

ON 6 Analyze geo research and design foundations.

### **Learning outcomes by discipline**

1 to make and draw topographic plans of the area

2 to perform primary mathematical processing of measurement results and assessment of their accuracy

3 create a survey justification and perform topographic surveys

### **Prerequisites**

Geodesy

### **Postrequisites**

Geodesic control in construction

## Water supply and sewerage

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The content of the discipline is aimed at achieving the main objectives of water supply and sewerage. The purpose of the discipline is to form students with the necessary knowledge of the fundamentals of the properties of liquids, the laws of hydrostatics, hydrodynamics, to ensure the supply of water to consumers, as well as the removal of domestic wastewater, the correct solution of engineering problems of water supply and sanitation of residential buildings.*

### Purpose of studying of the discipline

*The purpose of the discipline "Water supply and sanitation" is to form students with the necessary knowledge of the basics of the properties of liquids, the laws of hydrostatics, hydrodynamics, to ensure the supply of water to consumers, as well as the removal of domestic and surface wastewater, the correct solution of engineering problems of water supply and sanitation of residential buildings.*

### Learning Outcomes

*ON 4 Calculate engineering systems and machines in civil engineering.*

### Learning outcomes by discipline

*Calculates engineering systems and machines in civil engineering*

*The main problems of water supply and sanitation, buildings, facilities and settlements*

*Design indoor and outdoor water supply and sanitation systems*

### Prerequisites

*Introduction to construction*

### Postrequisites

*Technology of production construction Design and estimate work*

## Engineering systems of buildings and structure

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline is aimed at studying the history of the development of heating and ventilation technology, as well as thermal and air modes of buildings. Design and operation of heating systems. The discipline is aimed at the acquisition by future specialists of theoretical knowledge and practical skills in the field of water supply, sewerage, gas supply, heat supply of settlements, internal construction of water supply, sewerage, gas pipeline, ventilation, heat supply of residential buildings.*

### Purpose of studying of the discipline

*The discipline "Engineering systems of buildings and structures" aims to acquire future specialists the basics of theoretical knowledge and practical skills in the field of water supply, sewerage, gas supply, heat supply of populated areas, the internal structure of water supply, sewerage, gas pipeline, ventilation, heat supply of residential buildings.*

### Learning Outcomes

*ON 4 Calculate engineering systems and machines in civil engineering.*

### Learning outcomes by discipline

*1 To evaluate the quality of the work performed*

*2 Calculates engineering systems and machines in civil engineering*

*3 Theoretical bases of calculation of engineering networks, systems, equipment, principles of operation of equipment of buildings, structures, settlements in environmental protection conditions*

### Prerequisites

*Introduction to construction The architecture*

### Postrequisites

*Technology of construction of buildings and structures Design and estimate work*

## Heating and ventilation systems

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline is aimed at studying the hygienic and physical foundations of heating and ventilation, hydraulic calculation of the heating system. Aerodynamic calculations of air balance and ventilation systems, air treatment. The discipline aims to ensure thermal comfort – the study of the optimal temperature regime favorable for the life and activity of people in the cold season, the state of the air environment, humidity, pressure, composition and purity of air in public and industrial buildings*

### Purpose of studying of the discipline

*The discipline "Heating and ventilation systems" aims to provide thermal comfort – an optimal temperature environment favorable for people's life and activity in the cold season, the study of the state of the air environment – humidity, temperature, mobility, pressure, composition and purity of air in residential, public and industrial buildings.*

### Learning Outcomes

*ON 4 Calculate engineering systems and machines in civil engineering.*

### Learning outcomes by discipline

- 1 Design indoor and outdoor water supply and sanitation systems
- 2 Calculates engineering systems and machines in civil engineering
- 3 Master hydraulic and aerodynamic calculations of heating and ventilation systems

#### **Prerequisites**

Introduction to construction

#### **Postrequisites**

Technology of construction of buildings and structures Design and estimate work

### **Geotechnics**

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

#### **Short description of discipline**

*Geotechnics is a relatively new concept, which currently covers such sciences as soil mechanics, on which the foundation construction is based. The purpose of mastering the discipline "Geotechnics" is to acquaint the student with methods for determining physical and mechanical properties, with methods for analyzing the earth mass as the basis or environment for the location of engineering structures, depending on natural pressure and external load*

#### **Purpose of studying of the discipline**

*The objectives of mastering the discipline The objectives of mastering the discipline "Fundamentals of Geotechnics" are- initial acquaintance of the student with the methods of determining the physical and mechanical properties of soils in massifs, methods of calculating the stress-strain state of the soil mass depending on natural pressure and external load, analysis of the soil mass as a base or environment for placing engineering structures, familiarization with the methods of designing foundations according to limit states.*

#### **Learning Outcomes**

ON 5 Design and calculate building structures .

ON 6 Analyze geo research and design foundations.

#### **Learning outcomes by discipline**

1 Analyzes geo research and designs foundations

2 Evaluate engineering and geological conditions of construction

3 Anticipate and prevent various exogenous and gravitational processes

#### **Prerequisites**

Construction materials

#### **Postrequisites**

Technology of production construction

### **Engineering geology and soil mechanics**

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

#### **Short description of discipline**

*The purpose of the discipline is to form the necessary knowledge among specialists in the complex study of natural and man-made conditions of construction objects, making forecasts of the interaction of these objects with the environment, their engineering protection and justification of safe living conditions of the population. The purpose of the discipline is to gain in-depth knowledge of soil mechanics, to develop skills in the application of numerical computational methods in soil mechanics.*

#### **Purpose of studying of the discipline**

*The purpose of the discipline is the formation of knowledge and practical skills necessary for specialists in the integrated study of natural and man-made conditions of the territory of construction projects, forecasting the interaction of these objects with the environment, the rationale for their engineering protection and safe living conditions*

#### **Learning Outcomes**

ON 5 Design and calculate building structures .

ON 6 Analyze geo research and design foundations.

#### **Learning outcomes by discipline**

1 Formation of skills for determining the physical and mechanical properties of soils

2 Knowledge of the necessary engineering and geological surveys for specific construction sites, providing a reliable assessment of the soils of the bases

3 Mastering the physical and mechanical properties of soils and theoretical laws of soil mechanics

#### **Prerequisites**

Construction materials

#### **Postrequisites**

Technology of production construction

### **Fundamentals of soil mechanics**

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

#### **Short description of discipline**

*The purpose of studying the discipline is to acquire in-depth knowledge about soil mechanics, experimental and theoretical*

prerequisites, features of soil deformation, basic calculation models, special types of soils, rheological foundations of soil mechanics, dynamic properties of soils, the development of skills in applying numerical calculation methods in soil mechanics. The discipline helps students to study the properties of soils in the construction of buildings and structures.

### **Purpose of studying of the discipline**

The purpose of the discipline is to acquire in-depth knowledge about soil mechanics, experimental and theoretical prerequisites, features of soil deformation, basic calculation models, special types of soils, rheological foundations of soil mechanics, dynamic properties of soils, development of skills in applying numerical calculation methods in soil mechanics.

### **Learning Outcomes**

ON 5 Design and calculate building structures .

ON 6 Analyze geo research and design foundations.

### **Learning outcomes by discipline**

1 Perform engineering calculations of weak soils, calculations taking into account the rheological properties of soils, calculations of dynamic impacts in soils

2 Analyzes geo research and designs foundations

3 Knowledge of the necessary engineering and geological surveys for specific construction sites, providing a reliable assessment of the soils of the bases

### **Prerequisites**

Construction materials

### **Postrequisites**

Technology of production construction

## **Hydraulics and hydraulic machines**

Discipline cycle Basic disciplines

Course 3

Credits count 5

Knowledge control form Examination

### **Short description of discipline**

The discipline studies hydrostatics, fundamentals of kinematics, basic equations of motion of gases and liquids. Studies the modes of motion, the basics of hydrodynamic similarity, hydraulic resistances, as well as fluid leakage from holes, also studies the laws of fluid at rest and motion, data on hydraulic jumping and coupling of water courses, weirs, mating and waterworks, descriptions and designs of pumps, methods for calculating the main parameters.

### **Purpose of studying of the discipline**

The purpose of studying the discipline "Hydraulics and hydraulic machines" is to form students` systematic engineering knowledge on the laws of hydrostatics and fluid and gas hydrodynamics, to determine the basic properties of liquids and gases used in aviation technology, the principles of operation of hydrodynamic machines and mechanisms used on civil aviation aircraft.

### **Learning Outcomes**

ON 4 Calculate engineering systems and machines in civil engineering.

### **Learning outcomes by discipline**

1 Skills of creative generalization of the acquired knowledge, concrete and objective presentation of their knowledge in written and oral form

2 Calculates engineering systems and machines in civil engineering

3 To use the acquired knowledge in the bachelor`s work on the operation of vehicles in production

### **Prerequisites**

Introduction to construction

### **Postrequisites**

Technology of production construction

## **The Sanitary equipment of buildings**

Discipline cycle Basic disciplines

Course 3

Credits count 5

Knowledge control form Examination

### **Short description of discipline**

The discipline is aimed at studying the engineering support of buildings and individual objects for various purposes, sewers and drains of buildings and objects. The discipline studies theoretical and practical recommendations for solving engineering problems.

The purpose of studying the discipline is to train specialists in the field of design and operation of sanitary and technical systems, cold and hot water supply systems, as well as drainage systems of buildings for various purposes

### **Purpose of studying of the discipline**

The purpose of studying the discipline "Sanitary and technical equipment of buildings" is to train specialists in the field of design and operation of sanitary and technical systems, cold and hot water supply systems, as well as drainage systems of buildings for various purposes.

### **Learning Outcomes**

ON 4 Calculate engineering systems and machines in civil engineering.

### **Learning outcomes by discipline**

1 To study the issues of improving and introducing new methods of designing water supply and sanitation systems of buildings

2 To use the acquired knowledge in the bachelor`s work on the operation of vehicles in production

3 Calculates engineering systems and machines in civil engineering

### **Prerequisites**

Engineering systems of buildings and structure

### **Postrequisites**



## Construction machines and equipment

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The content of the discipline is aimed at studying the classification of construction machinery, transport, transporting, loading and unloading and lifting machines, machines and equipment for earth and pile work. Изучаются м/м/к машины для дробления, сортировки и мытья каменных материалов, изучаются машины и оборудование для приготовления, транспортировки бетона и растворов и уплотнения бетонных смесей. Машины для отделочных работ. Основы эксплуатации строительной техники

### Purpose of studying of the discipline

The purpose of mastering the discipline "Construction machinery and equipment" is to form knowledge, skills and abilities in the field of application of construction machinery and construction equipment in the construction of residential and industrial buildings.

### Learning Outcomes

ON 4 Calculate engineering systems and machines in civil engineering.

### Learning outcomes by discipline

1 Calculates engineering systems and machines in civil engineering

2 To use the knowledge gained during the study of the discipline on the choice of machinery and equipment when performing construction work on construction sites

3 Independently use special literature devoted to the field of application of construction machinery and construction equipment in the construction of residential and industrial buildings

### Prerequisites

Introduction to construction

### Postrequisites

Technology of production construction

## Engineering geodesy

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline "Engineering Geodesy" studies planned and high-altitude engineering and geodetic networks, topographic and geodetic surveys, geodetic center work, geodetic support of installation work, control of deformations of structures, geodetic work in transport construction, geodetic work on industrial sites, the use of space and computer technologies. The purpose of mastering the discipline is to form students' knowledge, skills and abilities in the field of engineering geodesy

### Purpose of studying of the discipline

The purpose of mastering the discipline "Engineering Geodesy" is to form students' knowledge, skills and abilities in the field of engineering geodesy: - improvement of measurement techniques that ensure obtaining results with a given and reasonable accuracy; - research and improvement of devices, as well as the organization and methods of performing measurements in various natural conditions.

### Learning Outcomes

ON 6 Analyze geo research and design foundations.

### Learning outcomes by discipline

1 Analyzes geo research and designs foundations

2 Improvement of measurement techniques that ensure obtaining results with a given and reasonable accuracy

3 Geodetic support of the construction process of buildings and structures at all stages of its stages

### Prerequisites

Geodesy

### Postrequisites

Geodesic control in construction

## Engineering landscaping

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

Students should be competent in the organization of transport and pedestrian traffic in the improvement of urban areas, engineering improvement of sports complexes and recreation areas. The purpose of mastering the discipline is the theoretical development of the basic methods of organizing the design of sites related to the engineering preparation of the territory and the solution of transport problems in the planning projects of residential buildings and partially municipalities.

### Purpose of studying of the discipline

The purpose of mastering the discipline "Engineering landscaping of territories" is the theoretical development of the main methods and methods of organizing the design of sections related to the solution of engineering preparation of the territory and transport tasks in the planning projects of residential territories and, partially, municipalities.

### Learning Outcomes

ON 8 Determine the cost of production costs and the efficiency of construction according to regulatory and economic bases.

### Learning outcomes by discipline

1 Know the requirements of engineering preparation of the territory for construction purposes

2 Be able to draw up vertical planning schemes when new conditions arise that interfere with the normal operation of the territory

3 Possess the skills of designing the main recreational areas of settlements

### Prerequisites

The architecture

### Postrequisites

Technology of construction of buildings and structures

## Foundations and bases

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline studies the basic concepts of foundations and foundations, their types and classification. The main components. Deposition of bases. Deformation of foundations. The calculation of the foundation precipitation, the depth of the foundation, the main and additional loads, the method of calculating foundations are studied.

Students study basic information about the types of modern foundations and foundations, methods of calculation and design, methods of strengthening the foundations and foundations of buildings and structures.

### Purpose of studying of the discipline

Students study basic information about the types of modern foundations and foundations, methods of calculation and design, methods of strengthening the foundations of buildings and structures

### Learning Outcomes

ON 3 Distinguish the types and properties of building materials and structures used.

ON 5 Design and calculate building structures .

ON 6 Analyze geo research and design foundations.

### Learning outcomes by discipline

1 Analyzes geo research and designs foundations

2 To determine the stresses in the soil mass and the deformation of the base under the influence of external loads

3 Assess the stability of soils at the base of structures and slopes, as well as pressure on enclosing structures

### Prerequisites

Geotechnics

### Postrequisites

Technology of construction of buildings and structures

## Modern finishing materials

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline "Modern finishing materials" explores finishing materials for the construction of buildings and structures. The purpose of the discipline is to obtain basic knowledge in the field of innovative finishing materials for interior decoration of buildings for civil and industrial purposes; acquisition and development of skills in choosing facade materials. The purpose of mastering the discipline is to prepare for practical activities on the rational choice of finishing materials and the effective use of their artistic possibilities in the composition of environmental objects.

### Purpose of studying of the discipline

The purpose (goals) of mastering the discipline:

- to form students ` idea of the level and prospects of development of modern finishing materials used in the design of the environment architecture;

- to prepare for practical activities on the rational choice of finishing materials and the effective use of their artistic capabilities in the composition of environmental objects for various purposes.

### Learning Outcomes

ON 3 Distinguish the types and properties of building materials and structures used.

### Learning outcomes by discipline

1 Mastering the methods of complex assessment of the composition, structure and properties of materials of products when choosing them for construction

2 Plans the organization and technology of construction production of buildings and structures

3 Familiarity with various types of modern building materials and their properties, features of production technology, rational areas of application

### Prerequisites

Construction materials

### Postrequisites

Technology of construction of buildings and structures

## Technological bases of production of building materials, products and structures

Discipline cycle	Basic disciplines
Course	3

Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline considers topics as raw materials: concept, classification, fundamentals of production technology.*

*The purpose of the discipline: to study the basics of organizational and technological support of construction industry enterprises based on a systematic approach. Study of the concepts of operational stability of building materials; theoretical knowledge in the field of ensuring the reliability of building structures; methods for obtaining materials with predictable strength.*

### Purpose of studying of the discipline

*The purpose of the discipline: To study the basics of organizational and technological support of construction industry enterprises based on a systematic approach. Study of ideas about the operational resistance of building materials; give theoretical knowledge in the field of ensuring the reliability of building structures; methodology for obtaining materials with predicted durability.*

### Learning Outcomes

*ON 3 Distinguish the types and properties of building materials and structures used.*

### Learning outcomes by discipline

*1 Plans the organization and technology of construction production of buildings and structures*

*2 Possess the ability to organize work in accordance with the requirements of occupational safety and Health*

*3 Know the ways of forming the specified structure and properties of materials with maximum resource and energy saving*

### Prerequisites

*Construction materials*

### Postrequisites

*Projecting and construction of energy efficient buildings*

## Technology of production of building materials

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline "Technology of production of building materials" provides accurate information about the main groups of modern building materials, the basics of their production technology and promising areas of their application and improvement. The discipline "Technology of production of building materials" has properties, nomenclature and features of technology of building materials and products, pursues the goal of training highly qualified bachelors for their rational use in construction.*

### Purpose of studying of the discipline

*The discipline "Technology of production of building materials" aims to train highly qualified bachelors who possess the properties, nomenclature and features of the technology of building materials and products for their rational use in construction.*

### Learning Outcomes

*ON 3 Distinguish the types and properties of building materials and structures used.*

### Learning outcomes by discipline

*1 Plans the organization and technology of construction production of buildings and structures*

*2 Know the ways of forming the specified structure and properties of materials with maximum resource and energy saving*

*3 Be able to choose the appropriate material for structures operating under specified operating conditions*

### Prerequisites

*Construction materials*

### Postrequisites

*Technology of construction of buildings and structures*

## Production of metal structures

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline "Manufacture of metal structures" is aimed at studying the technological and transport schemes of metal structures factories. The main materials used for the manufacture of metal structures. Basic operations for the manufacture of metalwork parts. The main characteristics of the equipment for the manufacture of parts and their devices. The purpose of mastering the discipline is to study the basics of designing, manufacturing, strengthening metal structures of buildings and structures, as well as preparing students for professional activity in the field of metal fabrication*

### Purpose of studying of the discipline

*The purpose of the discipline is to prepare students for professional activity in the field of designing metal structures.*

### Learning Outcomes

*ON 3 Distinguish the types and properties of building materials and structures used.*

*ON 5 Design and calculate building structures .*

*ON 9 Plan the organization and technology of construction production of buildings and structures.*

### Learning outcomes by discipline

*Designs and calculates building structures*

*Be able to develop the technological process of preparation, assembly and welding of certain Structures*

*Be able to compile technological documentation and search for the optimal variant of the technological process of assembling metal structures*

### Prerequisites

Construction structures

## Postrequisites

Technological bases of production of building materials, products and structures

## Metal structures

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline "Metal structures" is aimed at studying the technology of manufacturing elements of metal structures. Such as: assembly of lattice solid wall structures; assembly of surface structures; welding of steel structures; assembly of general and control structures; protection of metal structures from corrosion; product quality control.

The purpose of mastering the discipline is to form students` functional foundations of design and design features of modern load-bearing and enclosing metal structures of buildings and structures

### Purpose of studying of the discipline

The purpose of mastering the discipline" metal structures "is to form students` functional bases of design and features of design of modern lifting and enclosing metal structures of buildings and structures.

### Learning Outcomes

ON 3 Distinguish the types and properties of building materials and structures used.

ON 5 Design and calculate building structures .

ON 9 Plan the organization and technology of construction production of buildings and structures.

### Learning outcomes by discipline

Designs and calculates building structures

Formation of design and calculation skills for solving specific engineering problems using design norms, standards, reference books, design automation tools

Mastering the principles of design, layout methods and technical- economic analysis of metal structures

### Prerequisites

Construction structures

### Postrequisites

Technology of construction of buildings and structures Technological bases of production of building materials, products and structures

## Installation of metal structures

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The purpose of studying the discipline "Installation of metal structures" is the formation of students` functional design fundamentals and design features of modern supporting and enclosing metal structures of buildings and structures; the ability to correctly mount structural materials that provide the necessary reliability indicators of the design object. The technology of installation of metal structures, competent conduct of SMR, installation of equipment, individual structures or the entire structure is being studied.

### Purpose of studying of the discipline

The purpose of mastering the discipline "Installation of metal structures" is to study the basics of design, manufacture, installation, reinforcement of metal structures of buildings and structures, as well as to prepare students for professional activity in the field of design of metal structures.

### Learning Outcomes

ON 3 Distinguish the types and properties of building materials and structures used.

ON 9 Plan the organization and technology of construction production of buildings and structures.

### Learning outcomes by discipline

Designs and calculates building structures

To know: technology, methods and processes of installation of metal structures, to have an idea of the installation loads and features of the work of structures during installation

Develop a construction plan for the installation of metal structures, make the selection of lifting equipment and the selection of mounting devices

### Prerequisites

Construction structures

### Postrequisites

Technology of construction of buildings and structures The construction of special buildings and structures Technological bases of production of building materials, products and structures

## BIM-technology in building design

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline "BIM-technology in building design" studies the use of special architectural software to perform the necessary elements in

the design of standard architectural exhibits, the use of special functions to create walls, windows and specific building requirements for construction in residential/ commercial and industrial architecture. The discipline allows you to master the knowledge of the concept and terminology of BIM technology, get acquainted with the advantages and disadvantages, methods of implementation

### **Purpose of studying of the discipline**

The purpose of the discipline: To provide information about a new design method (Building Information Modeling) - the process that results in the formation of an information model of a building.

### **Learning Outcomes**

ON 3 Distinguish the types and properties of building materials and structures used.

ON 5 Design and calculate building structures .

ON 7 Design energy efficient and information modeling of buildings.

### **Learning outcomes by discipline**

1 Designs energy efficient and information modeling of buildings

2 BIM allows you to transfer a virtual information model from the development team to the general contractor and owners.

3 Allows you to implement the calculation of estimates, "5D Estimates" and others

### **Prerequisites**

Autocad in projecting

### **Postrequisites**

Final examination

## **Smart technologies in construction**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline "Smart Technology in Construction" is a basic discipline that delivers students information about current technologies in the design of engineering networks, and even more thoroughly explore the global construction industry, detect errors and shortcomings by comparing and analyzing, which in the end allow to make a choice of a rational option, using a computer model of the building and structure

### **Purpose of studying of the discipline**

The purpose of mastering the discipline "Smart technologies in construction" is to prepare the future student for independent work on the development of new technologies by optimizing technological modes.

### **Learning Outcomes**

ON 3 Distinguish the types and properties of building materials and structures used.

ON 5 Design and calculate building structures .

ON 7 Design energy efficient and information modeling of buildings.

### **Learning outcomes by discipline**

Designs energy-efficient and information modeling of buildings

### **Prerequisites**

Autocad in projecting Information and communication technology

### **Postrequisites**

Final examination

## **Digital technologies in organizations, management and planning of buildings**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline prepares students ` interest in organizational and technical, experimental research, and digital-related designers: designing modern, reliable, and highly efficient structural elements. Studies concepts of digital technologies and their types; digital technologies in the construction industry; features of modern design methods; methods of developing solutions using CT

### **Purpose of studying of the discipline**

The purpose of mastering the discipline "Digital technologies in the organization, management and planning of buildings" is to master students ` knowledge of digital and information and communication technologies, basic mathematical and statistical laws.

### **Learning Outcomes**

ON 5 Design and calculate building structures .

### **Learning outcomes by discipline**

Designs energy-efficient and information modeling of buildings

### **Prerequisites**

Autocad in projecting Information and communication technology

### **Postrequisites**

Final examination

## **Organization of project documentation**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline "Organization of project documentation" is basic and forms students' theoretical knowledge in the field of organization of project activities of enterprises, in the field of methodological approaches to project evaluation and practical skills in the field of working with project management standards, creating regulations for project activities, planning, management and control of projects, as well as analyzing the effectiveness of projects.

### **Purpose of studying of the discipline**

The purpose of the discipline "Organization of project activities" is to provide students with competencies in the field of organizing creative and production activities of designers and project teams.

### **Learning Outcomes**

ON 8 Determine the cost of production costs and the efficiency of construction according to regulatory and economic bases.

ON 9 Plan the organization and technology of construction production of buildings and structures.

### **Learning outcomes by discipline**

1 Demonstrates knowledge in the organization of project documentation

2 Distinguishes between types of project documents and applies them for their intended purpose

3 Uses the necessary standards and regulations in the project business

### **Prerequisites**

The architecture

### **Postrequisites**

Normative and technical documentation in construction

## **Design and estimate work**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline "Design and estimate business" is included in the cycle of basic disciplines. It provides for issues on determining the price of construction products, taking into account modern conditions and the requirements of the new estimate and regulatory framework of 2001, the rules and procedure for drawing up estimates using the ABC-4RS computer program. The discipline aims to provide an appropriate theoretical level and practical orientation in the issues of design and estimate documentation.

### **Purpose of studying of the discipline**

The purpose of studying the discipline is to form students' theoretical knowledge and practical skills on the issues of estimated pricing and financing of capital construction, the methodology for determining the price of construction products in order to ensure the profitability of construction organizations.

### **Learning Outcomes**

ON 3 Distinguish the types and properties of building materials and structures used.

ON 5 Design and calculate building structures .

ON 8 Determine the cost of production costs and the efficiency of construction according to regulatory and economic bases.

### **Learning outcomes by discipline**

1 Determines the cost of production costs and the efficiency of construction according to regulatory and economic bases

2 Applies knowledge of project documentation in the design

3 Calculates the construction volumes of buildings, the consumption of materials according to reference books

### **Prerequisites**

The architecture

### **Postrequisites**

Normative and technical documentation in construction

## **Documentation, valuation and pricing of construction works**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline "Estimate documentation, rationing and pricing of construction works" belongs to the block of basic disciplines. To master it, a student must know architecture and economics. The purpose of studying the discipline is to expand the system of knowledge and skills for the development of the estimated cost of construction and the formation of prices for construction products, determining the cost of construction and installation work to perform technical and economic calculations.

### **Purpose of studying of the discipline**

The purpose of studying the discipline is to expand the system of knowledge and skills for developing the estimated cost of construction and the formation of prices for construction products, determining the cost of construction and installation works for performing technical and economic calculations related to the specifics of the work of construction organizations in the conditions of the development of market relations.

### **Learning Outcomes**

ON 8 Determine the cost of production costs and the efficiency of construction according to regulatory and economic bases.

### **Learning outcomes by discipline**

1 demonstrates knowledge of estimate documentation and pricing

2 distinguishes between normative and actual prices for building materials

3 makes local and object estimates, performs a summary estimate calculation

### **Prerequisites**

The architecture

## Postrequisites

Normative and technical documentation in construction

## Software packages for computer-aided design

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The study of the discipline will become familiar with the basic principles of CAD, methods of classification of design processes and design work, to form knowledge, skills, automation process design and design documentation in the design of buildings and structures using modern software systems. To achieve the goal is given a review of the structure and principles of computer-aided design, provides an overview of the components and software tools CAD.

### Purpose of studying of the discipline

The main purpose of the discipline "Software systems for computer-aided design" is to familiarize students with the fundamental principles of CAD, their classification, methods of formalization of the design and construction process, ways of using information technologies to automate design, design and technological work.

### Learning Outcomes

ON 5 Design and calculate building structures .

ON 7 Design energy efficient and information modeling of buildings.

### Learning outcomes by discipline

ON5 Solve problems in the field of automation of new technologies in geodesic production.

1) solve geodetic tasks to ensure maximum efficiency of the required quality of engineering and geodetic work on buildings and structures

2) choose appropriate methods and tools for geodetic engineering tasks using CAD

3) create designs in CAD and work with them

### Prerequisites

Autocad in pojecting

### Postrequisites

Final examination

## Calculation of structures and systems of buildings by computer programs

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline "Calculation of structures and systems of buildings by computer programs" makes it possible for students to acquire the necessary knowledge for the application of software complexes (SCAD, LIRA, etc.) when solving professional tasks in individual parts and in general buildings, which is required for a modern design engineer. The calculation of structures is the most responsible when designing residential buildings and buildings for various purposes.

### Purpose of studying of the discipline

The objectives of mastering the discipline "Calculation of structures and systems of buildings according to computer programs" are: - study in the theoretical part of the classification of existing CAD systems, and their principles of functioning, including methods of mathematical (computer) modeling.

### Learning Outcomes

ON 3 Distinguish the types and properties of building materials and structures used.

ON 5 Design and calculate building structures .

ON 7 Design energy efficient and information modeling of buildings.

### Learning outcomes by discipline

Plans the organization and technology of construction production of buildings and structures

### Prerequisites

Autocad in pojecting

### Postrequisites

Final examination

## Computer-aided design systems in construction

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is aimed at acquiring and mastering the theoretical foundations of computer-aided design by students, familiarization with the principles of building modern CAD systems and obtaining skills in solving engineering problems of designing complex technical systems using CAD. Formation of students' theoretical and practical knowledge in the field of development of computer-aided design systems. Modern CAD systems should have elements of "artificial intelligence", for example, have so-called expert designer support systems.

### Purpose of studying of the discipline

The purpose of mastering the discipline "CAD in construction" is to form the knowledge, skills and abilities of students to use a computer

when performing design work and preparing relevant documentation.

### **Learning Outcomes**

ON 3 Distinguish the types and properties of building materials and structures used.

ON 5 Design and calculate building structures .

ON 7 Design energy efficient and information modeling of buildings.

### **Learning outcomes by discipline**

Plans the organization and technology of construction production of buildings and structures

### **Prerequisites**

Autocad in pojecting

### **Postrequisites**

Final examination

## **The construction of special buildings and structures**

Discipline cycle Profiling discipline

Course 4

Credits count 5

Knowledge control form Examination

### **Short description of discipline**

The discipline considers the following topics: basic concepts and regulatory provisions, technology of engineering preparation of a construction site, technology of construction of earthworks, technology of construction of underground structures, construction of buildings from prefabricated structures, general information on the construction of high-rise and large-span buildings and structures, students mastering the theoretical foundations and regulations of methods of construction of buildings and structures of various structural systems from prefabricated, monolithic and prefabricated monolithic structures

### **Purpose of studying of the discipline**

The purpose of mastering the discipline "Construction of special buildings and structures" is the formation of the student's competencies in the field of construction of high-rise and large-span buildings and structures, the development by students of the theoretical foundations and regulations of methods for the construction of buildings and structures of various structural systems from prefabricated, monolithic and prefabricated-monolithic structures.

### **Learning Outcomes**

ON 3 Distinguish the types and properties of building materials and structures used.

ON 5 Design and calculate building structures .

ON 9 Plan the organization and technology of construction production of buildings and structures.

ON 10 Develop technology for testing and reconstruction of buildings.

### **Learning outcomes by discipline**

-demonstrates basic knowledge of the design of special structures,

- uses computer-aided design systems, the AutoCAD program and others for the graphic representation of projects,

- distinguishes between structural systems of buildings

### **Prerequisites**

Technology of production construction Construction structures

### **Postrequisites**

Final examination

## **Construction in seismic areas**

Discipline cycle Profiling discipline

Course 4

Credits count 5

Knowledge control form Examination

### **Short description of discipline**

The discipline "Construction in seismic areas" provides the knowledge and skills necessary for the design and construction of unique buildings and structures in earthquake-prone areas. Basic information about earthquakes, their causes, manifestations, and consequences. Causes of earthquakes, types of earthquakes. Earthquake-prone zones of the Earth. The discipline forms knowledge, skills and abilities in the calculation and design of structures of buildings and structures erected and operated in seismic areas.

### **Purpose of studying of the discipline**

The purpose of mastering the discipline "Construction in seismic areas" is to form knowledge, skills and abilities in the calculation and design of structures of buildings and structures erected and operated in seismic areas.

### **Learning Outcomes**

ON 5 Design and calculate building structures .

ON 6 Analyze geo research and design foundations.

ON 9 Plan the organization and technology of construction production of buildings and structures.

ON 10 Develop technology for testing and reconstruction of buildings.

### **Learning outcomes by discipline**

- designs buildings and structures erected in seismic areas

- has an idea about earthquakes and their consequences

- performs calculations of structures taking into account the seismicity of the area

### **Prerequisites**

Stone and reinforced concrete structures Metal structures Technology of production construction Construction structures

### **Postrequisites**

Final examination

## **Technologies of high-rise construction**



Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline studies the general concepts and provisions of technology for the construction of various high-rise and large-span buildings and structures. In this discipline, the design and preparation of production of these works on the construction site and methods and methods of work on the construction of aboveground engineering structures for various purposes, modern methods of construction of high-rise and large-span buildings and structures are considered

### Purpose of studying of the discipline

The purpose of studying the discipline "Technology of high-rise construction" is to familiarize students with the basics of design and modern methods of construction of high-rise and large-span buildings and structures.

### Learning Outcomes

ON 3 Distinguish the types and properties of building materials and structures used.

ON 5 Design and calculate building structures .

ON 9 Plan the organization and technology of construction production of buildings and structures.

### Learning outcomes by discipline

- develops projects for high-rise and large-span buildings

- performs calculations of building structures for high-rise buildings

- uses knowledge to select machines and mechanisms for high-rise construction

### Prerequisites

Technology of production construction Technology of construction of buildings and structures The construction of special buildings and structures

### Postrequisites

Final examination

## Automations topographergeodetic Work

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

### Short description of discipline

In this discipline, we study the automation of geodetic measurements. Software features in topographic packages. Satellite navigation devices. Automated technology to create a topographic plan. Organization of work in CREDO-DAT system. Equalization of geodetic networks in CREDO-DAT system. The creation of digital elevation models in the system CREDO-MIX.

### Purpose of studying of the discipline

The purpose of this discipline is to study and master modern methods and means of automation of technological processes of topographic and geodetic production.

### Learning Outcomes

ON 6 Analyze geo research and design foundations.

ON 9 Plan the organization and technology of construction production of buildings and structures.

### Learning outcomes by discipline

Analyzes the geo research and design foundation

### Prerequisites

Geodesy

### Postrequisites

Final examination

## Geodetic works on the construction of industrial site

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline studies the basic geodetic center work on an industrial site, teaches to carry out the removal in kind of the main and main (overall) axes of buildings, structures, engineering communications from the points of the center geodetic basis. This discipline teaches you to process the measurement results, solve the tasks of transferring the mark to the bottom of the pit and tiers, determine the height of the structure at an inaccessible distance.

### Purpose of studying of the discipline

The objectives of the discipline are to acquire theoretical and practical knowledge necessary for the design, construction and operation of industrial, civil and special-purpose facilities.

### Learning Outcomes

ON 6 Analyze geo research and design foundations.

ON 9 Plan the organization and technology of construction production of buildings and structures.

ON 10 Develop technology for testing and reconstruction of buildings.

### Learning outcomes by discipline

- Performs the removal in kind of the overall axes of the building,

- solves the tasks of transferring the mark to the bottom of the pit,

- determines the height of the structure

### **Prerequisites**

Geodesy

### **Postrequisites**

Final examination

## **Geodesic control in construction**

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline "Geodetic control in construction" studies the method of production of topographic and geodetic works for solving engineering problems in various sectors of the economy. The discipline "Geodetic control in construction" allows you to reveal such main topics of the course as topographic and geodetic surveys of construction sites; engineering geodetic design of structures; center work; geodetic alignment of structures and technical equipment; monitoring of deformation of structures.

### **Purpose of studying of the discipline**

The initial requirements necessary for studying the discipline "Geodetic control in construction" include knowledge, skills and abilities formed in the process of studying different disciplines.

### **Learning Outcomes**

ON 6 Analyze geo research and design foundations.

ON 9 Plan the organization and technology of construction production of buildings and structures.

ON 10 Develop technology for testing and reconstruction of buildings.

### **Learning outcomes by discipline**

- Analyzes geo research and designs foundations
- Solves the issues of control of geodetic measurements in construction,
- conducts geodetic surveys of construction sites

### **Prerequisites**

Geodesy

### **Postrequisites**

Final examination

## **Tests of buildings and structures**

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline demonstrates the testing of buildings and structures, their main tasks, methods of testing buildings and structures, reliability, durability, maintainability, failure, operating time, technical resource. Also studies the indicators of reliability, durability and maintainability, the history of the development of methods of testing buildings and structures. The purpose of the discipline "Testing of buildings and structures" is to prepare a bachelor who knows the principles of optimal experiment planning, who is able to establish a correspondence between the actual work of the structure and its design model.

### **Purpose of studying of the discipline**

The purpose of the discipline "Testing of buildings and structures" is to prepare a bachelor who knows the principles of optimal planning of the experiment, who is able to establish a correspondence between the actual work of the structure and its design model.

### **Learning Outcomes**

ON 5 Design and calculate building structures .

ON 10 Develop technology for testing and reconstruction of buildings.

### **Learning outcomes by discipline**

- applies knowledge of structural testing methods in practice
- demonstrates basic knowledge of reliability, durability and maintainability of buildings,
- establishes the correspondence between the actual work of the structure and its model

### **Prerequisites**

Technology of production construction

### **Postrequisites**

Final examination

## **Technical maintenance of buildings**

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline studies the main provisions on the production and operation of buildings, regulatory and technical documentation for the operation of buildings and structures. Surveys during the operation of the building. Students study methods of quality control and acceptance of works into operation, labor protection and fire prevention. The objectives of mastering the discipline "Technical operation of buildings" are: To determine the operational qualities of building structures and engineering equipment, as well as the building as a whole.

### **Purpose of studying of the discipline**

The objectives of mastering the discipline "Technical operation of buildings" are: To determine the operational qualities of building structures and engineering equipment, as well as the building as a whole.

### **Learning Outcomes**

ON 9 Plan the organization and technology of construction production of buildings and structures.

### **Learning outcomes by discipline**

- studies the main provisions on the production and operation of buildings
- demonstrates knowledge of quality control methods and acceptance of works into operation,
- Determines the operational qualities of building structures and engineering equipment, as well as the building as a whole

### **Prerequisites**

Technology of construction of buildings and structures Construction structures

### **Postrequisites**

Final examination

## **Technical operation and testing of buildings and structures**

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline is basic for bachelors, gives knowledge about the basic provisions for the production and operation of buildings, technical documentation for the operation of buildings, workers` wages, their pricing, collective and labor contracts. The purpose of the discipline is the acquisition by students of knowledge and skills in the field of ensuring trouble-free operation, the required technical condition of building structures and engineering systems, as well as their maintenance.

### **Purpose of studying of the discipline**

The purpose of the discipline is the acquisition by students of knowledge and skills in the field of ensuring trouble-free operation, the required technical condition of building structures and engineering systems, as well as their maintenance, the development and consolidation of academic and socio-personal competencies.

### **Learning Outcomes**

ON 9 Plan the organization and technology of construction production of buildings and structures.

ON 10 Develop technology for testing and reconstruction of buildings.

### **Learning outcomes by discipline**

Develops technology for testing and reconstruction of buildings

### **Prerequisites**

Technology of production construction Construction structures

### **Postrequisites**

Final examination Fundamentals of Structural Safety of Buildings and Structures

## **Control and management of normative documentation at CIW**

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline considers the organization of quality control in construction, quality control in the production and acceptance of SMR and the organization of supervision and acceptance of objects. Since the quality of the performance of the SMR largely depends on the knowledge of the performers of the work. The purpose of mastering the discipline is to form knowledge about modern methods of organization and technical methods of quality control of construction and installation works, construction materials, project documentation.

### **Purpose of studying of the discipline**

The purpose of mastering the discipline "Control and management of normative documentation at the SMR" is to form knowledge about modern methods of organization and technical methods of quality control of construction and installation works, construction materials, project documentation.

### **Learning Outcomes**

ON 8 Determine the cost of production costs and the efficiency of construction according to regulatory and economic bases.

### **Learning outcomes by discipline**

- checks the organization of quality control in construction,
- supervises the organization of supervision and acceptance of objects
- selects methods of organization and technical methods of quality control of construction and installation works

### **Prerequisites**

Design and estimate work

### **Postrequisites**

Final examination

## **Normative and technical documentation in construction**

Discipline cycle	Profiling discipline
Course	4
Credits count	5

**Short description of discipline**

*Goals and objectives, communication with other disciplines. The concept of normative documents. Methods of standardization. State management of works on technical regulation. The discipline introduces the concept of normative documents, methods of standardization, state management of works on technical regulation. The procedure for the development of BCiR, standards. The purpose of studying the discipline "Normative and technical documentation in construction": preparation of bachelors to solve professional problems in the field of construction based on the study of the provisions of the main legal and regulatory documents regulating the procedure for the development of regulatory and technical documents*

**Purpose of studying of the discipline**

*The purpose of studying the discipline "Normative and technical documentation in construction": preparation of bachelors for solving professional problems in the field of construction on the basis of studying the provisions of the main legal and regulatory documents regulating the procedure for the development of normative and technical documents.*

**Learning Outcomes**

*ON 8 Determine the cost of production costs and the efficiency of construction according to regulatory and economic bases.*

**Learning outcomes by discipline**

- gets acquainted with the concept of normative documents, standardization methods,
- Classifies regulatory documentation, the procedure for the development of technical regulations,
- applies SNiPs, standards, eurocodes in practice

**Prerequisites**

*Design and estimate work*

**Postrequisites**

*Final examination*

**The organization, management and planning in building**

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

**Short description of discipline**

*The discipline "Organization, management and planning in construction" aims to train qualified specialists-organizers of construction production who know the basics of organization and planning of construction production and are able to use them in practice in construction organizations. Teaching the discipline "Organization, management and planning in construction" prepares students to work at construction sites as foremen, craftsmen and engineers who are able to organize the construction process*

**Purpose of studying of the discipline**

*The purpose of teaching the discipline "Organization, management and planning in construction" is to train qualified specialists-organizers of construction production who know the basics of organization and planning of construction production and are able to use them in practical activities in construction organizations.*

**Learning Outcomes**

- ON 3 Distinguish the types and properties of building materials and structures used.*
- ON 5 Design and calculate building structures .*
- ON 9 Plan the organization and technology of construction production of buildings and structures.*

**Learning outcomes by discipline**

- Demonstrates the basics of organization and planning of construction production,
- uses the knowledge of the organization of construction in practical activities in construction organizations.
- plans and manages construction

**Prerequisites**

*Technology of production construction*

**Postrequisites**

*Final examination*

**Fundamentals of Structural Safety of Buildings and Structures**

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

**Short description of discipline**

*The discipline "Fundamentals of Structural Safety of Buildings and Structures" is a basic discipline of the educational program, studying the basic concepts and methods in the field of buildings and structures safety during construction and operation to solve a number of state and construction tasks. In the course of study students will be able to predict potential risks and develop measures to eliminate them.*

**Purpose of studying of the discipline**

*The purpose of mastering the discipline is the formation of knowledge, skills and abilities to determine the structural safety of buildings and structures at the stages of design, construction and operation of residential and industrial buildings and structures*

**Learning Outcomes**

- ON 3 Distinguish the types and properties of building materials and structures used.*
- ON 5 Design and calculate building structures .*

**Learning outcomes by discipline**

- 1) reproduce the main activities carried out at various levels of management to ensure the safe operation of buildings and structures;
- 2) determine the physical deterioration of buildings, their structural elements and systems and ensure the safety of buildings and structures in complex natural and natural-technogenic conditions;

3) demonstrate the ability to use regulatory documents in the operation of buildings and structures

### **Prerequisites**

Construction structures

### **Postrequisites**

The construction of special buildings and structures Technology reconstruction of buildings

## **Construction and operation of highways**

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline is aimed at studying the prospects for the development of the road network, the influence of highways on the level of development of the national economy, the composition of road construction works and ways of their implementation. The study of the discipline helps to master theoretical knowledge and practical techniques for performing technological processes for the repair and maintenance of structural elements of the highway and road structures.

### **Purpose of studying of the discipline**

The purpose of mastering the discipline "Construction and operation of highways" is to master theoretical knowledge and practical techniques for performing technological processes for the repair and maintenance of structural elements of highways and road structures, mechanization and quality control of work, organization and ensuring road safety.

### **Learning Outcomes**

ON 6 Analyze geo research and design foundations.

### **Learning outcomes by discipline**

- demonstrates knowledge of the development of the road network and the impact of roads on the level of development of the national economy
- understands the technology of road construction,
- applies in practice knowledge on the repair and maintenance of structural elements of the highway and road structures

### **Prerequisites**

Geodesy Technology of production construction

### **Postrequisites**

Final examination

## **Operation of housing and communal services and urban infrastructure**

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline studies the modern principles of the use and maintenance of housing. As well as technical inspection and repair of the housing stock. Evaluation of the operational properties of the object. Organization, planning and management of technical operation of the facility and the urban area. The purpose of mastering the discipline is to form students' theoretical knowledge in the field of infrastructure and improvement of urban areas for various purposes, as well as practical skills.

### **Purpose of studying of the discipline**

The purpose of mastering the discipline is to form students' theoretical knowledge in the field of infrastructure and improvement of urban areas for various purposes, as well as practical skills for using this knowledge within the framework of the chosen educational direction.

### **Learning Outcomes**

ON 9 Plan the organization and technology of construction production of buildings and structures.

### **Learning outcomes by discipline**

- Performs a survey of the housing stock,
- evaluates the operational properties of the object,
- forms knowledge of the infrastructure of the urban area

### **Prerequisites**

The architecture Construction structures

### **Postrequisites**

Final examination