

NON-PROFIT JOINT-STOCK COMPANY "KAZAKH NATIONAL RESEARCH TECHNICAL  
UNIVERSITY named after K.I. SATPAYEV"



Institute of Architecture and Construction named after T.K. Basenov  
Department of "Construction and Building Materials"

**GRADUATE MODEL**  
Master`s degree program  
**7M07318 - "Civil engineering and production of building materials and  
structures"**

Almaty 2024

## 1. Description of the educational program

The educational program "Civil engineering and production of building materials and structures" is developed in accordance with the National Qualifications Framework, professional standards and aligned with the Dublin descriptors and the European Qualifications Framework. The educational program is focused on learning outcomes.

Dublin descriptors, which are a description of the level and scope of knowledge, skills, abilities and competencies acquired by students upon completion of the educational program of each level (stage) of higher and postgraduate education, are based on learning outcomes, competencies formed, as well as the total number of ECTS credit (credit) units.

The educational program "Civil engineering and production of building materials and structures" is aimed at production and technological activities.

The graduate will be able to carry out professional activities:

- master of engineering and technology: design institutions; bureaus; companies, firms and organizations (enterprises) of construction, transport and communication, road construction, mining, oil and gas and military complexes; companies, firms and organizations (enterprises) of other economic infrastructures.

Professional competence: - training of specialists in the profile for work, regardless of the forms of ownership and subordination: in design institutions; in bureaus; in companies, firms and organizations (enterprises) for example, in companies, firms and organizations (enterprises) of other economic infrastructures. The inculcation of managerial skills and providing training for professional managers (the heads of the General profile on all aspects of management activity).

**The objects of professional activity** of the master are: design bureaus, design institutes; construction organizations and firms, akimats, ministries.

Masters of the specialty 7M07318 " Civil engineering and production of building materials and structures" can perform the following **types of professional activities**:

- Calculation and design and technical and economic;
- organizational and managerial support;
- production, technological and operational;
- legal, expert and Advisory services;

Settlement and design and technical and economic activities:

- production of appropriate calculations of structural elements of buildings and structures of transport and communication and oil and gas complexes;
- preparation of projects and feasibility studies for the construction of new, repairs, current maintenance and reconstruction of existing objects of transport and communication and oil and gas complexes.

**Organizational and managerial activities:**

- organization of the work of the labor collective of performers with the creation of the necessary conditions, equipping (providing) production with labor and material resources, making optimal management decisions in various production conditions;

- finding optimal solutions in the event of labor disputes on staffing, wages, cost and quality of various types of work, ensuring the safety of life, labor protection and compliance with environmental safety in production areas;

- assessment of production and non-production costs to ensure the quality of products of construction and repair production;

**Production, technological and operational activities:**

- planning and solving technological problems encountered in the production process;

- efficient use of materials and raw materials, equipment, machinery, modern computer programs for calculating and designing parameters of technological processes;

- organization and effective implementation of input quality control of raw materials, production control of semi-finished products and parameters of technological processes, quality of finished products;

- engineering and technical operation of buildings and structures.

**Legal, expert and consulting activities:**

- possession of basic knowledge in the field of civil, financial, commercial and other branches of law;

- ability to navigate the current legislation and the ability to apply certain legal norms in practice;

- conducting expertise and providing consulting assistance in various production situations.

## **2 Awareness and formulation of the basic goals (objectives) of the educational program (EP) 7M07318 - "Civil engineering and production of building materials and structures"**

### **2.1 Objectives of the Master's degree program**

Training of specialists in the design, construction and operation of industrial and civil buildings and structures, as well as the production of building materials, products and structures.

### **2.2 Educational Program Objectives:**

- study and analysis of scientific and technical information, domestic and foreign experience in the field of activity;
- setting a scientific and technical task, choosing methodological methods and means of solving it,
- Preparation of data for the preparation of reviews, reports, scientific and other publications;
- setting up and conducting experiments, metrological support, collection, processing and analysis of results, identification of theory and experiment;
- development and use of databases and information technologies for solving scientific, technical and technical-economic tasks in the field of activity;
- presentation of the results of the work performed, organization of the implementation of the results of research and practical developments;
- Development of abstracts of lecture courses and practical exercises in the disciplines of secondary vocational and higher education;
- conducting classroom classes, directing course design, educational and production practices of students.

### **3 Requirements for assessing the learning outcomes of the educational program**

Description of the mandatory standard requirements for graduation and awarding the academic degree of Master: mastering at least 90 academic credits. The content of the Master's degree program consists of:

- 1) theoretical training, including the study of cycles of basic and core disciplines;
- 2) practical training of undergraduates: various types of practices, scientific or professional internships;
- 3) final certification.

#### **Descriptors of the level and scope of knowledge, skills, and competencies**

The requirements for the master's degree level are determined on the basis of the Dublin descriptors of the second level of higher education (Master's degree) and reflect the acquired competencies expressed in the achieved learning outcomes. Learning outcomes are formulated both at the level of the entire Master's degree program and at the level of individual modules or academic disciplines. Descriptors reflect learning outcomes that characterize the student's abilities: 1) demonstrate developing knowledge and understanding in the studied field of science and technology related to the design, construction, operation of buildings and structures, civil and industrial purposes, as well as the production of building materials, products and structures based on advanced knowledge of the construction industry, when developing and (or) applying ideas in the context of research; 2) apply their knowledge, understanding and abilities at a professional level to solve problems in a new environment, in a broader interdisciplinary context; 3) collect and interpret information to form judgments taking into account social, ethical and scientific considerations; 4) clearly and unambiguously communicate information, ideas, conclusions, problems and solutions, both specialists and non-specialists; 5) learning skills necessary for independent continuation of further education in the studied field of design, construction, operation of buildings and structures, civil and industrial purposes, as well as from the production of building materials, products and structures.

#### **4. Learning outcomes of the educational program and the matrix of correlation of learning outcomes of the educational program as a whole with the formed competences**

PO1 - Knows how to select the necessary raw materials and design compositions of different types of building materials by various methods, taking into account economic and environmental factors, including using mathematical modeling.

PO2 – Be able to make informed decisions on the choice of options and the formation of management structures for the effective operation of construction enterprises, using modern strategic planning technologies.

PO3 – Able to economically substantiate and solve issues related to the organization of the production process, determine the volume and quality indicators of the work of construction enterprises, process and analyze the results of theoretical and experimental studies on the technical level and operational state of building structures.

PO4 – By integrating knowledge, makes judgments and makes decisions based on incomplete or limited information, is able to think creatively and creatively approach new problems and situations.

PO5 – Demonstrates the ability to conduct scientific experiments using modern research equipment and instruments, evaluate research results.

PO6 – Knows how to technically and economically evaluate foreign and domestic projects, development programs, strategic plans and quickly draw up conclusions and proposals for practical application, as well as competently predict construction work and select methods for the rational organization of production processes in the construction industry.

PO7 – Know the principles, methods and techniques of practical management in the conditions of investment activity of enterprises in the construction industry.

PO8 – Knows the basic principles of construction design, advanced methods of calculating and designing parts and assemblies, the basics for achieving maximum production efficiency and high quality of the final product.

PO9 – Communicates orally and in writing in Russian and foreign languages to solve the problems of professional activity.

**Head of Department**  
**"Construction and building materials"**

**D.A. Akhmetov**

Considered at the meeting of the department  
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