

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  
**7M07326 - "Production of building materials, products and structures"**

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## **1. Description of the educational program**

The educational program "Production of building materials, products 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 "Production of building materials, products and structures" is aimed at production and technological activities.. The program, on the one hand, is based on centuries-old experience in the production of building materials and products, on the other hand, motivates graduates for creative participation and initiative in the development of new, modern methods of production of innovative building materials, including the use of nanostructuring additives.

The graduate will be able to carry out professional activities:

- at manufacturing enterprises working in the field of production of building materials, products and structures, as well as in academic and departmental research organizations and educational institutions,

- in technological, production, research, management departments and services of enterprises and organizations involved in ensuring, organizing and controlling the environmental safety of technological processes;

- as head of the laboratory at enterprises producing building materials based on binders modified with nanostructuring components.

Graduates of the educational program acquire skills to master and develop new technologies and equipment used in the production of building materials, products and structures. This is facilitated by the inclusion in the program of projects on modules, forming, along with professional competencies, the ability to work in a team and the development of the necessary leadership skills.

## **2 Awareness and formulation of the basic goals (objectives) of the educational program (EP) 7M07326 - "Production of building materials, products and structures"**

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

Training of qualified, competitive specialists focused on experimental research activities in the field of production of building materials, products and structures for construction industry enterprises.

## **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 - Conducts scientific experiments using modern research equipment and instruments, evaluates research results.

PO2 – Able to competently predict construction work using statistical and other data; technically and economically evaluate foreign and domestic projects, development programs, strategic plans and promptly draw conclusions and proposals for practical application.

PO3 – Makes informed decisions on the choice of options for management structures for the effective operation of construction enterprises; produces the formation of management structures at all levels; uses modern technologies for strategic planning purposes.

PO4 – Know the principles, methods and techniques of practical management in the conditions of investment activity of enterprises in the construction industry.

PO5 – 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 construction enterprises.

PO6 – Knows how to select the necessary raw materials for building materials and products, determine their suitability, taking into account economic and environmental factors; design compositions of different types of building materials by various methods, including using mathematical modeling.

PO7 – Know the basic principles of construction design, progressive methods of calculating and designing parts and assemblies, the basics of achieving maximum production efficiency and high quality of the final product.

PO8 – Able to communicate orally and in writing in Russian and foreign languages to solve the problems of professional activity.

PO9 – Demonstrates the ability, through the integration of knowledge, to make judgments and make decisions based on incomplete or limited information, is able to think creatively and creatively approach new problems and situations.

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

**D.A. Akhmetov**

Considered at the meeting of the department  
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