SATBAYEV UNIVERSITY	NON-PROFIT JOINT STOCK COMPANY «KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I.SATBAYEV»
	COMPETENCY MODEL OF A GRADUATE Type of regulatory document

COMPETENCY MODEL OF A GRADUATE

of the Kazakh National Research Technical University named after K.I. Satpayev

for Educational Program
8D07209 «Advanced material processing technologies»

Almaty 2025

Non-profit Joint Stock Company "KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I. SATPAYEV"

APPROVING:
Director of the Burkitbaev Institute of Energy and Mechanical Engineering
_____ K.K.Yelemessov
" 25 " 10 2025 y.

COMPETENCY MODEL OF A GRADUATE

8D07209 «Advanced material processing technologies»

1 Educational Program Objectives

Training of highly qualified specialists in the field of advanced pressure treatment technologies with in-depth knowledge and competencies for the development and implementation of innovative technologies, work in the field of education, as well as contributing to the sustainable development of industry through modern engineering solutions.

2 Objectives of the educational program

- training of scientific and pedagogical personnel with practical skills and the ability to perform professional functions in accordance with the market requirements for organizational management and professional competencies;
- training of competitive specialists in the field of advanced technologies for processing materials, new materials used in procurement;
- training of scientific and pedagogical personnel ready for constant self-improvement and self-development, mastering new knowledge, skills and skills in innovative areas in the field of technology for processing engineering materials;
- preparation of doctoral students for a successful career in the field of modern technological processes for processing new materials in mechanical engineering, in private, public and state organizations, educational institutions.

3 Doctoral student in the direction of training 8D07209 "Advanced technologies for processing materials" should be prepared for solving professional problems in accordance with the profile direction of the doctoral program and types of professional activities:

Doctoral student in the field of training "Advanced technologies for processing materials" should be prepared for solving professional problems in accordance with the profile direction of the doctoral program and types of professional activities:

design and engineering activities:

- analysis of the state of the scientific and technical problem and determination of goals and objectives for the design of instrument systems based on the study of world experience;
- making decisions on the results of calculations for projects and the results of technical, economic and functional-cost analysis of the effectiveness of the designed machine-building systems;

production and technological activities:

- development of methods for conducting theoretical and experimental studies on the analysis, synthesis and optimization of the characteristics of materials used in mechanical engineering;
- solving economic and organizational tasks of technological preparation of machine systems production and selection of systems for ensuring environmental safety of production;

research activities:

- construction of mathematical models for analysis and optimization of research objects, selection of a numerical method for their modeling or development of a new algorithm for solving the problem;
- development and optimization of full-scale experimental studies of machine systems taking into account their reliability criteria;
- preparation of scientific and technical reports, reviews, publications on the results of the studies performed;
- application of research results and use of intellectual property rights;

organizational and management activities:

- finding optimal solutions when creating high-tech products, taking into account the requirements of quality, cost, deadlines, competitiveness, life safety, as well as environmental safety;
- support of a single information space for planning and management of the enterprise at all stages of the product life cycle;
- development of plans and programs for organization of innovation activity at the enterprise.
- deep knowledge and understanding of fundamental phenomena in their field of science.

scientific and pedagogical activity:

- participation in the development of curricula and courses based on the study of pedagogical, scientific, technical and scientific and methodological literature, as well as the results of their own professional activities;
- participation in the formulation and modernization of individual laboratory works and workshops in professional disciplines;
- conducting training sessions with students, participation in the organization and management of their practical and research work;
- application and development of new educational technologies, including computer and distance learning systems.

Based on the obtained theoretical and practical knowledge, a doctoral student of technical sciences under the educational program 8D07209 - "Advanced technologies for processing materials" forms professional competencies.

4 Requirements for the key competencies of the doctoral student of the specialty 8D07209 "Advanced materials processing technologies"

Educational programs in the specialty of doctoral studies meet the requirements of section 2 of the State compulsory standard of postgraduate education, approved by Decree of the Government of the Republic of Kazakhstan No. 1080 of August 23, 2012.

The content of the educational disciplines of the mandatory component is strictly regulated by the State Educational Institution of the Republic of Kazakhstan in 2009. And it is reflected in the standard curricula of the specialty disciplines. The working curriculum displays the logical sequence of mastering modules and sections of the program (disciplines, practices) that ensure the formation of competencies. The curriculum model combines required components and elective components, the relationship between these two components varies from course to course. To supplement, expand and deepen the training along the selected learning path, elective disciplines are introduced into the curriculum of the specialty in accordance with the State Educational Institution. The educational program of a given direction in the preparation of doctoral students in the specialty is built through the choice of elective disciplines. Doctoral students are provided with the opportunity for an alternative choice of elective educational disciplines.

The educational program for OP 8D07209 "Advanced Materials Processing Technologies"

was developed in accordance with the National Qualification Framework for the industry and according to the Dublin Descriptors for the third level (doctoral studies). When developing educational programs, special attention is paid to the formation of goals to ensure the continuity of their content, taking into account the logic of the academic interconnection of disciplines, their sequence and continuity.

The main criterion for the completion of the educational process for the preparation of doctors of philosophy (PhD) or a doctor in profile is the development of at least 75 credits by a doctoral student, of which at least 36 credits of theoretical training, as well as at least 6 credits of practice and at least 28 credits of research (experimental research) work of a doctoral student (NIRD/EIRD).

The content of the PhD doctoral program in OP is aimed at achieving the competencies that are spelled out in the program when mastering each module separately and received a review of the modular educational program.

General competencies of higher education are formed on the basis of requirements for general education, socio-ethical competencies, economic and organizational and managerial competencies, special competencies.

5 Competency model of the specialist based on the results of the educational program

List of competencies of the educational program:

- Ability to use new research methods and areas of professional activity;
- Willingness to use knowledge of modern problems of science and education in solving problems in the field of advanced materials processing technologies;
- The ability to analyze the results of scientific research, apply them in solving specific research tasks in the field of science and education.

Head of the Department of Mechanical Engineering _____ **Nugman E.Z.**

Discussed at the meeting of the Department of Mechanical Engineering
Protocol No. 3 dated October 10, 2025.