

 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 Programs

- 6B07502 - Standardization, certification and metrology (by industry)**
- 7M07502 - Metrology (by industry)**
- 7M07503 - Quality control and diagnostic methods and systems (by branches)**
- 8D07122 – Engineering metrology and standardization in mechanical engineering**

Almaty 2025

Approving
Director of the Burkitbaev Institute of Energy
and Mechanical Engineering
K.K.Yelemessov

" 2025 г.

GRADUATE COMPETENCY MODEL

The Graduate Competency Model is a generalized representation of a graduate, reflecting the combination of personal qualities, professional and universal competencies that a graduate must possess upon completion of training within a specific educational program.

Purpose of the Graduate Model:

To define the ideal outcome of the educational process, towards which the university's higher education system is oriented.

The Graduate Model is developed taking into account:

- The mission, vision and strategic goals of Satbayev University;
- Labor market needs and changes (including digital transformation, sustainable development, ESG approaches and global trends);
- Recommendations from employers, industry experts, internal and external stakeholders;
- Requirements of professional standards, National and Industry Qualification Frameworks of the Republic of Kazakhstan;
- Principles and levels of Dublin Descriptors, aligned with the European Higher Education Area (QF-EHEA).

The structure of the Graduate Competency Model includes:

1. Professional Competencies

- Formed based on the educational program profile;
- Reflect the graduate's readiness to solve problems in a specific professional field;
- Take into account modern technologies, methods and tools used in the industry.

2. General Professional Competencies

- Ability to apply theoretical knowledge in practice;
- Proficiency in analysis, design and project management methods;
- Communication in a professional environment, including in foreign languages.

3. Universal (Key) Competencies

- Critical and systems thinking;
- Ability for self-learning and adaptation to changes;
- Ethical and academic integrity;
- Civic position, environmental and digital culture;
- Skills of interdisciplinary interaction and teamwork.

Model Purpose:

- Used in designing and updating educational programs;

- Serves as the basis for forming curricula, learning outcomes (LO), modular systems and syllabi;
- Ensures that graduates meet the requirements of national and international labor markets.

Table 1

Graduate Competency Model for the bachelor's educational program 6B07502
«Standardization, certification and metrology (by industry)»

№	Competency Type	Competency Name	Description (Learning Outcome)
1	Universal	Critical thinking, digital literacy, communication and teamwork.	The graduate is capable of analyzing information, justifying decisions, using digital technologies, and effectively collaborating in multicultural teams.
2	General Professional	Analysis methods, metrological support, documentation and project activities.	Ready to apply professional measurement, control, standardization and certification methods; prepare technical documentation; participate in process design.
3	Professional Competencies	Application of standards, organization of certification, metrological support, quality and conformity assessment.	Capable of developing, implementing and applying international and national standards; conducting certification of products, processes and management systems in accordance with regulatory requirements; providing metrological support for measurement processes, including calibration and verification of measuring instruments; assessing product and process quality.

Qualification Characteristics of the Graduate for EP 6B07502 «Standardization, certification and metrology (by industry)»

1. Graduate's Professional Activity Sphere

The sphere of activity includes:

- industry, technology, IT, construction, transport, healthcare and other sectors (specify depending on the educational program profile);
- research, design and manufacturing organizations;
- state and private companies, startups, consulting, etc.

2. Objects of Professional Activity

- processes, technologies, systems and their elements related to the program profile;
- software products, information resources, technical systems, etc.;
- people, collectives, teams — in case of management or teaching.

3. Subject of Professional Activity

- analysis, design, operation, development, implementation, management of objects and processes in the professional field.

4. Types of Professional Activity

- Production and Technological
- Organizational and Managerial
- Design and Engineering
- Research
- Operational and Service

5. Professional Activity Functions

- planning and organizing work processes;
- development and implementation of technological solutions;
- quality control, safety, process support;
- analysis, modeling, optimization of systems and solutions;
- interaction with the team, clients and partners.

Classification and Volume:

- Level according to the International Standard Classification of Education (ISCED): Level 6 _____
- Level according to the National Qualifications Framework of the Republic of Kazakhstan: Level 6
- Level according to the Industry Qualifications Framework: Level 6
- Educational program volume: 240 credits
- Academic degree awarded: Bachelor of Engineering and Technology

Table 2

**Graduate Competency Model for the master's educational program 7M07502
«Metrology (by industry)»**

№	Competency Type	Competency Name	Description (Learning Outcome)
1	Universal	Research culture, systems thinking, knowledge management.	Ability to conduct comprehensive research, formulate scientific conclusions, apply modern IT tools and databases.
2	General Professional	Metrological methods, uncertainty analysis, measurement system design.	The graduate is proficient in verification, calibration methods, error assessment, and modeling of measurement processes.
3	Professional Competencies	Advanced metrology, development of measurement methodologies.	Capable of creating new metrological methodologies, improving quality control systems, developing regulatory documents.

Qualification Characteristics of the Graduate EP 7M07502 Metrology (by industry)

- Graduate's professional activity sphere;
- Objects of professional activity;
- Subject of professional activity;
- Types of graduate's professional activity;
- Professional activity functions;

Level according to International Standard Classification of Education

Level according to the National Qualifications Framework Level 7

Level according to the Industry Qualifications Framework Level 7

Credit volume 120

Academic degree awarded Master of Technical Sciences

Table 3

Graduate Competency Model for the master's educational program 7M07503
«Quality control and diagnostic methods and systems (by branches)»

№	Competency Type	Competency Name	Description (Learning Outcome)
1	Universal	Critical thinking, leadership, project management.	conduct critical analysis of problems and make reasoned decisions under uncertainty
2	General Professional	Statistical control methods, audit, risk management.	use statistical data analysis methods, process control and assess their stability and capability
3	Professional Competencies	Quality management, building diagnostic systems, implementing Lean and Six Sigma tools.	design, implement and improve quality management systems based on ISO 9001, ISO/IEC requirements and industry standards

Qualification Characteristics of the Graduate **EP 7M07503 Quality control and diagnostic methods and systems (by branches)**

- Graduate's professional activity sphere;
- Objects of professional activity;
- Subject of professional activity;
- Types of graduate's professional activity;
- Professional activity functions;

Level according to International Standard Classification of Education

Level according to the National Qualifications Framework Level 7

Level according to the Industry Qualifications Framework Level 7

Credit volume 120

Academic degree awarded Master of Technical Sciences

Table 4

Graduate Competency Model for the educational program doctoral program
8D07122 «Engineering metrology and standardization in mechanical engineering»

№	Competency Type	Competency Name	Description (Learning Outcome)
1	Universal	Academic ethics, scientific writing, complex project management.	demonstrate a high level of academic integrity, follow international standards of scientific ethics and research culture
2	General Professional	Deep knowledge of metrological systems, scientific expertise, modeling.	possess modern methods of metrological analysis, measurements, verification and calibration in mechanical engineering
3	Professional Competencies	Development of new metrological systems, conducting fundamental research, creating standards and regulations in mechanical engineering.	develop new measurement methods, algorithms and systems adapted to the requirements of modern mechanical engineering

Qualification Characteristics of the Graduate EP 8D07122 - Engineering metrology and standardization in mechanical engineering

- Graduate's professional activity sphere;
- Objects of professional activity;
- Subject of professional activity;
- Types of graduate's professional activity;
- Professional activity functions;

Level according to International Standard Classification of Education

Level according to the National Qualifications Framework Level 8

Level according to the Industry Qualifications Framework Level 8

Credit volume 180

Academic degree awarded Doctor of Philosophy (PhD)

Acting Head of the Department

«Standardization, Certification and Metrology»

 **Omarova Zh.B.**

Discussed at the meeting of the «Standardization, Certification and Metrology»
Protocol № 2 dated September 10th 2025 y.