# MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN
## NON-PROFIT JOINT STOCK COMPANY «ALMATY UNIVERSITY OF POWER ENGINEERING AND TELECOMMUNICATIONS NAMED AFTER GUMARBEK DAUKEEV»
## INSTITUTE OF AUTOMATION AND INFORMATION TECHNOLOGIES

**«Agreed»**
«ITPARTNER.KZ» LLC co-founder
and technical director

_____ I. Kemelbekov
«19» 05 2025

**«Approved»**
AUPET Rector

_____ G. Nygymetov
«23» 2025

## MODULAR EDUCATIONAL PROGRAM
## DIRECTION «7M06103 - COMPUTER ENGINEERING AND SOFTWARE»
### (MASTER SCIENTIFIC AND PEDAGOGICAL DIRECTION)
## POSTGRADUATE EDUCATION

**Field of education (according to the classifier of 13.10.2018):** 7M06 - Information and communication technologies

**Direction of training (according to the classifier of 13.10.2018):** 7M061 - Information and communication technologies

**Group of educational programs:** M094 - Information technologies

**Training period:** *2 years*

**Awarded academic degree:** *Master of engineering science*

**Qualification level in accordance with the national qualifications framework:** *level 7 .*

**Almaty 2025**

The EP was developed on the basis of: The National Qualifications Framework, Approved by the Protocol of March 16, 2016 by the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations; Sectoral qualifications framework "Information and communication technologies", Approved by the minutes of the meeting of the Sectoral Commission in the field of information, informatization, communications and telecommunications dated December 20, 2016 No. 1; State Compulsory Standard of Higher Education, Approved by the Resolution of the Government of the Republic of Kazakhstan dated 23.08.2012 No. 1080 (as amended by the Resolution of the Government of the Republic of Kazakhstan. Order of the Minister of Education and Science of the Republic of Kazakhstan dated 31 October 2018 No. 604. Registered with the Ministry of Justice of the Republic of Kazakhstan 1 November 2018 No. 17669.); Professional standards or draft standards.

The educational program was developed at the Department of IT engineering and artificial intelligence.

Head of the educational program  Mussatayeva G., master of technical science, senior lecturer

The EP was considered and approved at a meeting of the IT engineering and artificial intelligence department of ___4. 03___ 2025, Minutes № _8_

Head of the IT engineering and artificial intelligence department _____ Utegenova A.

The EP was reviewed and approved at a meeting of the director of the Institute of automation and information technology (Minutes № _9_ dated _12. 05_. 2025).

Director of the IA&IT _____ Fedorenko I.

The EP was reviewed and approved by the AUPET Academic Council (Minutes № _11_ dated _23.05___ 2025).

**List of symbols and abbreviations**

| | |
|------|------------------------------------------|
| HE | - Higher education |
| SCES | - State compulsory education standard |
| EQF | - European qualifications framework |
| NCO | - National classifier of occupations |
| RK | - The Republic of Kazakhstan |
| NQF | - National qualifications framework |
| NSQ | - National system of qualifications |
| GEM | - General educational module |
| EP | - Educational program |
| GED | - General education disciplines |
| RC | - Required component |
| UC | - University component |
| BD | - Basic disciplines |
| MD | - Major disciplines |
| IET | - Individual educational trajectory |
| IQF | - Industry qualifications framework |
| PS | - Professional standard |
| PE | - Postgraduate education |
| ON | - Competencies |
| LO | - Learning outcome |
| CW | - Course work |
| SGW | - Settlement and graphic work |
| RWS | - Research work of students |
| CED | - Catalog of elective disciplines |

# 1. Passport of the educational program

| № | Field name | Note |
|---|---|---|
| 1 | Registration number | 7M06100121 |
| 2 | Education area code and classification | 7M06 Information and communication technologies |
| 3 | Code and classification of areas of training | 7M061 Information and communication technologies |
| 4 | Group of educational programs | M094 - Information technologies |
| 5 | EP name | 7M06103 -Computer engineering and software |
| 6 | EP type | Current EP |
| 7 | The purpose of the EP | The goal of the master's educational program is to train highly qualified researchers, competitive specialists in the field of hardware and software development and computer science for the accelerated innovative development of the economy of the Republic of Kazakhstan. |
| 8 | ISCED level | ISCED 7 Master or equivalent |
| 9 | NQF level | 7 |
| 10 | ORK level | 7 |
| 11 | Distinctive features of the EP | No |
| | Partner university (SOP) | No |
| | Partner university (DDOP) | No |
| 12 | List of competencies | Learning outcomes and correlation of learning outcomes in the educational program with the competencies being developed are presented in Appendices 1 and 3 |
| 13 | Learning outcomes | Graduates of this program will be able to: **ON1.** Apply in practice the theory and methods of humanitarian, social, ethical and scientific-pedagogical in various types of professional activities. **ON2.** Conduct scientific research in the chosen field and processes theoretical and experimental results using technical means and complexes; **ON3.** Research and apply software and hardware cryptographic security techniques in software development and understand regulatory frameworks; **ON4.** Apply methods of teaching programming disciplines, design, develop software for computer systems and complexes; **ON5.** Develop a system for collecting, storing, analyzing, and managing data using BigData, DataMining, cloud and distributed computing technologies; **ON6.** Develop, document design and technological solutions, manage the business process of developing a hardware and software complex; **ON7.** Apply models and methods of artificial intelligence, machine learning and neural networks when solving applied problems in various industries; **ON8.** Apply mathematical, instrumental methods of decision-making, evaluate the effectiveness of algorithms in solving complex optimization problems. |

| № | Field name | Note |
|---|---|---|
| 14 | Mode of education | Full-time |
| 15 | Language of education | Russian, Kazakh, English |
| 16 | Loan volume | 120 |
| 17 | Awarded academic degree | Master of Engineering and Technology |
| 18 | Availability of an annex to the license for the direction of personnel training | License №KZ80LAA00018161<br><br>Date of issue  05.05.2020 |
| 19 | Availability of EP accreditation | Available |
|  | Accreditation body name | IAAR NU "Independent Agency for Accreditation and Rating" |
|  | Period of validity of accreditation | 05.04.2024-04.04.2029 |
| 20 | Information about disciplines | Information about disciplines UK/EK BD, MD (Appendix 1) |
| 21 | Sphere of professional activity | The spheres of professional activity of graduates are public and private enterprises and organizations that develop, implement and use computers and software in various fields, namely: mechanical engineering, metallurgy, transport, telecommunications, science and education, health care, agriculture, in the service sector, administrative management, economics, business, management of various technologies, that is, in almost all spheres of human activity. |
| 22 | Professional activities | Specialist for work in research universities, research and design institutes, universities, energy enterprises capable of performing the following types of professional activities:<br>- design and engineering;<br>- production and technological;<br> - experimental research;<br> - organizational and managerial;<br> - operational. |
| 23 | Modular curriculum | Provided in **Appendix 2** |

**2. Matrix of correlation of learning outcomes for the educational program as a whole with the developed competencies**

3.

| № | Name of disciplines | ON1 | ON2 | ON3 | ON4 | ON5 | ON6 | ON7 | ON8 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | History and philosophy of science | v | | | | | | | |
| 2 | Foreign language (professional) | v | | | | | | | |
| 3 | Higher education pedagogy | v | | | | | | | |
| 4 | Psychology of management | v | | | | | | | |
| 5 | Algorithms and Their Complexity | | v | | | | | | v |
| 6 | Mathematical and Instrumental Methods of Decision Support | | v | | | | | | v |
| 7 | Technologies and Algorithms for High Performance Computing and Distributed Computing | | | | | v | | | |
| 8 | Cloud and Parallel Computing Technologies | | | | | v | | | |
| 9 | Artificial Neural Networks | | | | | | | v | |
| 10 | Machine Learning | | | | | | | v | |
| 11 | Scientific and Technical Problems of Information Technologies (Discipline for Admission to Doctoral Studies) | | v | | | | | | |
| 12 | Software Development Technologies for Real-Time Systems | | | | v | | | | |
| 13 | Software Development Using Visual Programming Tools | | | | v | | | | |
| 14 | Scalable Systems Development Technologies | | v | | | | | | |
| 15 | Software Engineering Technologies | | | | v | | | | |
| 16 | Analysis and design of business processes | | | | | | v | | |
| 17 | Theory and Practice of Project Management | | | | | | v | | |
| 18 | Organization and management of public procurement | | | | | | v | | |
| 19 | Design of microprocessor systems | | | | | | | v | |
| 20 | Digital Signal Processing Methods | | | | | | | v | |
| 21 | Modern cryptographic protection methods of information | | | v | | | | | |
| 22 | Information Security Management of Corporate Information Systems | | | v | | | | | |
| 23 | Modern Routing and Switching Systems in Computer Networks | | | | | | v | | |
| 24 | Design and protection of information and communication systems | | | | | | v | | |
| 25 | Decision Support & IS Management | | | | | v | | | |
| 26 | IP Data Management | | | | | v | | | |
| 27 | Design of information systems using modern DBMS | | | | | v | | | |
| 28 | Big Data Storage and Processing Technologies | | | | | v | | | |