MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
NON-PNOFIT JOINT-STOCK COMPANY "ALMATY UNIVERSITY OF NOWER ENGINEERING AND TELECOMMUNICATIONS NAMED GUMARBEK DAUCEYEV"
Institute of Automation and Information Technologies

"AGREED"
Director
"Honeywell-Automatic Control System LLP"
S. Abdygaliev
"12" 05 2025

"APPROVE"
Rector of AUPET
G. Nygymetov
"29" 05 2025

MODULAR EDUCATIONAL PNOGRAM "6B07108-AUTOMATION AND CONTROL" HIGHER EDUCATION

Training area (according to the classifier from 13.10.2018):
6B071 - Engineering and Engineering
Group of educational programs: B063 - Electrical Engineering and Automation

The training period is 4 years
Awarded degree: Bachelor's degree in EP "6B07108-Automation and Control"
Qualification level according to the National Qualifications Framework:
Level 6

Almaty 2025

The modular educational program "6B07108 - Automation and Control" was developed on the basis of the Law of the Republic of Kazakhstan "On Education" dated July 27, 2007 and regulatory documents:

- State obligatory standard for postgraduate education (Order of the Minister of Education and Science of the Republic of Kazakhstan dated July 20, 2022 No. 2);
- Model rules for the organization of higher and postgraduate education (order of the Minister of Education and Science of the Republic of Kazakhstan dated June 09, 2021 No. 282);
- Rules for organizing the educational process on credit technology of education (order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152, as amended from October 12, 2018 No. 563);
- 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), regulating the requirements for a graduate with an academic bachelor's degree in EP 6B07108 - Automation and Control1;
- Professional standards: "Management and design of computer hardware and embedded systems" (Annex #46 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" from 24.12.2019. No. 259), Operation and repair of thermal automatics and measuring devices" (Annex No. 2 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan 'Atameken' from 24.06.2020, No. 132), 'Management of computer systems architecture', Annex No. 23 to the order of the Acting Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan 'Atameken' No. 222 from 05.12.2022;
- Atlas of new professions: IT-Dispatcher (the profession will appear after 2025) https://www.enbek.kz/atlas/profession/109, Manager on synchronization of production processes/planner/adjuster (the profession will appear after 2030) https://www.enbek.kz/atlas/profession/22.

The modular educational program was developed at the Department of Automation and Control. Head of the educational program N. Syabina.

The program was reviewed and approved at the meeting of the Department of AC. Minutes No. 11 of 06.05.2025.

Head of the AC Department _____ L. Abzhanova

The program was approved at a meeting of the Academic Council of the Institute of Automation and Information Technologies. Minutes No. 10 of 12.05.2025.

Director IAIT _____ I. Fedorenko

The EP was reviewed and approvedby the Academic Council of the AUPET, Minutes No 11 of 23.05.2025.

The educational program has been reviewed and approved by "Honeywell-Automatic Control System LLP".

Director _____ S. Abdigaliev

List of Abbreviations and Acronyms

HE	- Higher Education
SSES	- State Compulsory Educational Standard
EQF	- European Qualifications Framework
NCO	- National Classifier of Occupations
RK	- Republic of Kazakhstan
NQF	- National Qualifications Framework
НСК	- National Qualifications System
GEM	- General Educational Module
EP	- Educational Program
GED	- General Education Disciplines
CC	- Compulsory Component
UC	- University Component
BD	- Basic Disciplines
PD	- Profiling Disciplines
IET	- Individual Educational Trajectory
IQF	- Industry Qualifications Framework
PS	- Professional Standard
CN	- Competencies
LO	- Learning Outcome
CW	- Course Work
CRW	- Calculative and Graphic Work
IWS	- Independent Work of Students
IWST	- Independent Work of Students with a Teacher
CED	- Catalog of Elective Disciplines

1. Passport of the Educational Program

№	Field Name	Description / Notes
1	Registration Number	6B07100023
2	Code and Classification of the Field of Education	6B07 Engineering, Manufacturing, and Construction Industries
3	Code and Classification of the Training Direction	6B071 Engineering and Engineering Affairs
4	Group of Educational Programs	B063 Electrical Engineering and Automation
5	Title of the Educational Program	6B07108 Automation and Control
6	Type of the Program (EP)	a) Active Educational Program
7	Purpose of the Program	Training highly qualified specialists in the field of automated control of technological processes and production systems.
8	ISCED Level	6
9	NQF Level	6
10	SQF Level	6
11	Distinctive Features of the Program	none
	Partner University (Double Degree Program)	none
12	List of Competencies	The learning outcomes and their correlation with the competencies developed under the educational program are presented in Annexes 1 and 2.
13	Learning Outcomes	LO-01. Use technical capabilities of microprocessor technology, data transmission systems, and software products to solve automation problems. LO-02. Possess basic knowledge of legal, cultural, and ethical norms, as well as linguistic, social, and economic knowledge; demonstrate awareness of production organization methods, occupational safety, labor protection, and environmental standards; understand and apply the principles of academic integrity. Understand and apply research methods and academic writing techniques. LO-03. Analyze and assess the state of automation objects, technological processes, and production systems. Identify potential opportunities for automation of control systems. Make qualified decisions on the use, installation, adjustment, and operation of automation elements and systems. LO-04. Be proficient in modern computer, information, and communication technologies, and software used in the creation and operation of automation systems. Develop and operate automated and remote control systems. Manage the functioning of information and computing systems for automated data processing, and solving engineering, economic, and research problems. LO-05. Demonstrate knowledge of higher mathematics, physics, electronics, electrical engineering, and other natural sciences; identify relationships between studied

		facts, phenomena, and theories in these areas and apply them to solve engineering problems in automation and control. LO-06. Master methods of data processing and automation system synthesis, as well as methods of system design and data management programming. Apply the functional capabilities of SCADA systems in practice. Conduct monitoring of production data. Control the operational parameters of remote equipment. Manage resources of automated systems and organize their operation. LO-07. Possess programming skills in high-level languages, tools and languages for microcontroller programming, and software for simulation and analysis of process control systems (PCS). LO-08. Apply knowledge of linear and nonlinear automatic control systems, their mathematical modeling, and analysis. Perform calculations for the synthesis and analysis of control systems. LO-09. Select measuring instruments and automation devices; perform measurements of technological parameters; carry out dismantling/installation, adjustment, calibration, and operation of automation elements and devices. LO-10. Develop structural, functional, and other automation schemes; analyze reference and regulatory literature; prepare technical documentation. Design technical, software, mathematical, algorithmic, informational, and other components of automated control systems. LO-11. Possess the knowledge and skills required to apply a systems approach to the development and implementation of automation and production robotics systems. LO-12. Be proficient in the state, Russian, and one of the widely used foreign languages, and use them in professional activities. Be ready for intellectual, cultural, physical, and spiritual self-development to improve qualifications throughout one's professional career.
14	Form of Education	Full-time, Distance
15	Language of Instruction	Russian, Kazakh, English
16	Total Number of Credits	240
17	Awarded Academic Degree	Bachelor of Engineering and Technology in "6B07108 – Automation and Control"
18	License for the Field of Study	License No. KZ80LAA00018161 dated 05.05.2020
19	Accreditation Status of the Program	there is
	Accrediting Body	IAAR, ASIIN
	Срок действия аккредитации	IAAR 05.04.2024-04.04.2029, ASIIN 22.03.2024-30.09.2029
20	Information about Disciplines	Information on UC, EC, BD, and PD disciplines is

		presented in Annex 3.
21	Field of Professional Activity	The professional field involves the design, construction, modeling, and implementation of automation and information systems for production and technological processes, taking into account energy, technological, design, operational, ergonomic, and economic parameters.
22	**Types of Professional Activity**	Specialist qualified to work in enterprises of any profile, capable of performing the following types of professional activities: – Design and engineering; – Production and technological; – Organizational and managerial.
23	**Structure of the Higher Education Program (Typical Curriculum)**	Annex 1
24	**Graduate Competencies**	Annex 2
25	**Modular Educational Program**	Annex 3

2. Matrix of Learning Objectives

Code	Course Title	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12	Competencies
HUM 11052	History of Kazakhstan		◑										●	GC-1,2,4,6,7; BC-5,6; PC-12
MAT 12022, MAT 12022	Differential and Integral Calculus I, II					●								OK-6,8 БК-1,2,5,7 ПК-9
MAT 12032	Linear Algebra					●								OK-6,8 БК-1,2,5,7 ПК-9
TVEMS 2212	Probability Theory and Elements of Mathematical Statistics					●								OK-6,8 БК-1,2,5,7 ПК-9
MAT 22062	Differential Equations					●								OK-6,8 БК-1,2,5,7 ПК-9
LNG 11012, LNG 11022	Foreign Language 1, 2		◑										●	OK-2,5,6-8 БК-5 ПК-12
LNG 11032, LNG 11042	Kazakh (Russian) Language 1, 2		◑										●	OK-2,5,6-8,10 БК-5 ПК-12
PHE 11082, PHE 11092, PHE 21102, PHE 21112	Physical Education		●										●	OK-2 БК-4 ПК-14
ICT 11072	Information and Communication Technologies				●									OK-7,8,10 БК-1,5,7 ПК-3
PHY 12092, PHY 22102	Physics 1, 2					●								OK-6,8,10 БК-1,2,5,7 ПК-9
TPZA 22182	Programming Technologies in Automation Tasks				◑			●						OK-8-10 БК-1,5,7 ПК-1,2

Code	Course Title	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12	Competencies
BDSU 32262	Databases in Control Systems				●		◑							GC-8-10 BC-1,2,5-7 PC-1,3
IBSU 42272	Information Security in Control Systems	◑			●									GC-3,8,10 BC-1,2,5-7 PC-1,3,10
HUM 21122	Module of Socio-Political Knowledge 1 (Political Science, Sociology)		◑										●	GC -1,2,4-8 BC-5,6 PC-12
HUM 21132	Module of Socio-Political Knowledge 2 (Cultural Studies, Psychology)		◑										●	GC-1,2,4-8,10 BC-5,6 PC-12
UREIB 2216	Sustainable Development: Ethics, Inclusion, and Safety		◑										●	GC-1-8,10 BC-3-6 PC-4,5,8,13,15
CEEN 22122	Theoretical Fundamentals of Electrical Engineering					●								GC-6,8,10 BC-1,2,5,7 PC-9
OSPI 32252	Fundamentals of Data Collection and Transmission	◑					●							GC-3,6,8,10 BC-1,2,5-7 PC-1,2,9
HUM 11062	Philosophy		◑										●	GC-1,2,4-8,10 BC-5,6 PC-12
MI 32082	Metrology and Measurements									●				GC-8-10 BC-1,2,5-7 PC-1,3,7,9-11
INTS 22162	Industrial Practice 1		●			●				●			●	GC-8-10 BC-1,2,5-7 PC-1-7,9-11
PIND 32142	Industrial Practice 2		●	●		●				●	●		●	GC-8-10 BC-1,2,5-7 PC-1-7,9-11
SAUI 33012	Automatic Control Systems								●					GC-8-10 BC-1,2,5-7 PC-1,2,4

Code	Course Title	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12	Competencies
PIUIP 32202	Industrial Actuating Devices and Drives					●				●				GC-8–10; BC-1–4; PC-1–8,16–18
PLKSU 33022	Programming of Logic Controllers for Control Systems	◑						●						GC-3,8–10; BC-1,2,5–7; PC-1,3,10
KIPIA 22222	Instrumentation and Automation									●				GC-8–10; BC-1,2,5–7; PC-1,3,7,9–11
SPOIP 33092	System Software and Programming				●			●			◑			GC-8–10; BC-1,2,5–7; PC-1,3,10
OSRVUP 33092	Real-Time Operating Systems for Industrial Control Systems				●			●			◑			GC-8–10; BC-1,2,5–7; PC-1,3,10
IPO 33122	Software Engineering				●			◑			●			GC-3,8–10; BC-1,2,5–7; PC-3,10,12,14
AOU 33102	Automation of Control Objects			●							●	●		GC-8–10; BC-1,2,5–7; PC-1–6
MPUSU 32042	Microprocessor Devices in Control Systems	●						●						GC-8–10; BC-1,2,5–7; PC-1,3,10
MIOU 33052	Modeling and Identification of Control Objects					●		◑	●					GC-8–10; BC-1,2,5–7; PC-1,3,10
RSAR 43072	Calculation of Automatic Control Systems								●	◑	◑			GC-8–10; BC-1,2,5–7; PC-1,2,4,9
PSS 43062	Development of SCADA Systems	●					●							GC-8–10; BC-1,2,5–7; PC-1–6
SDUP 43062	Production Dispatch Control Systems	●					●							GC-8–10; BC-1,2,5–7; PC-1–6

Code	Course Title	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12	Competencies
STA 43052	Network Technologies in Automation	●			◑		◑							GC-3,8–10; BC-1,2,5–7; PC-1,3,10
ASUPP 43132	Automated Process Control Systems										●	◑		GC-8–10; BC-1,2,5–7; PC-1–8
AUTP 33282	Electromechanical Systems					●				●				GC-8–10; BC-1–4; PC-1–8,16–18
ONIAP 42152	Fundamentals of Scientific Research and Academic Writing		◑										●	GC-6,8,10; BC-3,5–7; PC-1
MNOKIPA 43152	Installation and Commissioning of Instrumentation and Control Equipment			●						●				GC-8–10; BC-1–4; PC-1–8,11–15
AUT 43132	Methods of Equipment Protection in Automated Systems			●						●				GC-8–10; BC-1–4; PC-1–8,16–18
TPSA 22062	Technological Processes of Automation Systems			●							●			GC-8–10; BC-1–4; PC-1–8,16–18
CSU 43162	Digital Control Systems								●					GC-8–10; BC-1,2,5–7; PC-1,2,4,9
OBD 3218	Fundamentals of Big Data					●								GC-6,8; BC-1,2,5,7; PC-9
II 22052	Artificial Intelligence				●	◑								GC-7,8,10; BC-1,5,7; PC-3
OEME 22142	Fundamentals of Electronics and Microelectronics					●								GC-6,8,10; BC-1,2,5,7; PC-9
PSA 43092	Design of Automation Systems			◑							●	●		GC-8–10; BC-1,2,5–7; PC-1–8

Code	Course Title	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12	Competencies
SAUII 43022	Nonlinear Automatic Control Systems								●					GC-8–10; BC-1,2,5–7; PC-1,2,4
KSChU 43102	Computer Numerical Control (CNC) Systems				◑						●	◑		GC-8–10; BC-1,2,5–7; PC-1,3,10
ARS 33092	Automation and Fundamentals of Robotic Control				◑						◑	●		GC-8–10; BC-1–4; PC-1–8,16–18
MVK OOD 4117	University Module of General Education Disciplines (Economics, Law, Entrepreneurship, and Financial Literacy)		◑										◑	GC-8–10; BC-1,2,5–7; PC-1–8
MIN1	Minor 1												●	GC-1,2,4–8,10; BC-5,6; PC-12
MIN2	Minor 2												●	GC-1,2,4–8,10; BC-5,6; PC-12
MIN3	Minor 3												●	GC-1,2,4–8,10; BC-5,6; PC-12
MIN4	Minor 4												●	GC-1,2,4–8,10; BC-5,6; PC-12
PP 43082	Pre-Diploma Internship	●		●	◑		●	●	●	●	●	●		GC-8–10; BC-1,2,4–7; PC-1–6,14–18
	Final State Attestation	●	●	●	●	●	●	●	●	●	●	●	●	GC-8–10; BC-1,2,5–7; PC-1–5,9–11