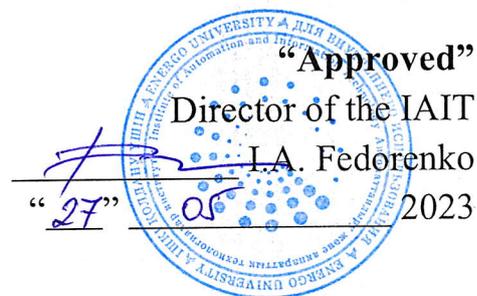


MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE
REPUBLIC OF KAZAKHSTAN
NON-PROFIT JOINT-STOCK COMPANY “ALMATY UNIVERSITY OF
POWER ENGINEERING AND TELECOMMUNICATIONS NAMED
AFTER GUMARBЕК DAUKEEV”
Institute of Automation and Information Technologies



“Approved”

Director of the IAIT

I.A. Fedorenko

2023

EDUCATIONAL PROGRAM DEVELOPMENT PLAN
6B07108 – “AUTOMATION AND CONTROL”
for 2023–2028

Level of the main educational program: Bachelor’s degree, Level 6
Field of study: 6B071 Engineering and Engineering Sciences
Group of educational programs: B063 Automation and Control

1. Information on the modular educational program

The Modular Educational Program “6B07108 – Automation and Control” was developed by the “Automation and Control” Department on the basis of the Law of the Republic of Kazakhstan “On Education” dated 27 July 2007 and the following regulatory documents:

- State (perpetual) license for educational activity No. KZ80LAA00018161 dated 05 May 2020 (initial license No. AB0137445 dated 04 August 2010);
- State Compulsory Standard of Postgraduate Education (Order of the Minister of Science and Higher Education of the Republic of Kazakhstan No. 2 dated 20 July 2022);
- Standard rules for the activities of higher and postgraduate education organizations (Order of the Minister of Education and Science of the Republic of Kazakhstan No. 282 dated 09 June 2021);
- Rules for organizing the educational process under the credit-based technology (Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 152 dated 20 April 2011, as amended on 12 October 2018, No. 563);
- Charter of NJSC “Almaty University of Power Engineering and Telecommunications named after Gumarbek Daukeev”;
- National Qualifications Framework (approved by the protocol of 16 March 2016 of the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations), setting requirements for graduates with a Bachelor’s degree under the EP “6B07108 – Automation and Control”;
- Professional standards: “Management and Design of Computer Hardware and Embedded Systems” (Appendix No. 46 to the Order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan “Atameken” No. 259 dated 24 December 2019), “Maintenance of Auxiliary Systems, Instrumentation and Automation” (Appendix No. 34 to Order No. 266 dated 27 December 2019), “Operation and Repair of Thermal Automation and Measuring Instruments” (Appendix No. 2 to Order No. 132 dated 24 June 2020).

The goal of the EP “6B07108 – Automation and Control” is to train qualified personnel in automation, informatization, and control of technological and technical systems.

The mission of the EP “6B07108 – Automation and Control” is to train highly qualified specialists in automation and control of industrial and technical processes.

The bachelor’s program duration is 4 years. Graduates are awarded the degree of Bachelor of Engineering and Technology under the educational program “6B07108 – Automation and Control”.

The University evaluates the effectiveness of the Educational Program Development Plan through a SWOT analysis. The SWOT analysis results provide the basis for improving the educational program. The SWOT analysis for the EP Development Plan is presented in Table 3.

2. Educational Program Management Mechanisms

At the level of long-term planning, general priority areas and strategic goals for developing the educational program are identified, along with metrics and indicators. Long-term planning documents include the vision, mission, strategy, quality policy, and the university development plan. Short-term EP development plans are built on the basis of these documents.

Short-term planning at the university level is represented by AUPET named after Gumarbek Daukeev quality objectives, work plans of collegial bodies, and annual work plans by areas that reflect implementation issues. At the level of structural units, EP development planning is reflected in the quality objectives of institutes and graduating departments, comprehensive institute plans, and department work plans. Institute and department plans must include timelines, responsible persons, and a completion mark column. One requirement for short-term plans is their alignment with the university's mission, strategic goals and objectives, and the presence of a section on activity improvement. This set of plans is the main mechanism for EP development and quality assurance. The plans cover teaching and methodological, practice-oriented, and material and technical issues of EP development. At the individual level, planning is represented by individual faculty plans.

3. Main objectives of the Educational Program Development Plan

- Managing the high-quality implementation of the educational program and improving the mechanisms for managing the educational process;
- Training competitive specialists;
- Improving conditions for high-quality staffing of the EP;
- Strengthening the role of research and innovation activities in the development of the EP;
- Developing the resource capacity for implementing the EP.

4. EDUCATIONAL PROGRAM DEVELOPMENT PLAN

The Development Plan for the EP "6B07108 – Automation and Control" for 2023–2028, indicating activities, timelines, responsible persons and implementation mechanisms, is presented in Table 1.

5. MEASURES TO REDUCE THE IMPACT OF RISKS FOR THE EP

Table 2 lists measures to reduce risks arising during the implementation of the educational program.

Table 1 – Development Plan for the EP “6B07108 – Automation and Control”

| Areas of activity | Activities | Responsible persons | Implementation mechanism | Timeframe |
|--|---|--|--|--|
| 1 | 2 | 3 | 4 | 5 |
| 1. Quality management of EP implementation and improvement of educational process management mechanisms. | <p>1. Provide the EP with regulatory documents of the Ministry (SCES, Model Curriculum, Working Curriculum) and internal regulatory documents (regulations, instructions, forms).</p> <p>2. Improve the EP structure. Update the Modular Educational Program.</p> <p>3. Develop and improve the modular principle of EP design.</p> <p>4. Systematic improvement of the EP’s teaching and methodological support.</p> <p>5. Cooperate with industrial</p> | <p>University management, Head of the A&C Department, EP Head.</p> <p>Head of the A&C Department, EP Head</p> <p>Head of the A&C Department, EP Head</p> <p>Head of the A&C Department, Faculty</p> <p>Head of the A&C</p> | <p>Prepare requests to obtain regulatory documents from the Ministry and the Republican Educational and Methodological Council. Work with the Department of Analysis and Strategic Development and the Quality Management System office.</p> <p>Update the educational program content by 15% annually based on international best practices in this field, employer requirements, and labor market demand. Analyze employer needs, graduate satisfaction, and monitor achievement of EP learning outcomes.</p> <p>Form modules considering the logical and content interconnection of disciplines. Ensure a unified methodological approach to teaching. Form student cohorts for independent work based on integrated learning content.</p> <p>Annual update of teaching and methodological support considering employer needs, graduate satisfaction, and faculty professional development.</p> <p>Hold master classes, round tables, and</p> | <p>2023-2028</p> <p>2023-2028</p> <p>2023-2028</p> <p>2023-2028</p> <p>2023-2028</p> |

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|--|---|--|--|--|
| | <p>companies and public services to involve them in training automation and control specialists, organizing internships, and employing graduates.</p> | <p>Department, EP Head, Faculty, Internship and Employment Office</p> | <p>scientific seminars with leading companies. Participate in organizing industrial internships. Analyze demand for young specialists across industries.</p> | |
| <p>2. Training competitive specialists</p> | <p>1. Develop and improve the Catalog of Elective Disciplines (CED) considering stakeholder proposals.</p> <p>2. Develop and implement a multilingual training program for specialists under the EP.</p> <p>3. Develop and implement innovative teaching methods.</p> <p>4. Form a high-quality student cohort.</p> <p>5. Implement academic mobility of students and faculty</p> | <p>Head of the A&C Department, EP Head</p> <p>University management, Head of the A&C Department, EP Head, Faculty</p> <p>Head of the A&C Department, Institute management, EP Head</p> <p>Head of the A&C Department, Faculty, IT Department, Admissions Recruitment Office</p> <p>Head of the A&C Department, Institute management,</p> | <p>Engage with employers. Annually update disciplines in the Modular Curriculum based on employer proposals, taking into account R&D results and faculty professional development.</p> <p>Develop programs; improve faculty qualifications and foreign language proficiency (up to 40% by 2028).</p> <p>Faculty professional development. Discuss improvements to teaching methods at methodological seminars of the department and institute. Use interactive teaching methods.</p> <p>Career guidance plan; regular updates of the department webpage; faculty consultations in the admissions committee.</p> <p>Student study and faculty internships at foreign universities. Expand the list of partner universities. Introduce double-degree</p> | <p>2023-2028</p> <p>2023-2028</p> <p>2023-2028</p> <p>2023-2028</p> <p>2023-2028</p> |

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| | | <p>Faculty, International Cooperation Office</p> | <p>education.</p> | |
| <p>3. Improving conditions for high-quality staffing of the EP</p> | <p>1. Increase the share of faculty with academic degrees to 75% through PhD doctoral studies, internships, and attracting international faculty with academic degrees.</p> | <p>Head of the A&C Department, University management, Department of Science and Commercialization</p> | <p>Faculty professional development; motivating young teachers to enter PhD programs; involving the most competent PhD graduates in teaching and research. Plan to invite international scholars to deliver courses and organize joint research projects.</p> | <p>2023-2028</p> |
| <p>4. Strengthening the role of research and innovation activities in the development of the EP.</p> | <p>1. Intensify research at the department. Participate in grant-funded and contract research and projects. Expand cooperation with international partners to conduct joint research and publish teaching and methodological literature.</p> | <p>Head of the A&C Department, Faculty</p> | <p>Involve faculty and students in initiative and funded R&D. Increase the number of innovation-oriented works, including filing for innovation patents and applying them, integrating results into the educational process, and publishing in high-impact and reputable international journals.</p> | <p>2023-2028</p> |
| | <p>2. Achieve commercialization of the department faculty's research results.</p> | <p>Head of the A&C Department, Department of Science and Commercialization, Faculty</p> | <p>Increase the number of scientific projects and programs implemented jointly with national companies and private enterprises.</p> | <p>2023-2028</p> |
| | <p>3. Encourage and motivate students for active participation in research activities.</p> | <p>Head of the A&C Department, Faculty</p> | <p>Student participation in national and international competitions. Engage students in department research projects. Increase the number of students involved in funded R&D.</p> | <p>2023-2028</p> |
| | <p>4. Increase publications by</p> | <p>Head of the A&C</p> | <p>Prepare scientific publications in impact-</p> | <p>2023-2028</p> |

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| | faculty and doctoral students in journals with a non-zero impact factor. | Department, Faculty | factor journals indexed in international scientometric databases (Thomson Reuters, Scopus). | |
| 5. Developing resource capacity for implementing the EP | 1. Purchase new laboratory equipment. | Head of the A&C Department, Faculty | Annual procurement plans | 2023-2028 |
| | 2. Purchase office equipment, scientific equipment, technical teaching aids, visual materials, etc. | Head of the A&C Department, EP Head | Annual procurement plans | 2023-2028 |
| | 3. Develop the department's information and educational resources (website, portal, electronic teaching packages, etc.). | Head of the A&C Department, IT Department, | Measures to develop the university's information and educational resources | 2023-2028 |
| | 4. Develop various forms of material and non-material incentives for faculty. | Head of the A&C Department | Faculty rating | 2023-2028 |
| | 5. Open themed laboratories with leading companies and manufacturers of innovative equipment. | Head of the A&C Department, EP Head | Contract signing; allocation of classrooms. | 2023-2028 |

Table 2 – Risk Mitigation Action Plan

| No. | Name of potential risks | Measures to mitigate them |
|-----|--|--|
| 1 | Insufficient availability of new teaching and methodological literature in professional disciplines in the state language. | Plan annual publication of scientific and teaching-methodological literature by department faculty in accordance with the working curriculum. Intensify faculty work on developing and introducing teaching literature in the state language into the educational process. |
| 2 | Decrease in student enrollment in the EP; outflow to other universities | Develop a comprehensive career guidance plan for schools and colleges in Almaty and other regions. Organize joint scientific and educational activities with school students, including master classes in schools and colleges and Olympiads. Maintain active social media outreach. |
| 3 | Insufficient level of foreign language proficiency among applicants | Conduct a diagnostic foreign language test among first-year students. Motivate students through opportunities for academic mobility at the University's foreign partner universities. |
| 4 | Decline in education quality due to low proficiency in natural sciences upon admission | Increase the threshold score for admission to the EP on a state grant. Provide preparatory courses for applicants. Identify and recruit prospective applicants in schools. |
| 5 | Rapid obsolescence of the existing material and technical base | Timely planned procurement of modern equipment. Conclude agreements with enterprises for joint use of their laboratory facilities in the educational process. |
| 6 | Obsolescence of traditional teaching methods | Improve and implement innovative educational technologies in the learning process. Update the technical teaching aids used. |
| 7 | Increase in the average age of faculty and research staff | Train highly qualified researchers through Master's and PhD programs in line with modern requirements. Invite young staff with an academic degree and/or Master's degree. Create favorable conditions for the career growth of young specialists. |
| 8 | Low faculty activity in publishing scientific papers in high-citation journals | Develop a publication plan for faculty in journals recommended by KKSON and in foreign journals with a non-zero impact factor. Ensure active faculty participation in competitions announced by RK ministries and international organizations for grants funding R&D. |
| 9 | Termination of cooperation agreements with industrial partners | Timely conclusion of new agreements with leading industry enterprises for internships/placements and subsequent employment (with renewal). |
| 10 | High competition of the EP with other universities | Participation in national, regional, state and international rankings, e.g., "Atameken". Analyze similar EPs implemented at other universities. |

Table 3 – SWOT analysis for the EP Development Plan “6B07108 – Automation and Control”

| Strengths | Weaknesses |
|---|---|
| <ul style="list-style-type: none"> • Educational program developed jointly with employers. • Four independent learning pathways (specializations). • Learning laboratories equipped with modern equipment. • Departmental competence centers with global vendors. • Qualified faculty. • Involvement of industry practitioners with extensive experience at large enterprises from various sectors as faculty. • Stable enrollment. • Joint educational programs with the Moscow Power Engineering Institute, Kazan State Power Engineering University, Lublin University of Technology (Poland), Poznań University of Technology (Poland), and Anhalt University of Applied Sciences (Germany). • Strong demand from enterprises for specialists of this EP and, accordingly, a high employment rate of graduates. • Established ties with industrial enterprises, enabling implementation of R&D results in production processes. • A developed student social support policy (tuition discounts; incentives for winning Olympiads/competitions and for scientific developments; payments from the Board of Trustees; Gumarbek Daukeev grant and scholarship; and the Bulat Khisarov scholarship established by graduates for the EP). | <ul style="list-style-type: none"> • Lagging behind the leaders of the “Atameken” ranking in the indicator “Statistical data and achievements of graduates”. • Lack of partners in all regions to provide all types of student internships. • Insufficient level of publications in international peer-reviewed journals. • Aging faculty and industry practitioners; low staff renewal. • Insufficient English proficiency among faculty, limiting broad and effective international cooperation. • Insufficient provision of the educational process with textbooks in the state language and in English. • Low level of promotion, incentives, and engagement of young faculty and students in research projects and developments. • Low publication activity of faculty and students. • Low student academic mobility. |
| Opportunities | Threats |
| <ul style="list-style-type: none"> • Established ties with global vendors enable the creation of strong training centers. • Certification of graduates by recognized organizations. • Faculty upskilling on preferential terms in global companies. • Diverse learning pathways. | <ul style="list-style-type: none"> • Decrease in the share of degree-holding faculty due to delayed dissertation defenses and retirement/attrition of senior degree-holding staff. • Rapid labor market changes requiring EP adjustments. • Obsolescence of laboratory equipment, software, and computer fleet. |

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| <ul style="list-style-type: none"> • Attractiveness of the EP for students and leading faculty from other universities. • Attracting young industry practitioners. • Introducing double-degree programs with foreign universities and universities of the Republic of Kazakhstan. • Growing demand for high-tech specialties will allow regular updates of learning pathways. • Engaging 4th-year students in research to encourage further Master's and PhD studies, teaching, and startup creation. | <ul style="list-style-type: none"> • Enrollment growth leading to shortages of classroom/lab space and faculty. • Internship placement issues in regions amid growing enrollment. • Frequent regulatory changes in education and science. • Deterioration of student cohort quality due to low preparedness of school and college graduates. • Outflow of qualified teachers and researchers to other (commercial) sectors with higher income and to other universities. • Outflow of strong students to other, including foreign, universities. |
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Head of the Automation and Control Department



Abzhanova L.K.

EP Head "6B07108 – Automation and Control"



Syabina N.V.