MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN

NON-PROFIT JSC "ALMATY UNIVERSITY OF POWER ENGINEERING AND TELECOMMUNICATIONS NAMED AFTER GUMARBEK DAUKEYEV"

«APPROVED»
Director of ITSE
_____ K.A.Alipbayev
«_17_» ___04_. 2023 y.

PLAN
for the development of the educational program
7M07106 – Instrument Engineering
(Scientific and Pedagogical Direction)
for 2023-2027

Almaty, 2023

The Educational Program Development Plan was developed at the Department of Electronic engineering.

The head of the educational program is _____S.A. Yusupova, PhD, Associate Professor of the Department of Electronic engineering.

The plan was reviewed at a meeting of the Department of Electronic engineering:

Minutes of the meeting dated "17 " 04. 2023

The head of the Department of Electronic engineering is_____S.K. Orazalieva.

Reviewed and approved at a meeting of the Scientific and Methodological Council of the Institute of Telecommunications and Space Engineering: Minutes dated " 17" 04. 2023

Director of the Institute of ITSE_____K.A.Alipbayev

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1. Passport of the Development Plan for the 7M07106 - Instrument Engineering Educational Program for 2023 - 2027

1	Grounds for developing an EP development plan	- The strategy and tactics of the OP development plan are developed in accordance with the educational and upbringing policy of the Republic of Kazakhstan (Law of the Republic of Kazakhstan "On Education" dated July 27, 2007, No. 319-III (as amended and supplemented as of July 4, 2018). - The Strategic Development Plan of the Republic of Kazakhstan until 2025. APPROVED by the Decree of the President of the Republic of Kazakhstan dated February 15, 2018, No. 636 - State Compulsory Standard of Higher Education (hereinafter – GOSO) No. 604 dated October 31, 2018 (by Order of the Minister of Education and Science of the Republic of Kazakhstan dated May 5, 2020 No. 182) - Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 12, 2018 No. 563 "On Approval of the Rules for the Organization of the Educational Process Using Credit-Based Learning Technology" - The State Program for the Development of Education and Science in the Republic of Kazakhstan for 2023-2027, - Developed by the 7M07106-Instrument Engineering Research Institute, - Strategic Development Plan of the Gumarbek Daueyev AUEI
2	Developers of the EP development plan	**Representatives of the Department** Orazalieva S.K. – Head of the Department of ER, PhD Yussupova S. A. – PhD, Associate Professor of the Department of ER **Employers:** K. E. Zikirbay - Head of the IT Department of Saiman Corporation
3	Terms of implementation of the EP development plan	Year 2023 - 2027
4	Volume and sources of financing	Funding from the state budget. Attracting external sources of funding
5	Expected end results of the implementation of the EP development plan	- improvement of educational and professional activities of students and teaching staff; -recruitment of teaching staff who have received doctoral education at domestic and foreign universities; -advanced training of teaching staff in the field of innovative teaching technologies; -development of educational and methodological literature in the state, Russian, and English languages; -participation of students and teaching staff in competitions and project implementation; -improvement of the information and technical base; -development and implementation of joint educational programs with foreign universities

2. Analytical justification of the program

2.1 Information about the educational program

The educational program is based on the following documents:

- License for conducting the educational program KZ80LAA00018161, validity period – unlimited, issued on 05.05.2020;

- State mandatory standard of higher and postgraduate education;

- Educational Program Agreement – «7M07106- Instrument Engineering» on the implementation of a joint «Double Degree» educational program in a network form with the National Research Tomsk Polytechnic University with the master's program «Information and Measuring Equipment and Non-Destructive Testing Technologies»;

The educational program is implemented through curricula (individual and working) and programs (syllabuses).

The main focus in the issue of the formation of the educational program is allocated to the group of employers and all stakeholders: students, PPS.

«7M07106 - Instrument Engineering» is developed as a modular educational program in accordance with the National Qualification Framework, coordinated with the Dublin descriptors for the training of practical skills and competencies. The educational program reflects the university's commitment to the ideas of the Bologna Process: education focused on students; lifelong learning; education aimed at the result, which is expressed in the formed competencies; ensuring and improving the quality of education.

2.2 Information about students

Table 1 – Student population

Academic year	Educational program "7M07106 - Instrument Engineering"		
	in total	kaz	rus
2023-2024	7	3	4
2024-2025	1	1	-
2025 - 2026	5	3	2
2026-2027	-	-	-
2027-2028	-	-	-
2028-2029	-	-	-

2.3 Internal conditions for the development of EP

To ensure the high quality of the classes, classrooms equipped with modern computers and classrooms with interactive whiteboards are used. All disciplines are provided with methodological guidelines for independent practical work, lecture notes to increase the accessibility of the educational material in the state and Russian languages.

There are appropriate material and technical resources for the development and implementation of the educational program "7M07106 - Instrument Engineering". NAUES named after Gumarbek Daukeev has 3 educational buildings with dining halls and cafes, lecture rooms, and an assembly hall with wireless Internet access. NAUES has a Student Services Center and a Career and Employment Center. It also has its own Publishing Center and a Library with 500 square meters of reading rooms. There are 3 dormitories for out-of-town students with a total area of 19,748.9 square meters and 1,644 beds. Two of these dormitories (Dormitories No. 2 and No. 3) are owned by the university, while Dormitory No. 1, with an area of 3,343 square meters, is managed by the Territorial Committee of State Property and Privatization of Almaty. Each educational building has medical facilities with treatment rooms with a total area of 104.4 m2. In dormitories No. 2 and No. 3.

AUEC has always been distinguished by its strong laboratory base and the fact that up-to-date equipment was always available. In 2019-2020, new laboratories were established, including international ones:

– measuring equipment from the Israeli company AYYEKA for the "Instrument Engineering" educational program;

– opening of the HUAWEI Academy to enhance the IT competencies of students;

– equipping a distance learning room with funds from an international grant under the ERASMUS+ program (5,000 euros).

– Schneider Electric laboratory based on the Department of Automation and Control;

– the creation of a branch of the European University of Cassino's Mechatronics and Robotics Laboratory;

– the branch of the Department of KTT at the National Center for Space Research and Technology;

– On September 18, 2020, the SpaCE – Space Research Center was opened., Communications and Engineering" in collaboration with the Bauman Moscow State Technical University's Engineering Center.

In 2020, the university developed the "Modern Huawei Technologies" educational program (minor) based on a certified Huawei laboratory.

To organize research activities and create appropriate conditions for students pursuing postgraduate professional education, the NAUES named after Gumarbek Daueyev is focused on four research centers and seven thematic research laboratories. There are more than 80 laboratories with modern equipment for students, including 7 educational and research laboratories.

To ensure an appropriate level of security and preservation of material assets, the university is equipped with a video surveillance system.

The general requirements for the university's educational and scientific material and technical base are regulated by the Regulations on Certification of Academic Rooms (Laboratories) of the Gumarbek AUEU.

The staffing of the educational program is fully staffed.

The effectiveness of the educational and professional program should be ensured by the educational and methodological complexes of disciplines, which include: the working and study program of the discipline, the syllabus,

the map of the educational and methodological support of the discipline, the schedule for completing and submitting tasks for SRO, the course of lectures, seminars, practical and laboratory classes, materials for SROP: plans, methodological instructions, a list of recommended literature; materials for SRO: test tasks, homework, self-control materials for each topic, tasks for performing current types of work, etc. The educational program should be provided with 100% of the required teaching and methodological complexes of disciplines.

When developing the teaching and methodological complexes of disciplines, it is necessary to use modern scientific research in the field of information technologies used in the construction industry that meet the current requirements of the regional, national, and international markets.

2.4 Characteristics of the surrounding society

During the development of the OP, the following participants took part in its discussion: employers K.E.Zikirbay - Head of the IT Department at Saiman Corporation, students, and faculty members of the department.

Every year, representatives from partner industries and foreign leading faculty members from partner universities are invited to give lectures. There is an agreement to implement a joint (Double Degree) educational program in a network format with the National Research Tomsk Polytechnic University

2.5 Information about the teaching staff implementing the educational program

The 7M07106 - Instrument Engineering program is implemented by the university's highly qualified faculty. The department's faculty carries out educational and methodological work, participates in scientific and methodological work in all areas of professional education, oversees and guides the research work of students, conducts independent research work, and develops textbooks, educational and methodological materials, lecture notes, and other methodological materials for the courses they teach.

The staffing level is 100%.

The faculty members who implement the educational program have the potential for development, which means that they are committed to improving and self-developing their skills through integrating educational, scientific, and innovative activities into their work. The faculty members actively publish their research papers, including in high-ranking journals.

Overall, the faculty members have a high level of professional and scientific expertise, which is fully aligned with the goals and objectives of the educational program. Taking into account the further development of the OP, this is not enough, and the department plans to continue working on improving its staffing. The staffing potential of the Department of Electronics and Robotics is due to the presence of PhD candidates and doctors, and the department's academic staffing is 45%, which meets the qualification requirements that are updated annually.

The teaching staff of the Department of Electronics and Robotics constantly improves their knowledge in the field and undergoes advanced training, including short-term advanced training courses, participation in various seminars, and internships at leading universities in Kazakhstan and abroad, as well as at other organizations.

3. Characteristics of the problems addressed by the EP development plan and the rationale for addressing them

The educational program "7M07106 - Instrument Engineering" is aimed at training modern highly qualified and in-demand personnel with advanced skills in the application of information technologies in the field of electronics, which meet the current requirements of the regional, national, and international labor market.

Currently, there are the following problems:

- insufficient activity of the teaching staff in publishing scientific articles in journals with a non-zero impact factor;
- the risk of a decrease in the percentage of academic degrees among the teaching staff due to a decrease in government orders for the training of PhD students;
- a lack of educational literature in the state language
- lack of international educational programs;
- insufficient level of involvement of foreign professors in the educational process;
- insufficient level of realization of potential in research work (participation in competitions, tenders, and funded projects);
- - lack of joint educational programs with foreign universities;
- - need for professional development of the department's teaching staff in the field of innovative teaching technologies at the national and international levels.

4. Main goals and objectives of the educational program development plan

The main goal of the educational activity development plan is to improve the content of the educational program and to develop the professional competencies of electronic engineers.

The objectives of the educational program development plan are as follows:

-to improve and enhance the conditions for obtaining a full-fledged and high-quality professional education;

-to update the content of the educational program that develops the main professional competencies of future masters of engineering and technology in the educational program "7M07106 - Instrument Engineering";

-to create the necessary conditions for independent research activities by students.

- development of measures to master the use of scientific information using domestic and foreign experience in professional activities.

5. Measures to reduce the impact of risks on the EP

The following activities are used in the implementation of educational programs to reduce risks:

№	Naming of possible risks	Measures to eliminate them
1	Insufficient publication activity of academic staff implementing research programs in high-ranking journals	Encouraging the department's teaching staff to increase their publication activity
2	Average research performance	Initiation of research projects at the national and international levels. Stimulating academic staff to increase publication activity. Participation in international scientific conferences and symposiums. Organization and holding of own conferences and symposiums
3	Insufficient involvement of young teachers and students in research activities	Encouraging young teachers and students to carry out scientific projects and developments
4	Low level of academic mobility of students	Using the capabilities of the Academic Mobility Department to systematically increase the number of students traveling for studies and internships

6. List of activities of the OP development plan

№	Наименование мероприятий	Terms of implementation	The end result
1	Improving the content of the educational program by involving potential employers, stakeholders, and students	2023-2027 y.	Updated EP, Minutes of the Department's meetings on the development and updating of the EP
2	Improvement of educational and methodological complexes based on national development priorities and strategies	Annually	Updating the educational and methodological complex of disciplines
3	Development and improvement of elective disciplines based on the suggestions of employers, university professors, and students	Annually	Updated EP, Minutes of the department's meetings on the development and updating of the EP. Letters of recommendation from employers
4	Development and improvement of work curricula	Annually	working curriculum
5	Improvement and development of forms and methods of IWST and IWS	Annually	Methodological complexes
6	Development of methods for assessing the competencies acquired by students	Annually	Control materials

7	Improving the human resources potential for the development of the EP	Once a year	Certificates of advanced training for teaching staff
8	Attracting professors from leading foreign universities to teaching and research activities	Annually	Cooperation agreements
9	Involvement of leading practitioners in the educational process	Annually	Memorandum of Cooperation
10	Advanced training and academic degrees for young academic staff through PhD programs and internships	Annually	Promotion to academic rank PPS Department
11	Increasing the scientific potential of teaching staff by participating in tenders, grant competitions funded by the Ministry of Education and Science of the Republic of Kazakhstan, as well as in contractual activities	Annually	Housing Agreement Grants
12	Publication of scientific articles in journals included in the databases Web of Science, Scopus, in scientific journals with a non-zero impact factor	Every 3 years	Publications in scientific journals
13	Increase in the number of teaching staff who speak a professional foreign language	Annually	Certificates
14	Ensuring academic mobility of students and faculty on a permanent basis	Annually	Cooperation agreements
15	Conclusion of agreements with specialized enterprises for students to undergo research practice	Annually	Cooperation agreements on the employment of graduates
16	Improving the conditions for students' research activities	Annually	Projects for scientific research in various fields
17	Strengthening ties with foreign partners in order to carry out joint scientific research and publish	Annually	Research grants,
18	Modernization and expansion of the material and technical base of the EP	Annually	Updated educational and material resources
19	Publication of educational and methodological literature prepared by the department's teaching staff and acquisition of educational and methodological literature for students at all levels of training	Annually	Published textbooks and teaching aids
20	Participation in EP ratings	Annually	High rating
21	Continuous monitoring of graduates' employment	Annually	Employment 100%

7. Implementation mechanism for the EP development plan

To update the content of educational programs annually on the basis of generalization of modern domestic and global experience of training in this area, the requirements of employers and the demands of the labor market. Improvement of KED taking into account the proposals of stakeholders, and first of all, taking into account the opinions of employers.

To intensify scientific work at the department by involving the teaching staff, students in the initiative, state-budgeted research and publication of scientific results in journals with a high impact factor.

To ensure a high-quality renewal of the teaching staff, it is necessary to maintain continuity by attracting talented young people to teaching and research activities, as well as by training their own staff through PhD programs.

Development of international academic mobility of students and teachers through the construction of individual learning trajectories and the choice of educational programs at various universities around the world, including internships for students and teachers at leading foreign universities. Organization of professional practices at leading enterprises in the region.

8. Assessment of the socio-economic efficiency of the implementation of the EP development plan

As a result of the implementation of the OP development plan, the following socio-economic effects are expected:

- improving the quality of professional education and, as a result, the competitiveness of specialists in

electronics;
- training graduates who meet the needs of potential employers;
- increasing the role of employers in the training of professional personnel;
- the possibility of organizing research practices at leading enterprises;
- increasing the demand for qualified personnel and optimizing their age structure;
- expanding opportunities for professional self-realization of young people;
- updating the educational and material base (laboratory, computer, and technological equipment that meets modern requirements and standards).

9. The graduate model of the EP

The graduate model is a system of qualities of a graduate specialist, the result of his educational activity. The graduate model covers the qualification that connects his future activity with the subjects and objects of work, reflects the interdisciplinary requirements for the result of the educational process.

The competencies adopted by the university that the graduate must possess.

Universal competencies

- *the ability to set goals and plan their achievement;*
- *cultural competence;*
- *communication skills;*
- *analytical abilities;*
- *critical thinking, freedom of communication;*
- *leadership qualities, the ability to create and implement projects, etc.*

Professional competencies

Team worker, leadership,
ICT skills Innovative and entrepreneurial leader Creative approach and solution
Well-informed and technically capable
Professional, ethical and socially
responsible

Head of the Department of EE _____Orazalieva S.K.

Head of the Department of 7M07106 – Instrument Engineering _____Yusupova S.A.