



«APPROVED»

Director of ITSE

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DEVELOPMENT PLAN FOR THE EDUCATIONAL PROGRAM

6B07123 - System Engineering

FOR THE 2023-2027 SCHOOL YEAR

Level of the main educational program

(Bachelor's degree 6 level)

Institute of Telecommunications and Space Engineering (ITSE)

2023

Content

| | |
|---|---|
| Passport | 2 |
| Environmental analysis..... | 3 |
| Analysis of the internal environment..... | 5 |
| Action plan for the development of the Educational Program..... | 9 |

Passport
of the modular educational program (MEP) development plan
6B07123 - "SYSTEMS ENGINEERING"

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| <p>The purpose of the educational program (EP)</p> | <p><i>The objectives of the educational program in the field of training are:</i></p> <p>To train qualified specialists who are able to independently identify and acquire the necessary knowledge and skills to improve their professional activities, increase the effectiveness of their work results, and, in general, improve the state of the country's economy.</p> <ul style="list-style-type: none"> - Conceptual justification and modeling of conditions for training highly professional modern bachelors who are able to work effectively using fundamental theoretical knowledge, practical skills, and innovative technologies. - Develop and preserve, in the context of their professional activities, the best achievements and traditions of foreign and Kazakhstani experience in the field of international cooperation between states. |
| <p>Basis for developing the MEP development plan (hereinafter referred to as the "Plan")</p> | <p>The educational program has been developed in full compliance with regulatory and legal acts defining national priorities in the field of education in Kazakhstan, as well as the university's mission.</p> <p>The development of the 6B07123 System Engineering educational program involves the use of all necessary resources (information, material and technical base, financial, personnel, etc.) to develop graduate competencies, as well as to provide educational, scientific, methodological, and educational work with students.</p> |
| <p>The main developers</p> | <p><i>Head of the Department of Electronic Engineering, NAO "AUES named after Gumarbek Daukeev" Orazaliyeva S. K. - PhD, Associate Professor</i></p> <p><i>Teaching staff:</i></p> <p><i>Yusupova S.A. - Ph.D., Assistant Professor of the Department;</i></p> <p><i>Orynbay A.A. - PhD, Assistant Professor of the Department;</i></p> <p><i>Nusibaliyeva A.B. - Senior Lecturer of the Department;</i></p> <p><i>Umbetov E.S. - Candidate of Technical Sciences, Associate Professor;</i></p> <p><i>Coordinator of the joint educational program on behalf of the partner university::</i></p> <p><i>Prof. Dr. Eduard Siemens</i></p> <p><i>Employers:</i></p> <p><i>Zikirbay K. – Head of IT Department, Saiman Corporation;</i></p> <p><i>Students:</i></p> <p><i>Duisenbek D. – 3rd year student;</i></p> <p><i>Abzhapparova K. – 3rd year student, Otarbayev A. – 2nd year student</i></p> |
| <p>The purpose of the Plan</p> | <p>Ensure effective management of MEP</p> |

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| Plan formation mechanism | The MEP and Development Plan were drawn up with the involvement of developers, the educational program coordinator from the partner university, and employers. |
| Mechanisms for disseminating information about the Plan and the objectives of the modular educational program | All information about the educational program, including details about the teaching staff, students, university resources, partners, admission rules, library, etc., is available on the AUES university Internet portal https://aues.edu.kz The official website of the university provides access to educational, methodological, and administrative information necessary for students through links to the automated information system "Platonus," which is a system for automating the management of the educational process. The educational program is subject to mandatory discussion at meetings of the department and the university's Academic Council. |
| Deadlines for implementation of the plan | From 1.09.2023 to 1.09.2027 (4 years) |

Analysis of the External Environment

This Modular Educational Program (MEP) of Higher Education (Bachelor's Degree) in the field of study 6B07123 – Systems Engineering has been developed in accordance with the regulatory documents of the Ministry of Education and Science of the Republic of Kazakhstan (MES RK), the main of which are:

1. The Constitution of the Republic of Kazakhstan dated August 30, 1995.
2. The Law of the Republic of Kazakhstan "On Education" dated July 27, 2007 No. 319-III.
3. Order of the MES RK No. 604 dated October 31, 2018 "On Approval of State Mandatory Educational Standards at All Levels of Education."
4. Order of the Minister of Education and Science of the Republic of Kazakhstan No. 152 dated April 20, 2011 "On Approval of the Rules for Organizing the Educational Process under the Credit-Based Learning System."
5. Order of the Minister of Education and Science of the Republic of Kazakhstan No. 600 dated October 31, 2018 "On Approval of the Model Rules for Admission to Educational Institutions Implementing Higher and Postgraduate Education Programs."

In developing this MEP, along with the educational regulatory acts of the MES RK, the internal regulatory documents of the university and the documents of the educational program 6B07123 – Systems Engineering (Bachelor's Degree), already implemented at the university, were taken into account: curricula, catalogs of elective disciplines, recommendations of the partner university, faculty members, and stakeholders.

The next step undertaken by the developers of the MEP was to study the current state of the industrial sector with the aim of introducing adjustments, modifications, and improvements to the existing program. As engineering, technical, and human-machine systems continue to develop and become more complex, increasing attention in this field is given to general systems issues, which constitute the core content of scientific (primarily mathematical) systems engineering. Responsibility for the system as a whole, along with the interdisciplinary approach associated with other branches of engineering, distinguishes systems engineering from all other engineering specialties.

In this regard, there is a need to train highly qualified specialists for innovative and high-tech sectors of the energy and telecommunications industries.

Analysis of the Internal Environment

The implementation of the educational program 6B07123 – Systems Engineering actively involves the academic staff of the Department of Electronic Engineering of NJSC AUES, as well as faculty members of Anhalt University of Applied Sciences.

The academic staff fully meets all established qualification requirements.

The proportion of faculty members holding academic degrees is 55%, with a consistent upward trend each year. Department staff annually undertake professional development courses at leading scientific centers in this field in the Republic of Kazakhstan, the Russian Federation, Kyrgyzstan, the Republic of Belarus, and in countries abroad (Germany, the People's Republic of China, Poland, Latvia).

Research activities in the specialty are carried out annually through the participation of faculty members and students in international and national scientific and practical conferences, interuniversity methodological conferences, and other academic events.

The available classroom facilities meet the needs of the educational process and

make it possible to organize instruction in two shifts.

An analysis of student and faculty satisfaction is presented below in the form of a SWOT analysis of “Students” and a SWOT analysis of Faculty (for the period 2021–2023).

SWOT analysis

| <i>S (strength) – strengths</i> | <i>W (weakness) – weaknesses</i> |
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| <ul style="list-style-type: none"> - A strong material and technical base of the university and the departments supporting the educational program. - Student enrollment policy. - Student support measures. - Monitoring of learning outcomes. - Academic mobility through the partner university and involvement of students in research activities. - Engagement of faculty members from the partner university. - Education funded under the state educational grant. - Availability of a partner university. - Availability of an internal computerized system for monitoring the quality of students’ knowledge. - High academic achievements of students. | <ul style="list-style-type: none"> - A decline in the number of applicants due to insufficient preparation of prospective students in technical subjects and an increase in the university’s admission threshold score. - A limited number of students with an advanced level of foreign language proficiency. - An insufficient number of faculty members conducting classes in German. - An increase in the average age of the academic staff. - An insufficient level of realization of research potential (participation in competitions, tenders, and funded projects). |
| <i>O (opportunity) – favorable opportunities</i> | <i>T (threat– - threats</i> |
| <ul style="list-style-type: none"> - Implementation of a dual degree program. - Participation in research activities and student research projects jointly with the partner university. - Creation of conditions for students to write and publish scientific articles and present papers at international conferences. - Opportunity for faculty members to improve their qualifications at the partner university. | <ul style="list-style-type: none"> - Weakening of interuniversity cooperation. - Decrease in the student enrollment. |

Action Plan for the Development of the Joint Educational Program (JEP)

| Areas of Activity | Activities | Responsible Parties | Implementation mechanism |
|---|--|---|--|
| 1 | 2 | 3 | 4 |
| 1. Effective Management of Quality Implementation of the Educational Program and Improvement of Educational Process Management Mechanisms | <p>1. Ensuring the Joint Educational Program (JEP) is aligned with the regulatory documents of the MES RK: State Compulsory Educational Standards (SCES), Model Educational Programs (MEP), internal regulatory documents (Regulations, Instructions, Forms).</p> <p>2. Improvement of the structure of the JEP.</p> <p>3. Development and enhancement of the modular approach in forming the JEP.</p> | <p>Head of the Department, University Leadership</p> <p>Head of the Department, University Leadership, JEP Coordinator</p> <p>Head of the Department, JEP Coordinator</p> | <p>Formulation of Requests for the Acquisition of Regulatory Documents from MES RK and RUMS for the Educational Program at AUES. Collaboration with the Department of Analysis and Strategic Development, and the Quality Management Department.</p> <p>Formation and Optimization of the Educational Program (Annual update of 30% based on scientific advancements, labor market requirements, partner input, and analysis of student satisfaction with the MEP and their needs)</p> <p>Formation of Modules Taking into account the logical and content-related interconnections of disciplines. Ensuring a unified methodological approach to teaching each module. Formation of the student body for independent work, considering the integrated content of the educational material.</p> <p>Monitoring and Analysis of Employer Needs and Graduate Satisfaction</p> |
| | 4. Improvement of the Modular Educational Plan (updatability). | Head of the Department, | |

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| | <p>Strengthening the inclusion of in-demand scientific and educational disciplines and promising areas of study.</p> <p>5. Further implementation of the dual degree program 6B07123 – Systems Engineering, developed on the basis of the joint educational program: the “Electrical Engineering and Information Technologies” program (Anhalt University of Applied Sciences, Germany) and the educational program in 6B07123 – Systems Engineering (AUES University, Republic of Kazakhstan).</p> <p>6. Cooperation with industrial companies and government agencies to involve them in the training of specialists in the fields of Electric Power Engineering, Telecommunications, and IT technologies, as well as to organize industrial internships and employment opportunities for graduates.</p> <p>7. Development and implementation of a multilingual training program for specialists under the educational program.</p> | <p>JEP Coordinator</p> <p>Head of the Department, Partner University Coordinators, Faculty Members</p> <p>Head of the Department, JEP Coordinator, Faculty Members</p> <p>Head of the Department</p> <p>Head of the Department, University Leadership, JEP</p> | <p>Analysis of current international experience in the field of the educational program.</p> <p>staff Contract</p> <p>Conducting Master Classes and Seminars with Company Participation</p> <p>Participation in the organization of industrial internships.</p> <p>Preparation of Programs, Professional Development of Faculty, and Improvement of Foreign Language Proficiency</p> <p>Professional Development of Faculty</p> <p>Discussion of teaching methodology improvements at departmental and institute-level methodological seminars. Implementation of</p> |
| <p>2. Training of Competitive Specialists</p> | <p>1. Improvement of the Joint Educational Program (JEP) through the introduction of modern educational technologies into the learning process</p> | | |

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| | <p>2. Development and refinement of the curriculum and elective disciplines (CED) taking into account the suggestions of stakeholders, primarily considering employers' opinions.</p> <p>3. Strengthening the practical training of students at enterprises.</p> <p>4. Formation of a high-quality student body.</p> | <p>Coordinator Head of the Department, University Leadership, JEP Coordinator</p> <p>Head of the Department, University Leadership</p> <p>Head of the Department, University Leadership</p> | <p>interactive teaching methods. Annual Update of Courses in the Modular Educational Plan Based on Employers' Recommendations Collaboration with employers.</p> <p>Conclusion of Agreements on Collaboration with Leading IT Enterprises and Major Telecommunications Companies in the City, Region, and Republic Coordination with the Department of International Cooperation and Academic Mobility. Career Guidance Plan and Continuous Updating of the Department's Website Page</p> |
| <p>3. Improvement of Conditions for High-Quality Staffing of the Educational Program</p> | <p>1. Professional development of faculty members to organize work under new conditions.</p> <p>2. Exchange of experience among faculty through academic mobility with foreign partner universities.</p> <p>3. Invitation of leading scholars from</p> | <p>Head of the Department, University Leadership</p> <p>Head of the Department, University Leadership</p> <p>Head of the Department, University Leadership</p> | <p>Professional Development and Internship Courses in the Profile of Taught Disciplines (Training of in-house staff, improvement of German/English language proficiency) Academic mobility of teaching staff Engagement of Partner Employers and</p> |

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| | partner universities. | Department, University Leadership | <p>Program Alumni in Guest Lectures and Trainings</p> <p>Discussion of the MEP at departmental curriculum-methodological meetings. Information to be published on the AUES University website: https://aues.edu.kz</p> |
| | 4. Increasing the proportion of faculty members holding academic degrees in the department. | Head of the Department | Updating the Department's Faculty Staff Based on Continuity. Involving the most competent PhD graduates and specialists from the practical field in teaching and research activities. |
| 4. Research and Innovation Activities in the Development of the Educational Program | 1. Intensification of scientific research within the department. | Head of the Department | Involvement of Faculty and Students in Initiative and Funded Research Projects |
| | 2. Participation in grant-funded and contract-based research projects. | Head of the Department, Faculty Members | <p>Increasing the Number of Innovation-Oriented Projects</p> <p>Submitting applications for innovation patents and their practical implementation, integrating results into the educational process, and publishing in international high-impact journals.</p> |
| | 3. Encouragement and motivation of students to actively engage in research activities. | Head of the Department, Faculty Members | <p>Student Participation in National and International Competitions</p> <p>Involving students in departmental research projects.</p> <p>Increasing the number of students participating in funded research activities.</p> |

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| | 4. Increase in faculty publications in journals with a non-zero impact factor. | Head of the Department, Faculty Members | Preparation of Scientific Publications in Impact-Factor Journals Publications should be included in international scientometric databases such as Thomson Reuters and Scopus. |
| 5. Development of Resource Potential for the Implementation of the Educational Program | 1. Acquisition of office equipment, scientific instruments, technical teaching aids, visual materials, etc. | Head of the Department, University Leadership, JEP Coordinator | Annual procurement plans |
| | 2. Purchase of new laboratory equipment. | Head of the Department, Faculty Members | staff Annual procurement plans |
| | 3. Development of the department's information and educational resources (website, portal, electronic teaching materials, etc.). | Head of the Department, Faculty Members | Activities for the Development of the University's Information and Educational Resources |
| | 4. Development of various forms of material and moral incentives for faculty members. | Head of the Department, Faculty Members | Faculty performance ranking |
| | 5. Establishment of joint thematic laboratories in collaboration with leading companies and manufacturers of innovative electrical equipment. | Head of the Department, University Leadership, JEP Coordinator | Conclusion of agreements and provision of classrooms |

Measures to Mitigate Risks for the Educational Program

The following measures are applied to mitigate risks in the implementation of the joint educational program:

| No. p / p | Name of possible risks | Measures to eliminate them |
|-----------|--|---|
| 1 | Insufficient provision of new educational and methodological literature in professional disciplines. | Plan the annual publication of scientific and educational-methodological literature by the department's faculty according to the students' curriculum, and acquire additional materials externally. |
| 2 | Traditional methods of conducting classes. | Improve and implement innovative teaching technologies in the educational process. |
| 3 | Conventional classrooms and laboratories. | Create state-of-the-art specialized classrooms and research laboratories. |
| 4 | Renewal of teaching and research staff. | Train highly qualified scientific personnel through master's and doctoral (PhD) programs in line with current standards. |

Educational Program Director *Septi Raynoba C. A.*

Head of the EI Department *Agus Prayuwana C. K.*

Director of ITKI *[Signature]*