Kazakh agrotechnical University Ş. Seifullina

Considered
at the meeting
of the faculty
Council Protocol No. 12 of 24.04.2019

Approved by the Dean of the
faculty of energy
_____ S.S.Isenov
(signature)
24.04.2019
(Date, month, year)

PLAN
DEVELOPMENT OF EDUCATIONAL PROGRAMS
6V062 – "Radio engineering and electronics"
"7M062– "Radio-Electronic technologies and systems"
in the years 2019-2024

Considered at the extended meeting of the Department "Radio engineering, electronics and telecommunications»
Protocol no. _12_ from 15.04.19

Content

1 Passport of the plan of development of educational programs of the bachelor's degree "radio engineering and electronics"and master's degree" radio Electronic technologies and systems " for 2019-2024

1	Grounds for developing an educational program development plan	The basis for the development of the development plan of the OP "radio engineering and electronics", "Radio-Electronic technologies of the educational program of the system" is the improvement and effective implementation of educational programs of the specialty. The strategy and tactics of the OP development plan are developed in accordance with the educational policy of the Republic of Kazakhstan, the main goal of which is to train highly qualified personnel that meet the needs of the state and stakeholders.
2	Main developers of the educational program development plan	Head of the Department, c.t.s Tolegenova A. S., faculty of the Department "Radioengineering, electronics and telecommunications»»
3	Terms of implementation of the educational program development plan	2019-2024
4	Amount and sources of funding	-
5	Expected results of the implementation of the educational program development plan	The expected results of the implementation of the plan for the development of the educational program "radio engineering and electronics", "radio Electronic technologies and systems" are: improving the quality of educational services to the international level; improving the efficiency of the educational process through the widespread introduction and application of innovative technologies in the educational process of the Department "radio engineering, electronics and telecommunications"; improving the effectiveness of research and their application in the educational process, improving the quality of educational and research base, teaching materials.

2 Analytical justification of the educational program

2.1 Information about educational programs: the educational programs of the bachelor's degree "radio engineering and electronics" and the master's degree "radio Electronic technologies and systems" are developed in accordance with the National and European qualifications framework, professional standards, and are coordinated with the Dublin descriptors. Developed on the basis of the State compulsory standard of higher education, approved by the government of the Republic of Kazakhstan on October 31, 2019, No. 604. Educational programs are designed on the basis of modular systems for studying disciplines and consist of modules that form General and professional competencies. Educational programs were created based on the request of employers, in accordance with national development priorities and the development trend of communication technology.

2.2 information about students

Currently, 57 students and undergraduates are enrolled in the bachelor's degree program "Radioengineering and electronics" and the master's program "Radioelectronic technologies and systems". The number of students enrolled in 1st-year bachelor's degree programs and the number of students enrolled in master's degree programs, excluding enrollment for the 2020-2021 academic year, is shown in tables 1 and 2.

Table 1-Contingent of students studying in 2020-2021 for the bachelor's degree program "Radioengineering and electronics»

	Course 1 2019-2020
In state language	29
In russian	20
In a multilingual language	-
Full-time and distance learning	-
Total	49

Таблица 2 - Контингент обучающихся магистрантов специальности

	Course 1

Scientific and pedagogical direction	8
Profile direction	-
Total	8

2.3 Internal conditions for the development of the educational program

Due to the reduction of classroom hours, the use of innovative teaching methods is of particular importance for the effective implementation of credit training technology. Technological support for students of the educational programs under consideration

it is carried out as follows: interactive teaching methods are actively used during laboratory sessions based on virtual and hardware-software laboratory-practical complexes. The educational program "radio engineering and electronics" constantly introduces innovative teaching methods using interactive whiteboards, virtual laboratories, and digital educational resources. Teachers of the Department widely use a variety of traditional, innovative technologies, such as:" brainstorming", synquain, cluster, raft technology, Smart Education, problem-oriented learning or PBL.

2.4 Characteristics of the surrounding society.

The laboratory base of educational programs meets the requirements of the time and covers a wide range of technologies and theories for communication systems. the Department has concluded agreements and agreements with enterprises for training, production and pre-graduate practices. Currently, there are contracts for educational programs with 20 specialized enterprises and organizations. Every year, representatives from production companies are invited to give lectures. In order to develop academic mobility and double-degree education, we are searching for partner universities in foreign countries, the customs Union and the CIS.

For the purpose of high-quality training of specialists at the Department of radio engineering, electronics and telecommunications, work is being done to expand international cooperation, which is carried out in two main areas – training of teachers and students, the organization of scientific and experimental and scientific - pedagogical practices in other Universities. The Department has agreements on cooperation with organizations from Belarus, Bulgaria, the Czech Republic, Poland, Russia, and Uzbekistan. Today, the Department successfully cooperates with the Belarusian State University of Informatics and Radioelectronics, the Siberian State University of Telecommunications and Informatics, and the Tomsk Polytechnic University.

2.5 Information about the teaching staff implementing educational programs

The faculty is the main resource for ensuring the mission of the University. In this regard, much attention is paid to the selection and training of personnel. The staff for the preparation of educational programs is staffed in accordance with the legislation of the Republic of Kazakhstan and the rules of competitive replacement of positions of scientific and pedagogical personnel of higher educational institutions. The teaching staff of the Department consists of 29 employees, including 5 doctors of technical Sciences, 12 candidates of science and 7 masters. The qualification of the teaching staff of the Department is fundamental to the quality of educational services provided and is provided by a systematic assessment of the competence of teachers by the University administration. To ensure better quality of the educational process, the Department invites settled teachers, graduates of master's and doctoral studies to work. OP in relation to PPS requires compliance with basic education, pedagogical experience, competence in the taught discipline. The teaching staff of the Department meets the qualification requirements for licensing educational activities and has full knowledge of modern teaching methods, which allows you to organize an effective learning process.
In accordance with the law of the Republic of Kazakhstan "on education", all teachers at least once every 5 years undergo professional development at the national and international levels, and have certificates. Professional development of the teaching staff is carried out in accordance with the main activities of the Department, which are conducting research and teaching disciplines in the field of radio engineering, electronics and telecommunications. Practical teachers, using their practical experience, introduce them into the educational process in the form of business games, situational tasks, thereby improving the assimilation of the program of disciplines, and developing professional skills of the future specialist.

2.6 Characteristics of educational program achievements

KATU im. S. Seifullina participates in ratings, such as the national rating of demand for higher education institutions of the Republic of Kazakhstan, which assesses the quality of educational programs by levels and areas of training (NAAR), as well as the rating of the Republican rating Agency Kazakhstan 2050 – the national rating for innovation and academic excellence. The success of educational programs is determined by a systematic, purposeful and effective implementation of the goals and

plan of development mentioned above, the cluster developed with the involvement of all stakeholders of the programme, taking into account the analysis of satisfaction of students and faculty/staff, analysis of available and required program resources, including material-technical base.

3 Characteristics of the problems to be solved by the development plan obrazovatelnyh programs, and the rationale of their decision: Educational programs aimed at training for the exercise of professional activities of graduates in the field of definition of optimum technological modes of operation of radio systems and electronic technologies, advanced projects design of radio systems for various purposes, performing technological calculations for the preparation and adjustment of electronic technology, selection of operating modes and regulation of technological processes, control of operating modes of radio engineering and radio electronics systems, verification of measuring instruments, diagnostics and preparation of repair plans for technological equipment of radio engineering systems, diagnostics, maintenance and current repair of radio electronic equipment and devices.

4 Main goals and objectives of the plan for the development of educational programs, indicating the dates and stages of its implementation: educational programs "radio engineering and electronics", "radio Electronic technologies and systems" were created on the basis of a request from employers, in accordance with national development priorities.

The main objectives of the development plan are as follows:

№	The name of the task	The time of development	Stage of development
1	Providing conditions for obtaining a full-fledged, high-quality professional education	The entire training period	Providing educational services for the development of professional skills
2	Formation of basic professional competencies for future bachelors in educational programs	The entire training period	Acquisition of professional competencies
3	Ability to work with scientific and technical literature, use domestic and foreign experience in professional activities, systematize and summarize the information received.	The entire training period	Analysis and processing of the results obtained
4	Consultations of employers and research Institute scientists when selecting relevant and practically significant topics for theses and master's theses	End of bachelor's degree and start of master's degree	Consultations with employers and stakeholders

The expected final results of the educational program assume a clear orientation to the future, which is manifested in the possibility of building your education taking into account success in personal and professional activities that meet the requirements of employers.

5 Measures to reduce the impact of risks for educational programs:

Educational activities, like any other, are characterized by specific risks that are unique to them. This should be taken into account when developing measures to manage these risks. Therefore, risk management methods should also be adjusted in accordance with the tasks assigned to them. There is a need to develop a model that would allow effective management of emerging risks in educational institutions, taking into account the specific features of educational activities. Speaking about the specific features of educational activities, it is necessary to highlight the impalpability of educational services, which is manifested in the inability to assess their quality and volume until full acquisition, that is, until the moment when a University graduate receives a certain specialty, having defended the final qualifying work. Another distinctive feature of educational services is the impossibility of their direct monetary measurement. The price mechanism is often unable to objectively estimate the cost of educational services, which is due to the difficulty of reflecting all the costs of educational activities. There are other features of educational activities. Each of them is characterized by certain categories of risks, which in turn are analyzed and managed by different methods.

Risks of educational activities:

1 Insufficient number of applicants, due to the fact that the OP is new;

2 Insufficient funding for educational activities;

3 Changing market conditions for educational services;

Risk analysis is focused on contributing to the understanding of risks. It provides data for risk assessment and decision-making regarding the need to consider risks and the most appropriate strategies and methods of consideration. At the end of the school year, process managers submit a risk management report to the quality service. After submitting reports, the IC conducts risk management analysis 1 time per year. By November 1 of this year, Department managers are developing a risk management plan. In July, for the past academic year, each process Manager provides a report according to the risk management plan. The risk map and risk management plan are reviewed and approved by the management Board of KATU. S. Seifullina " in December of this year.

The approved risk management plan and risk map are submitted to the Board of Directors by the first Deputy Chairman of the Management Board.

Risk monitoring is about controlling the level of risk. This is achieved by updating on a regular basis (once a year) information about risks, risk management measures, the status of implementation of measures, as well as by tracking the degree of impact and probability of risks that were developed earlier at the stage of risk identification and assessment.

6 План мероприятий по развитию ОП

№	The name of the events	Term of realization	Responsible	Expected result	Resource provision
1	Formation of a Commission for the development and adjustment of educational programs	2019-2023 June	A.S.Tolegenova, teaching staff	Commission for the development of an educational program	Personnel, library, and electronic resources
2	Development and adjustment of goals and objectives of educational programs	2019-2023 June	A.S.Tolegenova, teaching staff	Goals and objectives of the educational program	Personnel, library, and electronic resources
4	Determination of specialist competencies and specialty disciplines	2019-2023 June	A.S.Tolegenova, teaching staff	Competences of the specialist and disciplines of specialty	Personnel, library, and electronic resources
5	Development of a common position on the competence of the educational program of specialists with employers	2019-2023 June	A.S.Tolegenova, teaching staff	Positions on the competencies of the educational program specialists with employers	Personnel, library, and electronic resources
6	Formation of the educational program in accordance with professional standards	2019-2023 June	A.S.Tolegenova, teaching staff	educational program in accordance with professional standards	Personnel, library, and electronic resources
7	Preparation of the academic calendar and working curriculum for the specialty in accordance with the developed educational program	2019-2023 June	A.S.Tolegenova, teaching staff	The academic calendar and the working curriculum in the specialty according to the developed educational program	Personnel, library, and electronic resources
8	Consideration of the educational program at an extended meeting of the Department with the participation	2019-2023 June	Department of radio engineering, electronics and	Protocol for reviewing the educational program	Personnel, electronic resources

	of employers		telecommunications, employers	at an extended meeting of the Department with the participation of employers	
9	Review and approval of the educational program at the academic Council of the faculty	2019-2023 June	The members of the Council of the energy Department, employers	Protocolof consideration of the educational program at the academic Council of the faculty	Personnel, electronic resources

7 Mechanism for implementing the educational program development plan: the development Plan and goals of educational programs are developed in accordance with national development priorities.

Plan development of educational programs promotes the bachelor's personality, and the formation of common cultural universal (General scientific, socio-personal, instrumental) and professional competences in accordance with the requirements of the standard in the field of training educational programs, formation of professional competences.

When drawing up the plan for the development of educational programs, the provision of all necessary resources for the implementation of this educational program was taken into account. To inform all interested parties, on the website www.kazatu.kz the University publishes an approved plan for the development of educational programs, draft work plans for disciplines, academic calendars and lists of elective disciplines. Catalogues of elective subjects are available in the library.

The plan of development of educational programs takes into account:

- compliance with the training period, the graduate's qualification, the complexity of training, the structure, terminology, and a number of other provisions of the main educational program;
- continuity of the scientific foundations of the educational process, laid down in the educational program, the traditional foundations of the functioning of the education system, in particular, the principle of unity of education, education and training, a comprehensive approach to the organization of the educational process and the theory of gradual formation of knowledge, skills and abilities of students;
- pedagogical traditions of the University aimed at training high-class personnel of a wide profile, taking into account the specifics of the country's economy in modern social conditions;
- representation of the system of higher professional education as a stage of the system of continuous professional

education, the set of educational institutions which provides training of professional personnel;

- competence orientation of the entire pedagogical system and each of its elements, considering competence as a system of knowledge, skills, experience and personal professionally oriented qualities of the graduate.

8 Evaluation of the socio-economic effectiveness of the implementation of the educational program development plan:

At the end of the academic year, a meeting of the Department with the participation of all interested parties (faculty, employers) is conducted self-assessment of educational programs, taking into account the changes made, the results achieved, the effectiveness and efficiency of the implementation of educational programs are discussed.

- The demand for the specialty and its prospects generates a significant interest of applicants in this direction: every year the passing score on the UNT is 65-94 points, and the set reaches, for example, 57 students for the 2019-2020 academic year.and undergraduates

- The set goal of educational programs meets the needs of the state, employers of individuals and students. The needs of the state are determined by the annual state order, which is at least 500 people, and according to the state order, the Kazakh agrotechnical University named after Saken Seifullin receives at least 31-80 people annually, which is 7 or more percent of the total state order in the Republic. In Kazakhstan, more than 14 universities teach this specialty.

- KATU im. S. Seifullina cooperates with 26 international organizations and programs from 9 countries: TEMPUS, ERASMUS MUNDUS, FAO, (European Union), TIKA, Mevlana Exchange Program (Turkey), MASHAV, (Israel) IAMO, LOGO e.V., Konrad Adenauer Stiftung, DEULA, DAAD, APOLLO, John Deere, CLAAS, Wiehenstephan-Triesdorf (Germany), AF (French Alliance), ESA (France), qualita Studio, federbio, (Italy), Cochran FELLOWSHIP program, USDA, USAID, Borlaug fellow-ship program, Fulbright, (USA), JICA (Japan), Chinese machinery Institute (PRC).

- The University has signed more than 200 agreements and memoranda of cooperation with universities and research centers from 35 countries. Full list of agreements and memoranda of KATU.S. Seifullina with foreign universities is presented on the University's website in the section international cooperation, as well as the main directions of development of international cooperation (http://kazatu.kz/ru/ob-universitete/centr-razvitiya-mejdunarodnogo-sotrudnichestva-i-poliyazichnogo-obrazovaniya/mejdunarodnoe-sotrudnichestvo). This information is useful for students and undergraduates of the specialty "radio engineering, electronics and telecommunications" when planning practical training, or implementing an external academic mobility program.

The Department "radio engineering, electronics and telecommunications" has been cooperating in the framework of contracts with leading foreign scientific centers, such as TPU, Tomsk, TUSUR, Tomsk, Sibhat them. Prof. M. A. Bonch-

Bruevicha, MTUSI, Moscow, BGUIR, Minsk, TUIT, Tashkent, CHTU, Prague.

- The laboratories of the Department of radio engineering, electronics and telecommunications have modern educational and research equipment, educational software and methodological complexes designed for laboratory and practical work on cycles: "Theory of electric circuits", "Digital signal processing", "electronics and circuitry", "Digital devices and microprocessor technology", "wireless communication Technologies", "Television and radio broadcasting". In the educational process, 7 specialized laboratories of the Department are used that meet the requirements of the SES.

There are unique training stands from National Instruments (NI) working in the LabView environment and laboratory equipment from Uchpribor. In addition, there is laboratory telecommunications equipment for conducting Cisco courses. Educational laboratory complex "Theory of electric circuits", "electronics and circuitry", "Digital signal processing", etc. (computerized version).

It is planned to purchase laboratory equipment in the amount of 12,000,000 (twelve million) tenge in 2021..

Training of highly qualified scientific personnel through the master's degree program is carried out at the level of modern requirements. In 2021, it is planned to open an educational program for PhD training.

9 Model of the graduate of educational programs by levels of training

The model of the graduate of educational programs for two levels of education: bachelor's degree "radio engineering and electronics" and master's degree "radio-Electronic technologies and systems" is supplemented taking into account the national qualification framework and the needs of key employers. The graduate model was developed by a working group based on the SES and discussed with employers and at a meeting of the Department.

The bachelor's degree in educational programs is prepared for the following main types of professional activity: production and technological; design and technological; organizational and managerial.

At the same time, professional activity of a graduate of a bachelor degree is associated primarily with the implementation and operation of modern electronic equipment, new systems of technical diagnostics of elements of radio engineering systems, the technical measures and prepare for the implementation of projects aimed at improving the reliability and performance of electronic systems. The sphere of professional activity is the field of science and technology, which includes a set of technologies, means, methods and methods of human activity aimed at creating conditions for the exchange of information at a distance.

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A bachelor studying in educational programs 6B062 - "radio engineering and electronics" must have the following

competencies:

- Types of professional activity
- Types of professional activity:
- industrial-technological;
- service and operational;
- organizational and management;
- installation and commissioning;
- calculation and design;
- experimental research.
- Professional competence:

know the principles of operation, technical characteristics, and features of the radio systems used; know the necessary measures to ensure life safety and environmental protection in the design, construction, and operation of radio systems;

- be able to develop the structure of radio engineering and electronics systems; perform calculations related to the selection of values of parameters of radio engineering and electronics systems, optimization of these parameters and operating modes with the use of computer equipment and special programs; be able to analyze the reliability of circuits of radio engineering systems; be able to diagnose electronic devices of radio engineering systems; be able to select the necessary electronic components (standard replacement elements) when repairing damage; have the skills to operate the technical objects (tools and systems) being studied, have the skills to work in equipment with electronic components and computer systems and networks;

- be ready for the design and operation of radio engineering systems, including the design, construction, installation and operation of radio communication systems, computer networks, methods of conducting theoretical and experimental research in the field of communication technology;

- be able to analyze the structure and capabilities of the main systems for transmitting and converting information about objects and systems, have the skills to develop and design on the modern element base of equipment and devices for transmitting, receiving and distributing information;

- be ready for operation of radio engineering systems; be ready for operation of radio engineering systems, diagnose and evaluate the state of radio engineering and electronics systems using the necessary methods and means of control and analysis.

Professional activity of the master of technical Sciences (engineering and technology) in the field of multiservice

radio-electronic technologies:

development, production, installation and technical operation of radio-electronic systems;

implementation of scientific, experimental and design works in the field of radio-electronic systems;

ensuring the technical readiness of communication equipment for operation, timely and high-quality scheduled maintenance work, technical inspections of equipment;

control of correct maintenance of operational and technical documentation and operation of radio-electronic systems.

monitoring and compliance with safety requirements during operation and maintenance of communication equipment;

analysis of the technical support of radio-electronic systems in order to improve their reliability.

Types of professional activity:

- scientific (experimental) research;
- industrial-technological;
- design and development;
- repair-operational;
- organizational and management;
- innovative,
- calculation and design;
- scientific-pedagogical.

The master must have the following professional competencies by type of activity, be able to:

- prepare research and reporting documentation according to established forms;
- possess modern methods and software modeling tools;
- evaluate the competitiveness and economic efficiency of multiservice technologies being developed;
- develop technical projects for the introduction of innovative electronic equipment;
- conduct experiments, analyze the results and make recommendations for the introduction of electronic equipment.
- conduct measurements and observations, compile descriptions of ongoing research, and prepare data for reviews, reports, and scientific publications.

Head of the Department "Radioengineering,
electronics and telecommunications" A. S. Tolegenova