

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN
KARAGANDY UNIVERSITY OF THE NAME OF ACADEMICIAN E.A. BUKETOV

«APPROVED»

By decision of the Board
NJSC «Karaganda University
named after academician E.A. Buketova»

Protocol No. 2 of «21» _____ 2024 г.

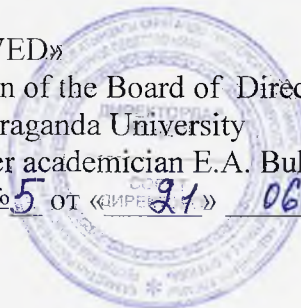
Prof. Dulatbekov N.O.



«APPROVED»

By decision of the Board of Directors
NJSC «Karaganda University
named after academician E.A. Buketova»

Protocol No. 5 of «21» 06 _____ 2024 г.



EDUCATIONAL PROGRAM

Level: Master

Degree: master of science in education program 7M07105 – Electronics of communication systems and telecommunication technologies

Karaganda,
2024

APPROVAL SHEET

EDUCATIONAL PROGRAM «7M07105 – Electronics of communication systems and telecommunication technologies»

«AGREED»

Director of the branch of «Kazteleradio» JSC
Karaganda ODRT



_____ A.K. Zhumabaev

_____ 2024 y.

«AGREED»

Director of the Representative Office
JSC «National Information
Technologies» in the Karaganda region



_____ T.A. Kulbaev

_____ 2024 y.

The educational program «7M07105 – Electronics of communication systems and telecommunication technologies» was developed on the basis of:

- Law of the Republic of Kazakhstan dated July 27, 2007 No. 319-III "On Education";
- Law of the Republic of Kazakhstan dated July 11, 1997 No. 151-I. "About languages in the Republic of Kazakhstan";
- State Mandatory Standards of Higher and Postgraduate Education No. 2 dated July 20, 2022.
- The National Qualifications Framework dated March 16, 2016 by the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations.
- Order of the Ministry of Education and Science of the Republic of Kazakhstan "On approval of the Rules for the organization of the educational process in credit technology" dated April 20, 2011 No. 152 (with amendments and additions dated 07/25/2023 No. 334).
- Classifier of areas of training with higher and postgraduate education dated October 13, 2018 No. 569.

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Passport of the educational program

1. Code and name of the educational program: "7M07105 – Electronics of communication systems and telecommunication technologies"

2. Code and classification of the field of education, training areas: 7M07 Engineering, manufacturing and construction industries, 7M071 Engineering and Engineering work

3. Group of educational programs: M099- Energy and electrical engineering

4. Volume of credits: 120 ECTS.

5. Form of study: full-time

6. Language of instruction: Kazakh, Russian

7. Degree awarded Master of Technical Sciences in the educational program 7M07105- Electronics of communication systems and telecommunication technologies

8. Type of EP: the current EP is an educational program, according to which training is carried out at the university.

9. ISCE level (International Standard Classification of Education) – level 7.

10. The level of the NQF (National Qualifications Framework) - level 7.

11. IQF level (Industry Qualifications Framework) – level 7.

12. Distinctive features of EP: - no

13. Number of the appendix to the license for the direction of personnel training: №016 KZ 83LAA00018495 dated 05/30/2019.

14. The name of the accreditation body and the validity period of the accreditation of the EP: Certificate of international accreditation of educational programs of NAOKO SA-A No. 0174/2 dated December 23, 2019-December 20, 2024.

15. The purpose of the EP: Training of highly qualified and competitive specialists for the development of the economy, industry and culture of the Republic of Kazakhstan, providing conditions for obtaining a full-fledged education, professional competence in the field of electronics of communication systems and telecommunication technologies.

a) Qualification characteristics of the graduate: the graduate of the master's degree is awarded the degree of Master of Technical Sciences in the educational program "7M07104-Heat Power Engineering".

b) List of graduate positions: The graduate the graduate is awarded the degree "Master of science in education program 7M07105 - Electronics of communication systems electronics and telecommunication technologies".

c) The scope and objects of professional activity of graduates methods and techniques of human activity aimed at creating conditions for the exchange of information at a distance, the transformation of information by electronic means.

The objects of professional activity of masters in the educational program are:

-enterprises, complexes, institutions, educational organizations and other objects on which technological systems are operated, technical means providing any transmission, radiation and reception of signs, signals, written text, images, sounds, wired, radio, optical, as well as the conversion of information by electronic means or the following other systems:

- communication networks and switching systems;
- multichannel telecommunication systems, including optical band systems;
- radio communication systems and devices, including satellite, radio relay and mobile communication systems;
- systems and devices of sound and television broadcasting, electroacoustics and speech Informatics, multimedia equipment;
- data transmission systems and devices;
- electronic, including computer systems of management of objects, transformation of information;
- means of information security in telecommunication systems;
- means of metrological support of telecommunication systems and networks;
- management and marketing in telecommunications;
- management of operational and service maintenance of telecommunication devices.

d) Types of professional activities for which graduates who have mastered the educational program in the direction of training "7M07105 – Electronics of communication systems and telecommunication technologies " are preparing

- industrial-technological; service and operational; organizational and managerial; installation and adjustment; settlement and design; experimental research. telecommunications'; Radiocommunications; broadcastings; radar and navigation; radio control, transmitting and receiving radio centers, television centers; mobile communication; devices of radio engineering; electronic and computer; controlled by microcontrollers and microcomputers; carries out maintenance and quality control of functioning, improvement, modernization and improvement of technical and economic indicators of switching systems, multichannel transmission systems and communication networks, optical communication, systems and means of mobile radio communication, television systems, radio navigation and radar systems, electronic systems and products of electronic equipment, radio systems.

16. Functions of the graduate's professional activity

Under the guidance of a leading (senior) engineer, a responsible executor or the head of the topic (task), a master's student performs: participates in learning activities:

- under the guidance of a mentor, determines the content and selects the forms, methods and means of training sessions (seminars, practical, laboratory) in accordance with the objectives of the course;
- plans and organizes independent work of students under the guidance of a mentor;
- under the guidance of a mentor, develops the EMC of the disciplines to be read;
- author's courses under the guidance of a mentor in accordance with the mission and goals of the organization of education.

17. Formulation of learning outcomes based on competencies

| Type of competencies | Learning result code | Learning result (according to Bloom's taxonomy) |
|--|----------------------|--|
| 1. Behavioral skills and personal qualities: ((Soft skills) | LR 1 | To analyze the modern paradigm of higher education and its content; to identify the features of modern didactic concepts in higher education; to demonstrate knowledge in the field of modern educational technologies; to choose the optimal and most effective modern educational technologies and forms of organization of the educational process in higher education. |
| | LR 2 | Able to use in cognitive and professional activities basic knowledge in the areas of commercialization of innovations and assessment of the commercial potential of innovations. Possesses basic theoretical knowledge about the organization of innovation activities, basic theoretical knowledge about the use of information technology in innovation risk management. |
| | LR 3 | Able to use knowledge of traditional and modern problems of the history and philosophy of science in research activities in the professional direction. He owns the basic concepts and categories of the philosophy of science for setting and solving urgent problems in his own field of scientific research. |
| | LR 4 | Has the skills to use the knowledge, positions and methods of the psychological science of management obtained in the process of mastering the psychology of management in professional activity. Knows the basic psychological methods and techniques of conflict management in the organization. Demonstrates knowledge in the field of modern educational technologies and selects the optimal and most effective forms of organization of the educational process in higher education. |
| | LR 5 | Able to apply methodological and methodological knowledge in conducting scientific research, pedagogical and educational work, in writing scientific articles, abstracts, for speaking at conferences, symposiums, round tables, discussions and disputes. |
| 2. Digital competencies: (Digital skills): | LR 6 | Fluent in foreign languages at a level that allows you to effectively interact in a professional and scientific environment; possesses skills that allow to carry out further education and development of a linguistic personality with a high degree of independence and self-regulation. |

| | | |
|---|-------|--|
| | LR 7 | Uses the acquired knowledge of modern areas of science in solving professional problems. Knows modern information technologies, methods of processing scientific information; software development technologies; principles of building database systems, data presentation models; basic data operations; basic methods and algorithms of relation theory, combinatorics related to modeling and optimization of systems of various nature. |
| | LR 8 | Knows modern trends in electronics of communication systems and telecommunication technologies for the successful application of knowledge in solving practical problems. He has an understanding of the installation and operation of digital and cable data transmission systems, the operation of multichannel systems and the skills of working to ensure the information security of networks, measuring equipment performance. |
| | LR 9 | Possesses the skills to freely navigate in fundamental and applied issues of the field of physics, in which specialization is carried out within the framework of the educational program of the magistracy. Knows foreign terminology in radio electronics. Able to demonstrate foreign language competence when working in an interdisciplinary team. Applies knowledge of foreign terminology in radio electronics at a professional level when reading foreign literature. |
| | LR 10 | Knows the basics of building information and communication systems and networks, software data encryption technology to protect important information. He is able to process the results obtained, analyzes and comprehends them taking into account the available data. He has the skills of independent research and pedagogical activity, methods of designing, organizing, implementing and evaluating the results of scientific research in the field of primary education methodology using modern scientific methods. |
| 3. Professional competencies: (Hard-skills) | LR 11 | Knows the physical essence of the influence of surface states on the characteristics of micro- and nanoelectronic devices; possibilities of beam technologies; the quantum nature of the size limitation effect in the creation of micro- and nanoelectronic devices; technological aspects of high-temperature semiconductor electronics, is able to assess the state of various areas of development of electronics; see the future in the development of various areas of electronics. |
| | LR 12 | Knows how to use methods of protection against computer viruses, protection against information leakage through technical channels. Formulates the requirements for the designed network, taking into account the analysis of threats and unauthorized influences; draw up functional diagrams of the designed systems and telecommunications networks. Analysis of the main characteristics and capabilities of telecommunication systems for the transmission of operational and special messages. |
| | LR 13 | He has the ability to read structural and functional diagrams of elements and devices of mobile and satellite communication systems built on the basis of modern technologies; skills in designing networks of mobile and satellite communication systems of various standards and calculating their basic parameters in standard ones, optimization of information transmission systems and communication networks. |
| | LR 14 | Has the skills of designing electronic digital devices, including those based on MP and MK; software development of MP and MK; setting up and debugging digital information, searching for information about the properties of integrated circuits; information about the technical parameters of semiconductor devices used in the design of power plants; skills of applying the information received. |
| | LR 15 | He knows the basics of designing the main components and blocks of radio-electronic means; the basics of implementing electromagnetic compatibility of radio-electronic equipment components. Has the skills to develop and execute design and working technical documentation based on computer-aided design systems; control of compliance of developed projects and technical documentation with standards, specifications and other regulatory documents. Applies modern tools in the development of design documentation. |

18. Determination of modules of disciplines in accordance with the results of training

| Learning result code | Name of the module | Name of disciplines | Volume (ECTS) |
|----------------------|--------------------|---------------------|---------------|
|----------------------|--------------------|---------------------|---------------|

| | | | |
|------|---|--|----|
| LR 1 | Philosophical and historical aspects of social and humanitarian knowledge | History and philosophy of science | 4 |
| | | Higher School Pedagogy | 4 |
| | | Psychology of management | 4 |
| | | Teaching practice | 4 |
| LR 2 | Professional Languages | Foreign language (professional) | 4 |
| | | Professional foreign terminology in radio electronics Theory and methodology of preparation of a scientific publication in a foreign language | 5 |
| LR 3 | The innovation process the organization of scientific research | Advanced technologies in micro and nanoelectronics Commercialization of the results of scientific and technical activities | 5 |
| | | Functional electronics Innovation in natural-scientific, technical and technological research | 5 |
| LR 4 | Fundamental principles of electronics and telecommunications | Scientific and technical problems of radio engineering, electronics and telecommunications | 4 |
| | | Theory of construction of infocommunication networks and systems | 4 |
| | | Theory of electromagnetic compatibility of radio-electronic means and systems | 4 |
| LR 5 | Current state of electronics and telecommunications | Organizational and technical methods of protection of communication systems Methods of designing secure communication systems | 4 |
| | | Satellite and mobile communication systems Data transmission systems and networks | 4 |
| | | Microelectronics and basics of nanoelectronics Digital electronics and microprocessors | 4 |
| | | Design of radio communication elements and devices The circuitry of the communication devices | 5 |
| | | Semiconductor electronics Molecular electronics | 4 |
| | | Optical communication and information processing systems Optoelectronic active and passive components of optical systems | 4 |
| | | Methods of teaching the basics of electronics Methods of teaching special disciplines in higher education | 4 |
| | | | |
| LR 6 | Research work | Research practice | 12 |
| | | The scientific research work of the undergraduate, including the performance of the master (RWMS) | 24 |
| LR 7 | Final examination | Formalization and defense of the master's thesis | 8 |

19. Matrix of achievability of learning outcomes

| NN | Name of disciplines | Brief description of the discipline | Number | Generated learning results (codes) |
|----|---------------------|-------------------------------------|--------|------------------------------------|
|----|---------------------|-------------------------------------|--------|------------------------------------|

| | | | | | | | | | | | | | |
|---|--|---|---|--|--|---|---|---|--|--|--|--|--|
| D 7 | Advanced technologies in micro and nanoelectronics | The purpose of the discipline: to study the theoretical foundations of various types of micro- and nanoelectronics devices, to develop skills in applying the principles of micro- and nanoelectronics to automate process control. Tasks: to use micro- and nanoelectronics methods that allow solving specific practical tasks; skills in interpreting physical ideas, their quantitative formulation and solving physical problems; knowledge of the theoretical foundations of micro- and nanoelectronics, analysis of various dependencies, principles of functioning of micro- and nanoelectronics devices. | 5 | | | | | + | | | | | |
| | Commercialization of the results of scientific and technical activities | Legal basis of commercialization of the results of scientific and technical activities. Legal mechanisms of intellectual property protection. Determination of the optimal legal form of a legal entity for a startup company and its creation. Technology of commercialization of the results of scientific and technical activities. Content and objectives of business planning of the project of commercialization of the results of scientific and technical activities. | 5 | | | | | | | | | | |
| D 8 | Functional electronics | The study of the physical foundations of functional electronics; the basic physical processes underlying the operation of functional electronics devices. The main features and directions of development of functional electronics. Dynamic heterogeneities. Continuum environments. The emergence, promotion and interaction of dynamic heterogeneities in continuum media. Devices and devices of functional electronics. Electrical volume instability in multipole semiconductors. | 5 | | | | | + | | | | | |
| | Innovation in natural-scientific, technical and technological research | Innovative processes, methods of processing research results into popular technologies and developments, formation of basic theoretical knowledge about innovations, their attributes and attributes, functions and forms of implementation, their stages and specific features, understanding of the basic laws and patterns of innovation, driving forces and key success factors | 5 | | | | | | | | | | |
| Cycle of basic disciplines Component of choice | | | | | | | | | | | | | |
| D 9 | Scientific and technical problems of radio engineering, electronics and telecommunications | In the process of studying the discipline are considered related to the transmission and transformation of information through the use of radio frequency electromagnetic oscillations based on the generation of their electronics devices. Be able to use practical knowledge for mastering the subject, providing a deep understanding of the essence of the technical problems facing electronics and telecommunications and the appropriateness of the methods used to solve them. | 4 | | | + | | | | | | | |
| D 10 | Theory of construction of information communication networks and systems | In the process of studying the discipline discusses the basics of building information communication systems and networks, mastering a set of facts, events of interest, and therefore subject to any kind of processing and registration, as well as all forms of information, including character, text, graphics, determine options for restoring the functioning of emergency equipment. Be able to study the technology of data encryption software to protect important information. | 4 | | | | + | | | | | | |
| D 11 | Theory of electromagnetic compatibility of radio-electronic means and systems | Forms the study of laws and processes occurring in electronic means and systems due to the electromagnetic interaction of elements in the presence of interference, as well as methods and techniques to ensure electromagnetic compatibility (EMC) equipment and its components. Be able to understand | 4 | | | | | + | | | | | |

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|--|--|---|--|--|--|--|--|--|--|--|--|--|--|--|
| | | previously unexplored. A master's student should rely on new inventions in her work and have suggestions for solving the problem. | | | | | | | | | | | | |
|--|--|---|--|--|--|--|--|--|--|--|--|--|--|--|

20. Coordination of the planned learning outcomes with the methods of teaching and evaluation within the module

| Learning results | Planned learning results for the module | Teaching methods | Assessment methods |
|------------------|--|--|----------------------|
| LR 1 | Knows about the main epistemological models, about the nature of the transformation of the concept of rationality; about the forms and methods of pre-scientific, scientific and extra-scientific knowledge, about modern approaches to socio-humanitarian and natural science knowledge and their commensurability. | Interactive lecture, case-methods, round table, analysis of publications, demonstration of speech | Colloquium, testing |
| LR 2 | Able to use in cognitive and professional activities basic knowledge in the areas of commercialization of innovations and assessment of the commercial potential of innovations. Possesses basic theoretical knowledge about the organization of innovation activities, basic theoretical knowledge about the use of information technology in innovation risk management. | Interactive lecture, experimental works intended for scientific research | Project preparation |
| LR 3 | Able to use knowledge of traditional and modern problems of the history and philosophy of science in research activities in the professional direction. He owns the basic concepts and categories of the philosophy of science for setting and solving urgent problems in his own field of scientific research. | Interactive lecture, experimental works intended for scientific research | Written work |
| LR 4 | Has the skills to use the knowledge, positions and methods of the psychological science of management obtained in the process of mastering the psychology of management in professional activity. Knows the basic psychological methods and techniques of conflict management in the organization. Demonstrates knowledge in the field of modern educational technologies and selects the optimal and most effective forms of organization of the educational process in higher education. | Round table | Portfolio |
| LR 5 | Able to apply methodological and methodological knowledge in conducting scientific research, pedagogical and educational work, in writing scientific articles, abstracts, for speaking at conferences, symposiums, round tables, discussions and disputes. | Interactive lecture, discussion, analysis of scientific literature, presentation of reports | Written work |
| LR 6 | Fluent in foreign languages at a level that allows you to effectively interact in a professional and scientific environment; possesses skills that allow to carry out further education and development of a linguistic personality with a high degree of independence and self-regulation. | Interactive lecture, discussion, analysis of scientific literature, presentation of reports | Testing |
| LR 7 | Uses the acquired knowledge of modern areas of science in solving professional problems. Knows modern information technologies, methods of processing scientific information; software development technologies; principles of building database systems, data presentation models; basic data operations; basic methods and algorithms of relation theory, combinatorics related to modeling and optimization of systems of various nature. | Analysis of conducted experiments, analysis of scientific literature, presentation of reports | Report, presentation |
| LR 8 | Knows modern trends in electronics of communication systems and telecommunication technologies for the successful application of knowledge in solving practical problems. He has an understanding of the installation and operation of digital and cable data transmission systems, the operation of multichannel systems and the skills of working to ensure the information security of networks, measuring equipment performance. | Monitoring of the implementation by doctoral students of an individual research plan (publication of scientific results, preparation of a dissertation). | Report, presentation |
| LR 9 | Possesses the skills to freely navigate in fundamental and applied issues of the field of physics, in which specialization is carried out within the framework of the educational program of the magistracy. Knows foreign terminology in radio electronics. Able to demonstrate foreign language competence when working in an interdisciplinary team. Applies knowledge of foreign terminology in radio electronics at a professional level when reading foreign literature. | Interactive lecture, experimental works intended for scientific research | Project preparation |
| LR 10 | Knows the basics of building information and communication systems and networks, software data encryption technology to protect important information. He is able to process the results obtained, analyzes and comprehends them taking into account the available data. He has the skills of independent research and pedagogical activity, | Interactive lecture, experimental works intended for scientific research | Written work |

| | | | |
|-------|--|---|----------------------|
| | methods of designing, organizing, implementing and evaluating the results of scientific research in the field of primary education methodology using modern scientific methods. | | |
| LR 11 | Knows the physical essence of the influence of surface states on the characteristics of micro- and nanoelectronic devices; possibilities of beam technologies; the quantum nature of the size limitation effect in the creation of micro- and nanoelectronic devices; technological aspects of high-temperature semiconductor electronics, is able to assess the state of various areas of development of electronics; see the future in the development of various areas of electronics. | Round table | Portfolio |
| LR 12 | Knows how to use methods of protection against computer viruses, protection against information leakage through technical channels. Formulates the requirements for the designed network, taking into account the analysis of threats and unauthorized influences; draw up functional diagrams of the designed systems and telecommunications networks. Analysis of the main characteristics and capabilities of telecommunication systems for the transmission of operational and special messages. | Interactive lecture, discussion, analysis of scientific literature, presentation of reports | Written work |
| LR 13 | He has the ability to read structural and functional diagrams of elements and devices of mobile and satellite communication systems built on the basis of modern technologies; skills in designing networks of mobile and satellite communication systems of various standards and calculating their basic parameters in standard ones, optimization of information transmission systems and communication networks. | Interactive lecture, discussion, analysis of scientific literature, presentation of reports | Testing |
| LR 14 | Has the skills of designing electronic digital devices, including those based on MP and MK; software development of MP and MK; setting up and debugging digital information, searching for information about the properties of integrated circuits; information about the technical parameters of semiconductor devices used in the design of power plants; skills of applying the information received. | Analysis of conducted experiments, analysis of scientific literature, presentation of reports | Report, presentation |
| LR 15 | He knows the basics of designing the main components and blocks of radio-electronic means; the basics of implementing electromagnetic compatibility of radio-electronic equipment components. Has the skills to develop and execute design and working technical documentation based on computer-aided design systems; control of compliance of developed projects and technical documentation with standards, specifications and other regulatory documents. Applies modern tools in the development of design documentation. | Analysis of the results of the intermediate and final certification of the research work of PhD students. Organization and monitoring of the defense of doctoral dissertations. | Protection |

21. The graduate model of the educational program

Attributes:


- deep professional knowledge in their field of study;
- interest in mastering trends in education and science;
- ability to collaborate in the professional community;
- independence in the search for opportunities for professional and personal development;
- sociability;
- tolerance and good manners;
- academic integrity;
- willingness to participate in solving state tasks and strategies of Kazakhstan.

| Types of competencies | Description of competencies |
|---|--|
| 1. Behavioral skills and personal qualities (Soft skills) | Knows about the main epistemological models, about the nature of the transformation of the concept of rationality; about the forms and methods of pre-scientific, scientific and extra-scientific knowledge, about modern approaches to socio-humanitarian and natural science knowledge and their commensurability. Able to use in cognitive and professional activities basic knowledge in the areas of commercialization of innovations and assessment of the commercial potential of innovations. Possesses basic theoretical knowledge about the organization of innovation activities, basic theoretical knowledge about |

| | |
|---|--|
| <p>2. Digital competencies (Digital skills):</p> | <p>the use of information technology in innovation risk management. Has the skills to use the knowledge, positions and methods of the psychological science of management obtained in the process of mastering the psychology of management in professional activity. Knows the basic psychological methods and techniques of conflict management in the organization. Demonstrates knowledge in the field of modern educational technologies and selects the optimal and most effective forms of organization of the educational process in higher education.</p> <p>Uses the acquired knowledge of modern areas of science in solving professional problems. Knows modern information technologies, methods of processing scientific information; software development technologies; principles of building database systems, data presentation models; basic data operations; basic methods and algorithms of relation theory, combinatorics related to modeling and optimization of systems of various nature. Knows modern trends in electronics of communication systems and telecommunication technologies for the successful application of knowledge in solving practical problems. He has an understanding of the installation and operation of digital and cable data transmission systems, the operation of multichannel systems and the skills of working to ensure the information security of networks, measuring equipment performance. Possesses the skills to freely navigate in fundamental and applied issues of the field of physics, in which specialization is carried out within the framework of the educational program of the magistracy. Knows foreign terminology in radio electronics. Able to demonstrate foreign language competence when working in an interdisciplinary team. Applies knowledge of foreign terminology in radio electronics at a professional level when reading foreign literature.</p> |
| <p>3. Professional competencies (Hard skills)</p> | <p>Knows how to use methods of protection against computer viruses, protection against information leakage through technical channels. Formulates the requirements for the designed network, taking into account the analysis of threats and unauthorized influences; draw up functional diagrams of the designed systems and telecommunications networks. Analysis of the main characteristics and capabilities of telecommunication systems for the transmission of operational and special messages. He has the ability to read structural and functional diagrams of elements and devices of mobile and satellite communication systems built on the basis of modern technologies; skills in designing networks of mobile and satellite communication systems of various standards and calculating their basic parameters in standard ones, optimization of information transmission systems and communication networks. He knows the basics of designing the main components and blocks of radio-electronic means; the basics of implementing electromagnetic compatibility of radio-electronic equipment components. Has the skills to develop and execute design and working technical documentation based on computer-aided design systems; control of compliance of developed projects and technical documentation with standards, specifications and other regulatory documents. Applies modern tools in the development of design documentation.</p> |

Developers:

Head of the Department of Radiophysics and Electronics, PhD
 Professor, Candidate of Physical and Mathematical Sciences
 Associate Professor, PhD



 G.K. Alpysova
 J.T. Ismailov
 D.A. Afanasyev

Notes.
 The educational program was reviewed by the faculty council from 25.04.24 Protocol no. 9

The educational program was reviewed at the meeting of the Academic Council from 29.04.24 Protocol no. 5

The educational program was reviewed and approved at the meeting of the University Board from 24.05.24 Protocol no. 8

Board Member-Vice-Rector for Academic Affairs


 M.M. Umurkulova

Director of the Academic Work Department

T.M. Khasenova

Dean of the Faculty of Physics and Technology


 A.K. Zeinidenov