AGREED
Chairman of the
Educational and Methodological
Council of JSC «International Information
Technology University»

_____ **Mustafina A.**

«12» December 2024 Protocol of the EMC № 3

APPROVED
Chairman of the Board-Rector of JSC
«International Information
Technology University»

_____ **Issakhov A.**

«28» February 2025 Protocol of the AC № 10

EDUCATIONAL PROGRAM

6B06203 Mobile telecommunication technologies

Code and classification of the field of education: 6B06 Information and communication technologies

Code and classification of training area: 6B062 Telecommunications

Group of educational programs: B059 Communications and communication technologies

ISCED level: 6

NQR level: 6

ORC level: 6

Academic degree awarded: Bachelor's degree in Information and Communication Technologies of the educational program «6B06203 Mobile telecommunication technologies»

Duration of study: 4 years

Number of credits: 240

AGREED
Director
«Institute of Space Technique and
Technology» LLP

_____ O.K. Toishibekov

«___» _____ 2025

AGREED
Director
«Argus Contact» LLP

_____ J.K. Akhmetov

_____ 2025

Almaty, 2025

The code and name of the educational program: **6B06203** - **«Mobile telecommunication technologies»**

№	Educational program developers (Position, scientific degree, academic degree, Full name)	Signature
1	Bakhtiyarova Yelena Azhibekovna – Candidate of Technical Sciences, Associate Professor, Head of the Department of Radio Engineering, Electronics and Telecommunications	
2	Aitmagambetov Altay Zufarovich – Candidate of Technical Sciences, Professor of the Department of Radio Engineering, Electronics and Telecommunications	
3	Kulakayeva Aigul Yergalievna – PhD, Associate Professor of the Department of Radio Engineering, Electronics and Telecommunications	
4	Orazymbetova Aigul Kanybekovna – PhD, Associate Professor of the Department of Radio Engineering, Electronics and Telecommunications	
5	Sultanbekova Leila Ermekovna, Deputy Director for Advanced Projects of «Institute of space technique and technology» LLP	
6	Akhmetov Zhenis Kadrishevich – Director of Argus Contact LLP	
7	Sagyntai Bakdaulet Erbolatuly - Head of Service Support Sector, JSC «ASTEL»	
8	Orazakova Aibala Nurakhmetovna - Senior Engineer of the Quality Control Department of Services and Local Solutions of Mobile Telecom-Service LLP	
9	Abdrakhmanov Arsen Oktyabryuly is a 2nd-year master's student of group TSN-231M	
10	Doshikhanov Nurasyl Sayakhatuly - is a 4th-year student of group SST-2301	

Contents

List of abbreviations and acronyms

BD   Cycle of basic disciplines
BC   Basic competency
BM   Basic module
UC   University component
HE   Higher education
NMS   National Mandatory Standards of Higher and Post-Graduate Education
ATT   Additional types of training
EQF   European qualifications framework
EFE   European foundation for education
KSA   Knowledge, Skills and Abilities
FA   Final attestation
EC   Elective component
ISCED   International Standard Classification of Education
NQF   National qualifications framework
NQS   National qualifications system
GHM   General humanitarian module
RC   Required component
GEM   General education module
GED   Cycle of general education disciplines
EP   Educational program
GPM   General professional module
SQF   Sectoral qualifications framework
GEC   General education competency
MD   Cycle of major disciplines
PI   Professional internship
PS   Professional standard
PE   Postgraduate education
PC   Professional competency
PM   Professional module
LO   Learning outcome
QMS   Quality Management System

1. Description of the educational program

The present educational program "6B06203 Mobile Telecommunication Technologies" has been developed based on the main regulatory documents that define the content of training in the field of "6B062 Telecommunications":

- The Law of the Republic of Kazakhstan "On Education" dated July 27, 2007 No. 319-III (with amendments and additions as of January 1, 2022);

- Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No. 2 "On approval of state compulsory standards for higher and postgraduate education";

- The National Qualifications Framework (NQF), approved by the protocol of the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations dated March 16, 2016;

- The Sectoral Qualifications Framework (SQF), approved by the protocol of the meeting of the Sectoral Commission in the field of information, informatization, communications, and telecommunications dated December 20, 2016 No. 1;

- The State Program "Digital Kazakhstan", approved by the Resolution of the Government of the Republic of Kazakhstan dated December 12, 2017 No. 827;

- Rules for organizing the educational process based on credit technology of education, approved by the order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152.

The program is designed to implement the principles of democratic governance in education, the expansion of academic freedom, and the empowerment of educational institutions. This will ensure the training of specialists who are competitive in the labor market for innovative and high-tech industries in the field of telecommunications.

The educational program ensures the application of an individualized approach to students and facilitates the transformation of professional competencies from professional standards and qualification frameworks into learning outcomes. Student-centered learning is ensured — an educational principle that shifts the focus of the learning process from teaching to learning.

The educational program "6B06203 Mobile Telecommunication Technologies" is developed based on labor market needs through the analysis of job functions outlined in professional standards.

2. Aim and objectives of the educational program

The purpose of the EP - - training of practice-oriented specialists in the field of wireless communications who possess theoretical and practical knowledge, skills, and competencies that meet the needs of both global and domestic telecommunications service markets, and who are capable of competing effectively and adapting quickly to the constantly changing conditions of the labor market.

AP objectives:

1. Ensure the training of practice-oriented specialists in the field of wireless communication.

2. Create conditions that encourage personal and professional growth.

3. Develop students' ability to analyze socially significant problems and processes, and to apply the fundamental principles and methods of the humanities, social sciences, economics, and technical sciences in various types of professional activities.

4. Operate wireless network equipment, understand the challenges and ways to address them, conduct experimental research and measurement work, and implement experimental research programs, including the selection of technical tools and processing of results.

5. Be able to classify, measure, evaluate, design, and calculate the parameters of blocks and units of wireless communication systems, process the obtained results in accordance with technical

specifications, and provide technical support and maintenance for the software of intelligent radio systems.

6. Develop students' skills in operating wireless network equipment, understanding the challenges and solutions, conducting experimental research and measurements through modeling using modern computer technologies, applying acquired knowledge in practice, and correctly interpreting the results obtained.

3. Passport of the academic program

№	Name	Description
1.	Education area code and classification	6B06 – Information and communication technologies
2.	Training direction code and classification	6B062 – Telecommunications
3.	Group of academic programs	B059 – Communications and communication technologies
4.	Name of the educational program	6B06203 Mobile Telecommunication Technologies
5.	Aim of the educational program	The goal of the educational program "6B06203 – Mobile Telecommunication Technologies" is to train practice-oriented specialists in the field of wireless communications who possess theoretical and practical knowledge, skills, and competencies that meet the needs of both global and domestic telecommunications service markets, and who are capable of competing effectively and adapting quickly to the constantly changing conditions of the labor market.
6.	Type of the educational program	current
7.	Level according to the National Classifications Framework	Level 6
8.	Level according to the Sectoral Qualifications Framework	Level 6
9.	Distinctive features of the program	-
10.	Partner University	-
11.	Academic degree awarded	Bachelor in Information and Communication Technologies under the educational program "6B06203 – Mobile Telecommunication Technologies"
12.	Duration of study	4 years
13.	Volume of credits	240
14.	Language of education	Russian, English, Kazakh
15.	Atlas of new professions	-
16.	Regional standard	-
17.	Availability of an attachment to the training license	Yes
18.	License number for the training area	KZ81LAM00001263
19.	Availability of program accreditation	Independent Quality Assurance Agency for Education (IQAA)
20.	Expected learning outcomes	**LO1.** Apply knowledge to solve professional problems in the field of radio engineering, electronics, telecommunications and

programming, signal processing in communication systems, demonstrating knowledge of the basic concepts and laws of electrical/radio circuits and signals, microprocessor devices.

LO2. Classify, measure, evaluate, design, calculate the parameters of blocks and nodes of wireless communication systems and process the results, demonstrating knowledge in the field of radio wave propagation, electromagnetic compatibility, distribution of radio frequency and orbital frequency resources.

LO3. Be able to carry out work to detect faults in networks, systems, devices, and operating systems, locate and maintain all network components, document faults and develop recommendations for their elimination, know current trends in the development and use of wireless communication systems in Internet of Things networks.

LO4. Know the methods of signal processing, the element base and circuitry of radio electronic devices and microprocessor technology, the main characteristics of electronic and measuring devices, antenna technology, building networks and mobile communication systems, radio access systems, satellite and radio relay communications, television and radio broadcasting, radio navigation and radar.

LO5. Demonstrate the ability for self-organization, self-education and professional development, critical reflection on accumulated experience, collect and interpret information to form judgments, taking into account social, ethical and scientific considerations and the ability to work in a team.

LO6. Design and calculate transceiver devices, electromagnetic compatibility of radio electronic equipment, switching systems, parameters of system nodes and networks, be able to organize a full range of work to create a high-speed telecommunications transport environment, work with regulatory and technical documentation and use artificial intelligence in wireless communication systems.

LO7. Demonstrate and apply basic mathematical, scientific, humanitarian, socio-economic and legal knowledge in an interdisciplinary context to solve professional problems, demonstrating an understanding of the importance of the principles and culture of academic integrity.

LO8. Be able to communicate orally and in writing, including in a foreign language, defend

			their own point of view, worldview and citizenship in interpersonal interaction and intercultural environment, demonstrating the skills of scientific research and academic writing and apply them in their professional activities. **LO9.** Make decisions and evaluate their consequences, demonstrating knowledge in the field of economics, management, marketing, finance, infocommunication technologies, demonstrating economic and organizational decision-making skills in conditions of uncertainty and risk, learning skills necessary for independent continuation of further education. **LO10.** Collect, process, analyze, use modern scientific achievements and advanced infocommunication technologies, the ability to design, build, install and operate technical means of infocommunications, guiding media of information transmission. **LO11.** Use scientific and technical literature, national and international standards in the specialty, use various types of information and communication technologies in professional activities: programming languages, Internet resources, cloud, and mobile services for searching, storing, processing, protecting, and disseminating information. **LO12.** Have the skills to operate the equipment of wireless networks and systems, identify problems and ways to solve them, conduct experimental studies using measuring equipment and by modeling based on modern computer technologies, applying the acquired knowledge in practice and correctly interpreting the results. **LO13.** To be able to apply the acquired knowledge in the chosen additional educational program

4. Professional Standards (PS), profession cards, labor functions

№	Name of the PS	Profession card	Labor functions
1	System and Network Administration	System and Network Administration Specialist (System Administrator)	1. Design, installation, and maintenance of the organization's local area network (LAN). 2. Assembly, installation, configuration, and maintenance of the organization's server equipment. 3. Installation, configuration, and maintenance of video surveillance systems and access control systems (ACS) within the organization. 4. Ensuring the organization's system security.
2	Technical support	Technical Support and	1. Maintenance of telecommunications

	and maintenance of communication networks	Network Diagnostics Specialist	equipment software. 2. Collection, distribution, and execution of technical support requests.
3	Installation of information and communication equipment	Mobile Communication Station Equipment Installer	1. Installation and setup of mobile communication equipment. 2. Determination of electrical and electromagnetic parameters of mobile communication channels.
4	IT Manager in the Field of Digitalization	IT Manager in the Field of Digitalization	1. Managing digitalization projects, analyzing and selecting digital solutions. 2. Managing budgets and resources, collaborating with various departments, monitoring the results of digital technology implementation, and ensuring information security.
5	Development of IoT systems	Cloud IoT Systems Engineer	1. Ensuring functionality at the physical layer. 2. Ensuring functionality at the network layer. 3. Ensuring functionality at the application layer.
6	Maintenance of train and station radio communication devices	Head of Section for Train Radio Communication Equipment Maintenance	1. Organizing technical maintenance and repair of railway train radio communication devices within the assigned section. 2. Organizing the implementation of new devices and technologies within the section. 3. Organizing compliance with and maintenance of regulatory and technical documentation requirements.
7	Telecommunications and Broadcasting Engineering Assistants	Broadcast Engineering Assistant	1. Participating in the installation of newly commissioned equipment and ensuring the operation of technical systems. 2. Participating in the development and implementation of plans for the improvement and optimization of the broadcasting system in use. 3. Participating in the organization and execution of technical inspections, all types of measurements, repair, adjustment, and calibration work on assigned equipment and devices.
8	Broadcasting	Government Relations Coordinator	1. Monitoring and analyzing legislative, political decisions, and trends. 2. Ensuring communication with government agencies and professional communities.
9	Technical Support for Electronics	Electronics Engineer	1. Operation of electronic equipment. 2. Development and design of electronic devices, complexes, and systems for various purposes.
10	Manufacturing of Electrical, Radio-Technical, and Electronic Devices	Radio Electronics Equipment Engineer	1. Preparation for the manufacturing process of radio-technical and electronic devices. 2. Technical maintenance of complex functional units of radio-electronic

			equipment. 3. Routine repair and post-repair acceptance of complex functional units of radio-electronic equipment. 4. Quality control of manufactured radio-technical and electronic devices.
11	Communication Network Administration and Coordination	Network Coordinator	1. Coordinating activities related to the creation and development of communication networks. 2. Coordinating the operational and technical management activities of telecommunications operators.
12	Radio Engineering Support of Flights and Aviation Telecommunications	Engineer in Radio Navigation, Radar, and Communications	1. Maintenance of surveillance systems, radio navigation and radar equipment, communication equipment, and automated air traffic control systems. 2.00 Repair of surveillance systems, radio navigation equipment, communication equipment, and automated air traffic control systems.

5. List of the EP competencies

GEC1. Able to construct oral and written speech in a reasoned, logically correct, and clear manner, including in a foreign language; to defend one's own point of view, worldview, and civic position in interpersonal interaction and intercultural environments.

GEC2. Able to demonstrate knowledge and understanding of basic methods for analyzing socially significant problems and processes; the main principles and methods of the humanities, social, and economic sciences in various types of professional and social activities; and the basic concepts of written and oral communication theory in the state language and the language of interethnic communication.

GEC3. Able to demonstrate knowledge and understanding of the fundamentals of the legal system and legislation of the Republic of Kazakhstan, international standards and recommendations, national professional standards, the radio frequency spectrum allocation table of the Republic of Kazakhstan; to comply with business ethics norms and possess ethnic and legal norms of behavior.

GEC4. Able to navigate various social situations, work effectively in a team, respectfully defend one's point of view, propose new solutions, find compromises, align personal opinions with those of the group, and strive for professional and personal growth.

GEC5. Able to possess basic economic knowledge, have scientific understanding of management, marketing, finance, and infocommunication technologies; know methods of physical education and health promotion; understand the goals and methods of state regulation of the economy and the role of the public sector in the economy.

GEC6. Able to analyze socially significant problems and processes, and apply the main principles and methods of the humanities, social, economic, and technical sciences in various types of professional activities.

GEC7. Able to consider modern trends in the development of electronics, measurement and computing technology, and information technologies in professional activities; possess basic methods of signal processing and experimental data representation.

GEC8. Able to collect, process, analyze, and systematize scientific and technical information related to research topics; use achievements of domestic and foreign science, technology, and engineering; be competent in selecting mathematical modeling methods for solving engineering problems, including using standard application software packages.

GEC9. Able to prepare completed design and engineering documentation and ensure compliance of developed projects and technical documentation with standards, technical specifications, and other regulatory documents; implement development results in production, prepare reports, and participate in the enterprise's quality management system.

GEC10. Able to participate in the development of organizational and technical documentation and required reporting in approved formats; perform tasks in the field of certification of technical devices, systems, processes, equipment, and materials, and ensure metrological support of production; organize the protection of intellectual property rights.

GEC11. Able to operate wireless network equipment, understand problems and solutions, conduct experimental research and measurement work, implement experimental research programs including selection of technical tools and processing of results.

GEC12. Able to classify, measure, evaluate, design, and calculate parameters of blocks and units of wireless communication systems and process the obtained results according to technical specifications; provide technical support and maintenance of software for intelligent radio systems.

GEC13. Able to detect malfunctions in network devices and operating systems, deploy and maintain all network components, document issues, and develop recommendations for troubleshooting; understand modern trends in the development of wireless communication systems.

6. List of learning outcomes of the EP

LO1. Apply knowledge to solve professional problems in the field of radio engineering, electronics, telecommunications and programming, signal processing in communication systems, demonstrating knowledge of the basic concepts and laws of electrical/radio circuits and signals, microprocessor devices.

LO2. Classify, measure, evaluate, design, calculate the parameters of blocks and nodes of wireless communication systems and process the results, demonstrating knowledge in the field of radio wave propagation, electromagnetic compatibility, distribution of radio frequency and orbital frequency resources.

LO3. Be able to carry out work to detect faults in networks, systems, devices, and operating systems, locate and maintain all network components, document faults and develop recommendations for their elimination, know current trends in the development and use of wireless communication systems in Internet of Things networks.

LO4. Know the methods of signal processing, the element base and circuitry of radio electronic devices and microprocessor technology, the main characteristics of electronic and measuring devices, antenna technology, building networks and mobile communication systems, radio access systems, satellite and radio relay communications, television and radio broadcasting, radio navigation and radar.

LO5. Demonstrate the ability for self-organization, self-education and professional development, critical reflection on accumulated experience, collect and interpret information to form judgments, taking into account social, ethical and scientific considerations and the ability to work in a team.

LO6. Design and calculate transceiver devices, electromagnetic compatibility of radio electronic equipment, switching systems, parameters of system nodes and networks, be able to organize a full range of work to create a high-speed telecommunications transport environment, work with regulatory and technical documentation and use artificial intelligence in wireless communication systems.

LO7. Demonstrate and apply basic mathematical, scientific, humanitarian, socio-economic and legal knowledge in an interdisciplinary context to solve professional problems, demonstrating an understanding of the importance of the principles and culture of academic integrity.

LO8. Be able to communicate orally and in writing, including in a foreign language, defend their own point of view, worldview and citizenship in interpersonal interaction and intercultural environment, demonstrating the skills of scientific research and academic writing and apply them in their professional activities.

LO9. Make decisions and evaluate their consequences, demonstrating knowledge in the field of economics, management, marketing, finance, infocommunication technologies, demonstrating economic and organizational decision-making skills in conditions of uncertainty and risk, learning skills necessary for independent continuation of further education.

LO10. Collect, process, analyze, use modern scientific achievements and advanced infocommunication technologies, the ability to design, build, install and operate technical means of infocommunications, guiding media of information transmission.

LO11. Use scientific and technical literature, national and international standards in the specialty, use various types of information and communication technologies in professional activities: programming languages, Internet resources, cloud, and mobile services for searching, storing, processing, protecting, and disseminating information.

LO12. Have the skills to operate the equipment of wireless networks and systems, identify problems and ways to solve them, conduct experimental studies using measuring equipment and by modeling based on modern computer technologies, applying the acquired knowledge in practice and correctly interpreting the results.

LO13. To be able to apply the acquired knowledge in the chosen additional educational program

7.   Matrix for correlating the learning outcomes of the EP with the formed competencies (V)

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12	LO13
GEC1						V							
GEC 2						V			V				
GEC3							V		V		V		
GEC4							V		V		V		
GEC5			V				V				V		
GEC6			V				V	V					
GEC7		V						V					
GEC8	V	V		V				V					
GEC9	V			V									
GEC10				V	V					V			
GEC11					V					V			V
GEC12					V					V		V	V
GEC13										V		V	V

8.   The relationship of LO with labor functions

№	LO	Labor functions
1.	**LO1.** Apply knowledge to solve professional problems in the field of radio engineering, electronics, telecommunications and programming, signal processing in communication systems, demonstrating knowledge of the basic concepts and laws of electrical/radio circuits and signals, microprocessor devices.	Maintenance of surveillance systems, radio navigation and radar services, communication equipment, and automated air traffic control systems.
2.	**LO2.** Classify, measure, evaluate, design, calculate the parameters of blocks and nodes of wireless communication systems and process the results, demonstrating knowledge in the field of radio wave	Preparation for the workflow of manufacturing radio engineering and electronic devices. Routine repair and acceptance after repair of complex functional units of radio-electronic equipment.

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	propagation, electromagnetic compatibility, distribution of radio frequency and orbital frequency resources.	
3.	**LO3.** Be able to carry out work to detect faults in networks, systems, devices, and operating systems, locate and maintain all network components, document faults and develop recommendations for their elimination, know current trends in the development and use of wireless communication systems in Internet of Things networks.	Maintenance of complex functional units of radio-electronic equipment. Repair of surveillance systems, radio navigation equipment, communication equipment, and automated air traffic control systems. Maintenance of surveillance systems, radio navigation and radar services, communication equipment, and automated air traffic control systems.
4.	**LO4.** Know the methods of signal processing, the element base and circuitry of radio electronic devices and microprocessor technology, the main characteristics of electronic and measuring devices, antenna technology, building networks and mobile communication systems, radio access systems, satellite and radio relay communications, television and radio broadcasting, radio navigation and radar.	Maintenance of complex functional units of radio-electronic equipment. Ensuring operability at the physical level.
5.	**LO5.** Demonstrate the ability for self-organization, self-education and professional development, critical reflection on accumulated experience, collect and interpret information to form judgments, taking into account social, ethical and scientific considerations and the ability to work in a team.	Ensuring operability at the physical level. Ensuring operability at the network level. Ensuring operability at the application level.
6.	**LO6.** Design and calculate transceiver devices, electromagnetic compatibility of radio electronic equipment, switching systems, parameters of system nodes and networks, be able to organize a full range of work to create a high-speed telecommunications transport environment, work with regulatory and technical documentation and use artificial intelligence in wireless communication systems.	Preparation for the workflow of manufacturing radio engineering and electronic devices. Maintenance of complex functional units of radio-electronic equipment. Routine repair and post-repair acceptance of complex functional units of radio-electronic equipment. Quality control of manufactured radio engineering and electronic devices.
7.	**LO7.** Demonstrate and apply basic mathematical, scientific, humanitarian, socio-economic and legal knowledge in an interdisciplinary context to solve professional problems, demonstrating an understanding of the importance of the principles and culture of academic integrity.	Ensuring operability at the physical level. Ensuring operability at the network level. Ensuring operability at the application level.
8.	**LO8.** Be able to communicate orally and in writing, including in a foreign language, defend their own point of view, worldview and citizenship in interpersonal interaction	Project management in digitalization, analysis and selection of digital solutions. Budget and resource management, collaboration with various departments, monitoring the results

		of digital technology implementation, and ensuring information security.
9.	**LO9.** Make decisions and evaluate their consequences, demonstrating knowledge in the field of economics, management, marketing, finance, infocommunication technologies, demonstrating economic and organizational decision-making skills in conditions of uncertainty and risk, learning skills necessary for independent continuation of further education.	Project management in digitalization, analysis and selection of digital solutions. Budget and resource management, collaboration with various departments, monitoring the results of digital technology implementation, and ensuring information security.
10.	**LO10.** Collect, process, analyze, use modern scientific achievements and advanced infocommunication technologies, the ability to design, build, install and operate technical means of infocommunications, guiding media of information transmission.	Maintenance of complex functional units of radio-electronic equipment. Repair of surveillance systems, radio navigation equipment, communication equipment, and automated air traffic control systems.
11.	**LO11.** Use scientific and technical literature, national and international standards in the specialty, use various types of information and communication technologies in professional activities: programming languages, Internet resources, cloud, and mobile services for searching, storing, processing, protecting, and disseminating information.	Ensuring operability at the physical level. Ensuring operability at the network level. Ensuring operability at the application level. Project management in digitalization, analysis and selection of digital solutions. Budget and resource management, collaboration with various departments, monitoring the results of digital technology implementation, and ensuring information security.
12.	**LO12.** Have the skills to operate the equipment of wireless networks and systems, identify problems and ways to solve them, conduct experimental studies using measuring equipment and by modeling based on modern computer technologies, applying the acquired knowledge in practice and correctly interpreting the results.	Maintenance of complex functional units of radio-electronic equipment. Repair of surveillance systems, radio navigation equipment, communication equipment, and automated air traffic control systems. Maintenance of complex functional units of radio-electronic equipment. Routine repair and post-repair acceptance of complex functional units of radio-electronic equipment. Quality control of manufactured radio engineering and electronic devices.
13.	**LO13.** To be able to apply the acquired knowledge in the chosen additional educational program	Project management in digitalization, analysis and selection of digital solutions. Budget and resource management, collaboration with various departments, monitoring the results of digital technology implementation, and ensuring information security.

9.   Table showing interconnection of competencies, learning outcomes, assessment methods and criteria

Competencies of the EP graduate	Competences expressed in expected learning outcomes	Evaluation criteria	Name of the estimation method
General educational competencies			
Competency 1 – Demonstrate knowledge and understanding of the main methods for analyzing socially significant problems and processes, the fundamental principles and methods of the humanities, social, and economic sciences in various types of professional and social activities, as well as knowledge of the basic concepts of written and oral communication theory in the state language and the language of interethnic communication.	**Learning Outcome 1** – Construct oral and written speech in a reasoned and clear manner in both the state language and the language of interethnic communication.	Speak clearly and express personal thoughts effectively.	Creative task
		Respond to questions accurately, thoroughly, and convincingly.	Creative task
		Manage office documentation and workflow.	Essay
	Learning Outcome 2 - Demonstrate and apply knowledge in the humanities, socio-economic, and legal fields in an interdisciplinary context to solve professional tasks.	Use the fundamentals of philosophical knowledge to form a personal worldview.	Debate
		Possess physical culture skills.	Passing standards
		Know the basics of the legal system and legislation.	Creative task
	Learning Outcome 3 - Be proficient in the state language and one foreign language at a level sufficient for solving tasks related to interpersonal and intercultural communication, as well as professional activities.	Have oral communication skills.	Creative task
		Be proficient in written communication in both the state and a foreign language.	Essay
		Know the methods of scientific research and academic writing.	Essay
Competency 2 - Be able to develop arguments, apply knowledge, and solve problems	**Learning Outcome 4** - Demonstrate the ability for self-organization, self-education, and professional development.	Strive for professional and personal growth	Creative task
		Deliver public speeches and presentations	Creative task
		Be able to find compromises	Creative task
	Learning Outcome 5 - Demonstrate the ability to critically reflect on accumulated experience.	Be able to develop arguments	Creative task
		Apply knowledge and solve problems on relevant issues	Creative task
	Learning Outcome 6 - Apply basic knowledge to solve professional tasks.	Be able to conduct negotiations	Creative task
		Strive for professional and personal growth	Creative task
		Understand the importance of academic integrity principles and culture	Creative task
Competency 3 - Be able to express personal judgments and interpret information to communicate one's understanding, skills, and activities to colleagues.	**Learning Outcome 7** - Be competent in matters related to production and non-production costs.	Ability to understand the presented task	Account
		Proficiency in subject matter	Account
	Learning Outcome 8 - e competent in ensuring safe living and working conditions.	Objective perception of the problem	Creative task
		Analysis of the initial situation	Creative task
Competency 4 - Possess the ability to build trustworthy relationships with colleagues, work effectively in a team, and communicate information, ideas, problems, and solutions.	**Learning Outcome 9** - Demonstrate the ability to work effectively in a team.	Maintaining partnership relations	Creative task
		Conducting electronic communications	Creative task
	Learning Outcome 10 - Tolerantly perceive social and cultural differences.	Ability to work in a team	Creative task
		Ability to take an active civic position	Creative task
Competency 5 - Be able to independently study materials necessary for continuing education in the chosen specialty.	**Learning Outcome 11** - Demonstrate the ability for self-organization and self-education.	Possession of self-organization and self-education skills	Creative task
		Applying principles and methods of self-organization and self-education in professional activities	Report

	Learning Outcome 12 - Be able to use regulatory documents in professional activities.	Be able to read technical literature	Creative task
		Know international standards and recommendations	Report
Basic competencies			
Competency 1 - Willingness to consider modern trends in the development of electronics, measurement and computing technology, and infocommunication technologies in professional activities, and proficiency in basic signal processing techniques.	**Learning Outcome 1** - Demonstrate and apply mathematical and natural science knowledge to solve basic tasks.	Solve professional tasks	Calculation and graphic work
		Conduct laboratory experiments	Account
		Reevaluate accumulated experience	Creative task
	Learning Outcome 2 - Be aware of modern trends in the development of electronics, measurement and computing technology, and infocommunication technologies in professional activities.	Identify the essence of problems	Account
		Calibrate measuring instruments	Creative task
		Conduct measurements	Creative task
		Interpret measurement results	Account
	Learning Outcome 3 - Be proficient in basic digital signal processing (DSP) techniques.	Be familiar with simulation software	Account
		Analyze simulation results	Creative task
		Understand modern digital signal processing (DSP) methods	Account
Competency 2 - Ability to collect, process, analyze, and systematize scientific and technical information related to the research topic; to apply the achievements of domestic and international science, engineering, and technology; and to be competent in selecting mathematical modeling methods for solving engineering problems, including the use of standard application software packages.	**Learning Outcome 4** - Able to apply fundamental knowledge to solve professional tasks in the field of wireless communication.	Design radio system components	Account
		Simulate radio engineering systems	Account
		Solve professional tasks	Calculation and graphic work
	Learning Outcome 5 - Demonstrate basic concepts and laws of electrical and radio engineering circuits.	Know the fundamental laws of electrical circuits	Creative task
		Understand the laws of radio engineering circuits under various operating modes	Creative task
		Read schematic diagrams	Creative task
	Learning Outcome 6 - Analyze and systematize scientific and technical information related to the research topic.	Solve engineering problems	Calculation and graphic work
		Work with scientific and technical literature	Account
		Work with national standards	Creative task
		Work with international standards, regulations, and recommendations	Presentation
Competency 3 - Ability to participate in the development of organizational and technical documentation and established accountability according to approved formats; to carry out tasks related to the certification of technical devices, systems, processes, equipment, and materials; and to ensure metrological support for production.	**Learning Outcome 7** – Understand the principles of building radio engineering systems for information transmission.	Understand the principles of network design	Presentation
		Be aware of modern trends in electronics development	Account
		Be aware of modern trends in measurement and computing technologies	Account
	Learning Outcome 8 – Know the component base of circuit design and determine the key parameters of electronic and measuring devices.	Read and understand circuit diagrams	Account
		Interpret measurement results	Project
		Be able to work with measuring instruments	Account
		Know national standards	Creative task
		Be able to use reference materials	Creative task
Competency 4 - Should possess the ability for self-organization, establish highly trustful relationships with colleagues, work in a team, and communicate information, ideas,	**Learning Outcome 9** – Possess self-organization skills.	Maintain partnership relations	Project
		Understand problems and ways to solve them	Creative task
	Learning Outcome 10 – Be capable of establishing trustful relationships with colleagues and working effectively in a	Work in a team	Creative task
		Respect social and cultural differences	Creative task

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problems, and possible solutions.		team.		
	Learning Outcome 11 - Know the main directions, problems, and methods of self-organization.	Maintaining partnership relations или Maintaining collaborative relationships	Project
		Improving professional qualifications или Enhancing professional skills	Account
		Solving problems или Problem-solving	Creative task
Competency 5 - Should be able to independently study scientific and technical literature necessary for continuing education in the chosen field of study.	**Learning Outcome 12** - To be able to use regulatory and technical documentation in professional activities.	Strive for professional and personal growth	Account
		Be able to use reference materials effectively	Report
		Develop methods for equipment operation	Account
	Learning Outcome 13 - To possess the skills of preparing technical reports (accounts) based on completed work.	Be able to prepare accounts, reports, and technical documentation	Account
		Develop technical documents	Account
		Read scientific and technical literature	Account
Professional competencies			
Competency 1 - Be ready to take into account current trends in the development of electronics, measurement, and computing technologies; possess skills in operating wireless network equipment; understand key problems and ways to solve them; and be able to conduct experimental research and measurement activities.	**Learning Outcome 1 –** Demonstrate and apply mathematical and natural science knowledge to solve professional tasks.	Solve professional tasks	Calculation and graphic work
		Set up laboratory experiments	Account
		Reevaluate accumulated experience	Creative task
	Learning Outcome 2 – Possess skills in operating wireless network equipment, understand related problems and ways to solve them.	Identify the essence of problems	Creative task
		Calibrate measuring instruments	Creative task
		Perform measurements	Creative task
		Interpret measurement results	Account
	Learning Outcome 3 - Conduct experimental research and measurement activities.	Be familiar with simulation software	Account
		Analyze simulation results	Creative task
		Be familiar with modern digital signal processing (DSP) methods	Account
Competency 2 - Classify, measure, evaluate, design, and calculate parameters of blocks and units of wireless communication systems; process the obtained results while demonstrating knowledge in the fields of radio wave propagation, electromagnetic compatibility, radio frequency spectrum (RFS) allocation, and orbital-frequency resource (OFR) management.	**Learning Outcome 4 –** Be able to apply professional knowledge to solve tasks in the professional field.	Design of wireless systems	Account
		Modeling of wireless systems	Account
		Solve professional tasks	Calculation and graphic work
	Learning Outcome 5 – Perform calculations of parameters for blocks and units of wireless communication systems, switching systems, and systems for transmission, reception, and processing of information; and process the obtained results.	Be familiar with classifications of wireless communication systems	Creative task
		Be able to work with regulatory and technical documentation	Creative task
		Understand the use of radio frequency spectrum (RFS) and orbital-frequency resources (OFR)	Account
	Learning Outcome 6 - Analyze and systematize scientific and technical information in professional activities.	Solving engineering tasks	Calculation and graphic work
		Working with scientific and technical literature	Account
		Working with national standards	Presentation
		Working with international standards and recommendations	Presentation
Competency 3 - Ability to develop design and technical documentation,	**Learning Outcome 7** - Possess skills in operating radio and telecommunication equipment,	Understand the principles of network design	Presentation
		Apply acquired knowledge in	Creative task

		practice	
formalize completed design and engineering work, ensure compliance of developed projects and technical documentation with standards, technical specifications, and other regulatory documents; implement development results in production, prepare documentation, and participate in the enterprise's quality management system.	and conduct laboratory research through modeling using modern computer technologies.	Be familiar with current trends in mobile technology development	Account
		Be able to use reference materials effectively	Creative task
		Understand modeling methods	Account
		Operation of radio engineering equipment	Creative task
	Learning Outcome 8 - Understand the fundamental principles of design and operation of antenna systems, mobile communication networks and systems, radio access systems, satellite and microwave communication, broadcasting, radionavigation, and radar systems.	Understand the principles of mobile technology design	Creative task
		Be able to work with measuring instruments	Account
		Develop regulatory and technical documentation	Creative task
		Know and develop national standards	Creative task
Competency 4 - Possess the ability for self-organization and self-education, establish trustworthy relationships with colleagues, work in a team, and communicate information, ideas, problems, and solutions.	**Learning Outcome 9** - Possess professional skills in self-organization and self-education.	Maintaining partnership relations	Presentation
		Understand problems and ways to solve them	Creative task
	Learning Outcome 10 - Establish trustworthy relationships with colleagues and work effectively in a team.	Work effectively in a team	Project
		Respect and tolerate social and cultural differences	Creative task
	Learning Outcome 11 - Understand the main directions, challenges, and methods of self-organization and self-education.	Maintaining partnership relations	Presentation
		Improve professional qualifications	Account
		Solve professional problems	Creative task
Competency 5 - Be able to independently study scientific and technical literature necessary for continuing education in the chosen field of study.	**Learning Outcome 12** - Be able to use regulatory and technical documentation in professional activities.	Strive for professional and personal growth	Creative task
		Be able to use reference materials effectively	Presentation
		Develop methods for operating radio equipment	Account
	Learning Outcome 13 - Possess skills in preparing technical accounts based on completed work.	Be able to prepare accounts, reports, and technical documentation	Account
		Develop technical documents	Account
		Read scientific and technical literature	Account

10. Information about the modules of the educational program

Module code and name	Volume (labor intensity) of the module	Learning outcomes	Learning outcomes assessment criteria	Disciplines forming the module Code and name
GENERAL EDUCATION MODULES				
OMM6001 Module of social and cultural development	18	*As a result of studying this module, the student should be able to:* - Understand the development of key approaches to addressing fundamental issues such as being, matter, consciousness, nature, and society; the techniques and logic of scientific research; and how to create strategies for cognitive activity. - Be able to connect and compare specific phenomena and events of the past with the general paradigm of the world-historical development of human society; demonstrate the ability to objectively understand and explain historical events; and practice meaningful citizenship based on the principles of patriotism and tolerance. - Apply scientific thinking to interpret psychological phenomena and demonstrate psychological information literacy. - Demonstrate a sense of political will and be able to identify specific ways in which individuals can fully participate in politics; convey sociological knowledge to others; and possess the skills and attitudes necessary for engaging community members.	1. Oral examination 2. Testing 3. Midterm assessment 4. Calculation and graphic assignments 5. Exam	SPS6001 Philosophy HK6002 History of Kazakhstan SPS6006 Cultural studies-Psychology SPS6007 Sociology-Political science
OMM6002 Language and ICT skills development module	25	*As a result of studying this module, the student should be able to:* - Distinguish and use grammatical phenomena such as present, past, and future tenses, as well as questions; correctly apply general and professional vocabulary related to the studied topics; and comprehend authentic speech on those topics. - Possess the ability to express opinions, write competently, manage information, gather key data, compile accounts, independently study, and use explanatory dictionaries. - Understand the use of software packages; the architecture of computer systems, operating systems, and networks; and the principles of information and communication technologies and e-learning.	1. Oral examination 2. Testing 3. Midterm assessment 4. Calculation and graphic assignments 5. Exam	LAN6001A Foreign language LAN6002A Foreign language LAN6001KR Kazakh (Russian) language LAN6002KR Kazakh (Russian) language ICT6001 Information and Communication Technologies
OOM6003 Module of physical culture	8	*As a result of studying this module, the student should be able to:* - Demonstrate knowledge of the fundamentals of physical culture and a healthy lifestyle, and be able to apply physical exercises to improve health, develop endurance, and enhance overall work capacity. - Develop skills of self-regulation and physical self-improvement, and be capable of independently organizing physical activity based on individual characteristics and health principles.	1. Oral examination 2. Testing 3. Midterm assessment 4. Exam	PhC6005 Physical Culture PhC6006 Physical Culture
OMM6004 Module of	5	*As a result of studying this module, the student should be able to:* - Demonstrate an understanding of the fundamentals of economics and law, and apply	1. Oral examination 2. Testing	ECO6007 Foundation of economics and financial literacy

personal and social development		acquired knowledge to make financial and economic decisions under conditions of uncertainty and risk. - Know the legal and organizational measures for combating corruption, be able to identify conflicts of interest, and apply research methods to analyze organizational activities. - Ensure the safe functioning of organizations and protect individuals from emergencies by using modern methods and tools for prevention and mitigation of their consequences. - Formulate well-grounded scientific judgments, critically evaluate information, and apply scientific knowledge in educational and research activities. - Understand the basics of business operations, forms of ownership, and key management processes in production, marketing, finance, and human resources. - Recognize the environmental aspects of sustainable development, assess the impact of economic activities on the environment, and understand the role of international cooperation in addressing global environmental challenges. - Organize an inclusive educational process at the university level, develop adapted programs, and provide psychological and pedagogical support to students with disabilities and special educational needs.	3. Midterm assessment 4. Calculation and graphic assignments 5. Exam	LAW6007 Fundamentals of law and anti-corruption culture
				JUR6413 Fundamentals safety of life activity
				RM6001 Research metodology
				MGT6706 Startups and entrepreneurship
				JUR6505 Ecology and sustainable development
				HUM6400 Inclusive education
BASIC MODULES				
BM6600 Physics and Mathematics module	24	*As a result of studying this module, the student should be able to:* - Solve systems of linear equations using matrix operations, apply and graphically illustrate arithmetic operations for vectors in the plane, in three-dimensional space, and in Rn; formulate and geometrically describe equations of lines and planes in three-dimensional space in both parametric and non-parametric forms. - Use derivatives to identify intervals where a function increases or decreases, determine maxima and minima, inflection points, and concavity of curves; and formulate the basic concepts and principles of mechanics, thermodynamics, electricity, and magnetism. - Apply knowledge of physical principles and equations to solve problems in mechanics, thermodynamics, electricity and magnetism, as well as in optics and light, quantum mechanics, and atomic physics. - Understand methods of differentiation and integration of functions of complex variables; and methods for expanding functions of a complex variable into a Laurent series.	1. Oral examination 2. Testing 3. Midterm assessment 4. Calculation and graphic assignments 5. Exam	MAT6002 Mathematical analysis
				MAT6007 Theory of functions of a complex variable
				MAT6081 Linear Algebra and Analytical Geometry
				PHY6002 Physics 1
				PHY6004 Physics (2)
BM6601 Basic module	14	*As a result of studying this module, the student should be able to:* - Understand the basic principles of electromagnetic wave propagation, including reflection, refraction, diffraction, and scattering in various media. - Know the fundamental Maxwell's laws and their application in the analysis of electromagnetic waves.	1. Oral examination 2. Testing 3. Midterm assessment 4. Calculation and graphic assignments	EP6601 Educational Internship

		- Understand the mechanisms of wave propagation in free space, waveguides, coaxial and fiber-optic lines. - Study the characteristics of electromagnetic wave transmission in atmospheric and ionospheric conditions, taking into account the influence of weather conditions and interference. - Be able to calculate radio wave parameters, Fresnel zones, attenuation levels, and antenna radiation patterns; understand the principles of building and operating radio access networks and systems. - Be able to analyze and calculate parameters of antennas and feeder systems.	5. Exam	EEC6604 Theory of Electromagnetic Waves Transmission
				EEC6651 Radio propagation and antenna feeder devices
BM6605 Computer Simulation module	4	*As a result of studying this module, the student should be able to:* - Use image transformation methods; apply the basic principles of descriptive geometry and engineering graphics; use the theory and approaches to solving positional and metric problems; read technical drawings; create visual representations using AutoCAD; and determine geometric shapes and dimensions of parts through drawings. - Design and improve modern radio engineering systems using MATLAB and connect mathematical modeling methods with the practical implementation of contemporary radio engineering objects.	1. Oral examination 2. Testing 3. Midterm assessment 4. Calculation and graphic assignments 5. Exam	EGR6600 Engineering and computer graphics
				EEC6608 Computer and mathematical modeling
BM6606 Module Modern telecommunicatio n networks and systems	16	*As a result of studying this module, the student should be able to:* - Have an understanding of Ethernet, data transmission media, services, and operating principles. - Evaluate and describe the importance of addressing schemes and name assignment at various levels of data transmission networks in IPv4 and IPv6 environments; design, calculate, and apply subnet masks and addresses in IPv4 and IPv6 networks according to specified requirements. - Understand the principles and configuration of Network Address Translation (NAT) for IPv4 networks and be able to troubleshoot related issues. - Know modern telecommunication technologies and information transmission systems, the architecture and operating principles of infocommunication systems and networks, including the use of artificial intelligence technologies for management, traffic analysis, and communication process optimization. - Use regulatory documents from ITU, RCC, and the Agency for Regulation of Communications of the Republic of Kazakhstan (AC PK) in the design, implementation, and operation of radio engineering systems and networks for various purposes. - Be competent in ensuring electromagnetic compatibility of electronic devices and in effectively managing the use of the radio frequency spectrum to prevent interference and optimize communication.	1. Oral examination 2. Testing 3. Midterm assessment 4. Calculation and graphic assignments 5. Exam	EEC6671 Introduction to Cisco Networking Technologies
				EEC6668 Principles of organizing infocommunication systems and networks with AI
				EEC6673 Electromagnetic compatibility and RF spectrum management
BM6607 Optical and radio engineering	5	*As a result of studying this module, the student should be able to:* - Understand the fundamentals of the design and operation of various types of radionavigation and radar systems, as well as their classification.	1. Oral examination 2. Testing 3. Midterm assessment	EEC6652 Theory and technology of radio navigation and radar systems

systems module		- Know the principles of constructing fiber-optic transmission systems and the main methods for measuring the parameters of transmission systems and communication lines.	4. Calculation and graphic assignments 5. Exam	EEC6653 Fiber optic communication systems
BM6608 Radio Engineering, Electronics and Metrology module	39	*As a result of studying this module, the student should be able to:* - Understand the operating principles and differences between various types of amplifiers, filters, signal converters, and generators; distinguish their parameters and characteristics; apply calculation methods and compute circuit parameters and characteristics; measure and analyze circuit parameters and characteristics. - Be able to read electrical schematic diagrams of amplifiers, generators, and converters; determine their parameters; recall key concepts, laws, and methods of electrical circuit analysis; evaluate calculation methods and compute circuit parameters and characteristics; measure and analyze circuit parameters and characteristics; assess probabilities and error intervals in measurements, as well as measurement and control inaccuracies. - Study the principles of signal transmission and modulation, the impact of noise and interference, coding methods, and the calculation of communication channel parameters for the analysis and design of electrical communication systems. - Read diagrams of various radio transmitting devices and their individual units and stages, and perform the necessary technical calculations, including using computing tools.	1. Oral examination 2. Testing 3. Midterm assessment 4. Calculation and graphic assignments 5. Exam	EEC6605 Basics of radio circuits and signals
				EEC6634 Electronics and circuitry of radio engineering devices
				EEC6635 Basic Circuit Theory
				EEC6636 Telecommunication theory and teletraffic engineering
				EEC6637 Metrology and radio measurements
				EEC6638 Radio receivers
				EEC6639 Radio transmitter devices
PROFESSIONAL MODULES				
PM6600 Professional module	16	*As a result of studying this module, the student should be able to:* - Participate in discussions on studied topics, express opinions, present ideas, agree or disagree, provide arguments, and propose solutions. - Possess professional communication skills in a foreign language within the field of telecommunications, understand and interpret technical documentation, standards, and scientific publications. - Apply acquired knowledge in practice during industrial and pre-graduation internships, perform analysis, configuration, and testing of telecommunication equipment. - Adapt to changing conditions of professional activity, work in a team, and adhere to professional ethics standards. - Understand technological processes of signal transmission and processing in telecommunication systems and radio engineering devices related to the topic of the thesis.	1. Oral examination 2. Testing 3. Midterm assessment 4. Calculation and graphic assignments 5. Exam	LAN6003PA Professionally oriented foreign language
				PP6602 Professional Internship
				PP6603 Professional Internship
				PP6604 Pre-diploma Internship
PM6603 Digital	15	*As a result of studying this module, the student should be able to:* - Understand the configuration tasks related to device maintenance and management, including the Cisco Discovery Protocol (CDP), Link Layer Discovery Protocol (LLDP),	1. Oral examination 2. Testing 3. Midterm assessment	NET6601 The basics of routing and switching

devices module		Network Time Protocol (NTP), system logging, device backup and recovery, password recovery, and IOS management. - Apply the MATLAB mathematical package to digital signal processing tasks and use application software packages for designing radio engineering devices. - Know the functions of microprocessor systems and how to integrate additional peripheral devices into them.	4. Calculation and graphic assignments 5. Exam	EEC6610 Digital signal processing
				EEC6611 Digital devices and microprocessors
PM6604 Module Modern mobile systems	28	*As a result of studying this module, the student should be able to:* - Understand device maintenance and management tasks, including the Cisco Discovery Protocol (CDP), Link Layer Discovery Protocol (LLDP), Network Time Protocol (NTP), system logging, device backup and recovery, password recovery, and IOS management. - Apply the MATLAB mathematical package to digital signal processing tasks and use application software packages for designing radio engineering devices. - Know the functions of microprocessor systems and how to integrate additional peripheral devices into them. - Analyze a given task to determine the data structure, constraints, and appropriate solution, and develop algorithms to solve problems. - Understand the principles of building broadband access networks and Internet of Things systems, mobile communication networks and systems, and broadcasting systems. - Know the purpose, types, and main categories of satellite systems and services, their operating principles, structural and operational characteristics, electrical parameters, and apply analytical and numerical methods to analyze satellite systems for various tasks and frequency ranges, including using modern software tools.	1. Oral examination 2. Testing 3. Midterm assessment 4. Calculation and graphic assignments 5. Exam	EEC6619 Broadcasting systems
				EEC6647 Mobile networks and systems
				EEC6648 Systems and devices for satellite and radio relay communication
				EEC6649 Broadband and Internet of Things networks and systems
				EEC6666 Design and operation of mobile communication systems

11. Information about the disciplines of the educational program

№	Discipline Code and Name	Brief description of the discipline	Labor intensity of discipline in credits	Learning outcomes formed (codes)	Prerequisites	Postrequisites
		Cycle of general education disciplines (GED) **Required component (RC)**				
1.	SPS6001 Philosophy	The object of study of the discipline is philosophy as a special form of spiritual studies in its cultural and historical development and modern sound. The main directions and problems of world and national philosophy are studied. Philosophy is a special form of cognition of the world, creating a system of cognition of the general principles and foundations of human life, about the essential characteristics of man's attitude to nature, society and spiritual life, in all its main direction.	5	LO5, LO7, LO8	-	RW6001 Final certification
2.	HK6002 History of Kazakhstan	This program is designed to form the historical consciousness of undergraduate students, based on the knowledge gained in the study of modern history of Kazakhstan. The versatility and importance of the discipline "Modern history of Kazakhstan" is due to its huge role in strengthening the identity of Kazakhstan, the identity of the people and the implementation of tasks related to the need for an intellectual breakthrough in the new Millennium. Kazakhstan's society must have a spiritual and ideological core for the successful implementation of its goals, which is facilitated by the "Ruhani zagyru" program, which reveals the mechanisms for modernizing public consciousness and is based on the continuity of spiritual and cultural traditions. This program is designed to form the historical consciousness of undergraduate students, based on the knowledge gained in the study of modern history of Kazakhstan.	5	LO5, LO7, LO8	-	RW6001 Final certification
3.	LAN6001A Foreign language	An English language course offered to the 1st year students of IITU majoring in various specialties with a basic knowledge of general English. The course centers around general topics such as countries and nationalities; family and friends; daily routines; neighbourhood; shopping habits; travelling; sports and hobbies, etc. Each topic is studied through skills-oriented acquisition of the relevant glossary and target grammar	5	LO5, LO7, LO8	-	LAN 6002A Foreign language

		structures in various kinds of listening, reading speaking and writing activities. The teaching and learning is heavily reliant on the use of IT technologies and students self-study (self-checked grammar exercises, small group projects) which makes it useful for the students' successful career in the chosen field.				
4.	LAN6002A Foreign language	A course of General English is offered to the 1st year students of IITU. It focuses on such topics as Student's life, Daily routine, Education, jobs. Professional Skills, Work Experience, Kazakhstan on the global map, Holidays/ Traditions and Customs, etc. It is designed to deepen the students' understanding of their priorities and values, raise their language awareness, improve their speech skills and communication competences in General English. The language training is communicative, interactive, student-centered, outcome-oriented and heavily reliant on students' self-study work. The latter is organized as TSIS (paragraph writing) and SIS (self-check Grammar, WB exercises, and project).	5	LO5, LO7, LO8	LAN 6001A Foreign language	LAN6003PA Professionally oriented foreign language
5.	LAN6001KR Kazakh (Russian) language	The Kazakh/Russian Language course is aimed at improving language, speech, and communication skills. Its task is to improve the language abilities of students, develop skills and skills in four types of speech activity (speaking, listening, reading, writing). The content of the standard curriculum of the general education discipline "Kazakh/Russian language" includes topics of seminar (practical) classes and independent work of students. The training is conducted at 3 levels: A, B, C.	5	LO5, LO7, LO8	-	LAN 6002KR Kazakh (Russian) language
6.	LAN 6002KR Kazakh (Russian) language	The course is based on a communicative-oriented concept, which includes elements of problem-based and communicative-individualized learning. The following three main linguo-methodological principles were chosen as the foundation: 1. The communicative focus of teaching, taking into account the relevant areas of speech communication; 2. The consideration of systematicity in the study of lexical units, their semantic interconnection, and their stylistic conditionality in various	5	LO5, LO7, LO8	LAN 6001KR Kazakh (Russian) language	RW6001 Final certification

		contexts and situations; 3. The formation of a system of language, speech, and communicative competencies that enable students to use the language effectively in diverse communicative situations. This approach allows students to develop not only theoretical knowledge but also practical skills necessary for effective language use in real-life situations.				
7.	ICT6001 Information and Communication Technologies	Information and Communication Technologies is a course dedicated to studying modern methods and tools for processing, storing, transmitting, and protecting information. It covers the basics of working with digital technologies, internet resources, and software, as well as their application in professional and everyday activities.	5	LO9, LO11	-	EEC6671 Introduction to Cisco Networking Technologies, EP6601 Educational Internship, EEC6608 Computer and mathematical modeling EGR6600 Engineering and computer graphics
8.	SPS6006 Cultural studies-Psychology	As a result of studying a course in the field of cultural studies, students will acquire the fundamentals for studying the entire complex of social sciences and humanities, and master intercultural communication. At the same time, the discipline of cultural studies can serve as an addition to general courses in history and philosophy. The course material can serve as a methodological guide for a number of special disciplines: for example, ethics, history of culture, styles of art, national schools of management, strategy and negotiation tactics, management of culture. Methods and technologies of training used in the implementation of the program: role-playing games and educational discussions in various formats; case study, project method. The psychology course studies main issues of psychology in a wide educational and social context. Knowledge and skills gained in the course give students the opportunity to practically apply them in different life spheres such as personal, family, professional, business, social (working with people of different age and social categories).	4	LO7, LO8	SPS6007 Sociology-Political science	RW6001 Final certification
9.	SPS6007 Sociology-Political science	During the course "Sociology" various phenomena of social life are studied. At the same time the study is carried out from various paradigms of	4	LO7, LO8	HK6002 History of Kazakhstan	SPS6006 Cultural studies-Psychology

		social knowledge, using theories and scientific methods. Students successfully completing the course will be able to: 1. Use qualitative and quantitative research methods, which will be useful in scientific and professional field. 2. Distinguish between scientific and non-scientific knowledge. 3. Understand and analyze social phenomena and issues from different perspectives. 4.Manage to work in a team. The course Political science provides comprehensive coverage of all key elements, the study of sources and political relations, types of political systems, democratic and authoritarian systems, political mechanisms, political competition and power, political capital and values, survival of political ideas, nationalism, analysis of domestic and foreign policy, political growth, state policy in the world political system.				
10.	PhC6005 Physical Culture	The course is devoted to the formation of physical culture of the individual and the ability to use a variety of means of physical culture for the preservation and promotion of health.	4	LO5, LO10	-	PhC6006 Physical Culture
11.	PhC6006 Physical Culture	The course provides a solution to the main tasks of physical education of students, provides for the delivery of control exercises and standards.	4	LO5, LO10	PhC6005 Physical Culture	RW6001 Final certification
Cycle of general education disciplines (GED) **University component (UC) and (or) Elective component (EC)**						
12.	ECO6007 Foundation of economics and financial literacy	This course provides an integrated introduction to economics and legal foundations relevant to entrepreneurial decision-making and everyday personal finance. Students will understand basic economic principles, and navigate legal systems affecting individuals and businesses and learn how to manage personal finances. Topics include economic behavior, legal research, business budgeting, taxation, investment and case analysis. The course is open to non-economics majors interested in how economic, legal and financial systems shape our lives.	5	LO7, LO9	SPS6007 Sociology-Political science	RW6001 Final certification
13.	LAW6007 Fundamentals of law and anti-corruption culture	The course outlines the legal, economic, and social foundations of fighting corruption. Throughout the course, students will gain practical knowledge in identifying the peculiarities of state policies, applying international experiences in combating corruption, mastering skills in conflict resolution, and	5	LO8, LO9	SPS6006 Cultural studies-Psychology	RW6001 Final certification

		detecting corruption activities using professional ethics and methods. After successful completion of the course, students will gain the following competencies: 1. Understand the measures of legal responsibility for participation in corruption violations. 2. Determine the conflict of interests in the activities of organizations leading to corruption. 3. Analyze the work of organizations using various research methods.				
14.	JUR6413 Fundamentals safety of life activity	Studying ways of safe human interaction with the environment (industrial, domestic, urban, natural), sustainable operation of business facilities (organizations) in emergency situations, issues of protection from negative factors, prevention and elimination of the consequences of natural and man-made emergencies and the use of modern means defeat.	5	LO5, LO7, LO8	SPS6006 Cultural studies-Psychology	RW6001 Final certification
15.	RM6001 Research metodology	The course is devoted to the study of activities aimed at developing students ' ability to independent theoretical and practical judgments and conclusions, skills of objective evaluation of scientific information, freedom of scientific research and the desire to apply scientific knowledge in educational activities, including for the diploma project (work).	5	LO5, LO8, LO11	SPS6006 Cultural studies-Psychology	RW6001 Final certification
16.	MGT6706 Startups and entrepreneurship	This course provides an introduction to what a business is, how it works and how to run it. Students will define ownership and processes used in manufacturing and marketing, finance, personnel, and management in business operations.	5	LO5, LO8, LO9	SPS6006 Cultural studies-Psychology	RW6001 Final certification
17.	JUR6505 Ecology and sustainable development	The course reveals the role of ecology in solving modern economic, social and political problems, as well as the emergence of global environmental problems as a result of human production activities and the responsibility of the world community for them. A very important aspect is also international cooperation to ensure sustainable development. Various areas of practical application of ecology are also considered - natural resources and environmental pollution.	5	LO7, LO8	SPS6006 Cultural studies-Psychology	RW6001 Final certification
18.	HUM6400 Inclusive education	The philosophy, history and methodology of an inclusive approach. Documents governing the development of an inclusive process in higher professional education. Educational needs of students with disabilities and disabilities. Methods	5	LO5	SPS6006 Cultural studies-Psychology	RW6001 Final certification

		and forms of organization of the educational process at a university for students with disabilities. Development of adapted educational programs, curricula and educational paths for students with disabilities and disabilities. Psychological and pedagogical support of students with disabilities and disabilities at the university.				
Cycle of basic disciplines (BD) **University component (UC)**						
19.	MAT6002 Mathematical analysis	The purpose of the course is to familiarize students with important branches of calculus and its applications in computer science. During the educational process, students should familiarize themselves and be able to apply mathematical methods and tools to solve various applied problems. Moreover, they study fundamental methods of studying infinitesimal variables using analysis, which is based on the theory of differential and integral calculations.	6	LO7	MAT6081 Linear Algebra and Analytical Geometry	MAT6007 Theory of functions of a complex variable
20.	MAT6007 Theory of functions of a complex variable	The purpose of the course is to provide students with the mathematical apparatus necessary for the application of mathematical methods in practice and in research; to introduce students to the concepts, facts and methods that make up the theoretical foundations of complex analysis.	4	LO7	MAT 6002 Mathematical analysis	EEC6605 Basics of radio circuits and signals
21.	MAT6081 Linear Algebra and Analytical Geometry	The course is devoted to the study of theoretical and practical foundations of the theory of matrices and determinants, methods of coordinate transformation; designed to develop mathematical intuition and form a scientific worldview and logical thinking.	4	LO7	-	MAT6002 Mathematical analysis
22.	PHY6002 Physics 1	The study of the laws, principles, postulates and equations of mechanics, molecular physics and thermodynamics, electricity and magnetism, the use of physics equations to solve specific physical problems, the use of physics methods for research, analysis, and laboratory work in order to verify the operation and implementation of the laws of physics in nature and technique.	6	LO7	-	PHY 6004 Физика (2), EEC6635 Basic Circuit Theory
23.	PHY6004 Physics (2)	Consideration of the laws, principles, postulates and equations of ray and geometric optics, quantum and wave optics, relativity theory, atomic and nuclear physics, analysis of the foundations of modern physics and quantum mechanics, the use of physical equations for solving physical problems, the use of physical methods for laboratory work with the	4	LO7	PHY 6002 Physics 1	EEC6634 Electronics and circuitry of radio engineering devices, EEC6604 Theory of Electromagn

		purpose of checking the work and implementation of the laws of physics in nature and technology.				etic Waves Transmission, EEC6651 Radio propagation and antenna feeder devices
24.	EEC6604 Theory of Electromagnetic Waves Transmission	Study of the main issues of the theory of electromagnetic fields and waves, the basic laws of electrodynamics, analysis of the issues of radiation, propagation, and diffraction of electromagnetic waves. Consideration of the theory of plane electromagnetic waves in various media, as well as coverage of the issues of the influence of the troposphere and ionosphere on the propagation of radio waves of various frequency ranges.	6	LO2, LO6	PHY 6004 Physics (2)	EEC6636 Telecommunication theory and teletraffic engineering, EEC6653 Fiber optic communication systems
25.	EEC6605 Basics of radio circuits and signals	The study of methods and foundations for the construction of radio circuits and devices, types of representation of signals and interference in radio systems for transmitting information.	4	PO1, LO7	EEC6635 Basic Circuit Theory	EEC6638 Radio receivers, EEC6639 Radio transmitter devices, EEC6611 Digital devices and microprocessors
26.	EEC6634 Electronics and circuitry of radio engineering devices	The study of the basic elements and devices of electronic engineering, microelectronics, types of amplifying devices, the physical foundations of semiconductors, the classification of semiconductor and optoelectronic devices, parameters, characteristics, operating modes and operating principles of diodes, transistors, thyristors, photoemitters, photodetectors, optocouplers and integrated circuits.	7	PO1, LO4	PHY6004 Physics (2)	EEC6611 Digital devices and microprocessors
27.	EEC6635 Basic Circuit Theory	The course has been designed to introduce fundamental principles of circuit theory commonly used in engineering research and science applications. Techniques and principles of electrical circuit analysis including basic concepts such as voltage, current, resistance, impedance, Ohm"s and Kirchoff"s law; basic electric circuit analysis techniques, resistive circuits, 1st order and 2nd order circuits; circuits with DC and AC sources.	6	PO1, LO4, LO7	PHY6002 Physics 1	EEC6605 Basics of radio circuits and signals, EEC6637 Metrology and radio measurements
28.	EEC6636 Telecommunication theory and	Studying the issues of formation, conversion, and transmission of signals over communication channels,	6	PO1, LO4	EEC6604 Theory of Electromagn	EEC6647 Mobile networks

	teletraffic engineering	methods for improving noise immunity and transmission speed in communication systems, increasing the efficiency of communication systems, describing the transformations of signals and interference in communication systems, analyzing processes in communication systems that improve the efficiency of communication systems			etic Waves Transmission	and systems, EEC6610 Digital signal processing
29.	EEC6637 Metrology and radio measurements	Study of the metrological foundations of radio measurements, classification of measurement errors, principles and features of the construction of radio measuring instruments for measuring voltage, frequency, phase shift, time intervals, power, signal spectra, characteristics of random processes, parameters of radio circuits, amplitude-frequency characteristics.	4	PO1, LO2, LO4	EEC6635 Basic Circuit Theory	EEC6652 Theory and technology of radio navigation and radar systems
30.	EEC6638 Radio receivers	The study of the classification of radio receivers, the structure and technical characteristics of radio receivers, input circuits, resonant amplifiers of radio signals, frequency converters, detectors of the main types of continuous, discrete, and pulsed signals, ways to improve the noise immunity of radio receivers for various purposes and frequency ranges, describes methods for designing radio receivers.	6	LO2, LO4, LO6, LO10, LO11	EEC6605 Basics of radio circuits and signals	EEC6666 Design and operation of mobile communication systems
31.	EEC6639 Radio transmitter devices	The study of the classification of radio transmitting devices, methods and devices for generating high-frequency oscillations (HF), consideration of methods for controlling HF oscillations by signals of transmitted information and the implementation of a given output power of generated radio signals, studying the principles of constructing basic radio-electronic devices, as well as obtaining skills in using modern development trends in the process design and operation of radio engineering devices.	6	LO2, LO4, LO6, LO10, LO11	EEC6605 Basics of radio circuits and signals	EEC6666 Design and operation of mobile communication systems
32.	EEC6651 Radio propagation and antenna feeder devices	Studying the features of radio wave propagation in various conditions, wave propagation along guiding feeder systems and their radiation by antenna devices; main technical characteristics of guiding feeder structures, antenna systems of various frequency ranges. Methods for calculating and designing antenna systems, considering the parameters of the RS.	6	LO4, LO6	PHY 6004 Физика (2)	EEC6673 Electromagnetic compatibility and RF spectrum management, EEC6619 Broadcasting systems, EEC6648 Systems and devices for satellite and radio relay communicatio

						n
33.	EEC6668 Principles of organizing infocommunication systems and networks with AI	Study of the basics of design and operation of telecommunication networks, as well as the integration of artificial intelligence technologies to improve efficiency. The course provides knowledge on the organization and management of info-communication systems, methods of optimizing data processing, ensuring security and improving the quality of communication using AI.	4	LO6	EEC6671 Introduction to Cisco Networking Technologies, EEC6610 Digital signal processing	EEC6649 Broadband and Internet of Things networks and systems
34.	EEC6671 Introduction to Cisco Networking Technologies	The discipline studies the basics of network construction and covers topics such as: local area network (LAN), local area network connection, global Internet connection, network protocols and services, cables and contacts, wireless technologies, wireless network, security in wired and wireless networks, troubleshooting in wired and wireless networks.	6	LO3, LO11, LO12	ICT 6001 Information and Communication Technologies	NET6601 The basics of routing and switching, EEC6668 Principles of organizing infocommunication systems and networks with AI
35.	EEC6673 Electromagnetic compatibility and RF spectrum management	The study of electromagnetic compatibility (EMC) of radio electronic equipment and management of the use of the radio frequency spectrum, consideration of the tasks of the International Telecommunication Union: electromagnetic environment, the causes of radiation that create unintentional interference with other electronic equipment, intra-object and inter-object EMC, EMC in mobile networks, methods of radio monitoring of the use of the radio frequency spectrum (RFS). Study of RFS management methods at the national and international levels, government structures, methods to improve the efficiency of RFS use.	6	LO2, LO3, LO12	EEC6651 Radio propagation and antenna feeder devices	RW6001 Final certification
36.	EP6601 Educational Internship	Study of the fundamentals of applying computer technologies, basics of programming, and their use in radio engineering and telecommunication systems.	2	PO1, LO4	ICT 6001 Information and Communication Technologies	PP6603 Professional Internship
Cycle of basic disciplines (BD) **Elective component (EC)**						
37.	MIN601 Minor 1	Additional educational program (minor) - a set of disciplines and (or) modules and other types of educational work, determined by students for study in order to form additional competencies	5	LO13	-	RW6001 Final certification
Elective Discipline 1						
38.	EEC6608 Computer and mathematical modeling	The study of algorithms and technology for solving differential and difference equations for building a mathematical model and their	4	PO1, LO11, LO12	ICT 6001 Information and Communicat	EEC6610 Digital signal processing

		computer simulation using the MatLab software package. Consideration of sound system support, expansion packs. Solving problems with matrices, vectors, lists, with program structures such as loops and branches in the MatLab package.			ion Technologie s	
39.	EGR6600 Engineering and computer graphics	The study of the theoretical foundations for constructing displays of geometric images on a plane, ways to solve engineering problems in a drawing. The development of spatial and logical thinking, the ability and skills to present technical ideas using a drawing in the AutoCAD environment.	4	LO11, LO12	ICT 6001 Information and Communicat ion Technologie s	RW6001 Final certification
Elective Discipline 2						
40.	EEC6652 Theory and technology of radio navigation and radar systems	The study of the basics of the construction and operation of radio navigation and radar systems for various purposes, the classification of radio navigation and radar systems, the basics of the functioning of these systems, the study of methods for calculating the main characteristics of these systems, the principles of functioning of the main nodes and blocks.	5	LO4	EEC6637 Metrology and radio measuremen ts	RW6001 Final certification
41.	EEC6653 Fiber optic communicatio n systems	The study of the principles of operation, the main parameters, design features of radiation sources and receivers, optical amplifiers, passive optoelectronic components of the WOSK, the study structural, functional diagrams and units WAX - PDH and WAX - SDH, WDM technologies.	5	LO6	EEC6604 Theory of Electromagn etic Waves Transmissio n	RW6001 Final certification
Cycle of major disciplines (MD)						
University component (UC)						
42.	LAN6003PA Professionally oriented foreign language	The course is devoted to the analysis of professional topics: "Computers and work", "Work in ICT", "Types of computer systems", "Basics of working with a computer", "Operating systems and graphical interface", "Text processing", "Cyberspace: security and crime", etc.	3	LO7, LO8	LAN 6002A Foreign language	RW6001 Final certification
43.	NET6601 The basics of routing and switching	Learn how to configure routers and switches for advanced functionality, configure aggregation, redundancy, and routing protocols, troubleshoot devices, and fine-tune routing protocols.	6	LO3, LO11, LO12	EEC6671 Introduction to Cisco Networking Technologie s	RW6001 Final certification
44.	EEC6610 Digital signal processing	The study of basic methods and algorithms for digital signal processing, and their computer simulation using a software package (MatLab). The specifics of the representation of signals and digital signal processing systems in the MatLab language, the study of linear discrete systems, the synthesis of	5	PO1, LO4	EEC6636 Telecommu nication theory and teletraffic engineering, EEC6608 Computer and	EEC6668 Principles of organizing infocommunic ation systems and networks with AI

		digital filters and the modeling of these objects and processes using MatLab software.			mathematical modeling	
45.	EEC6611 Digital devices and microprocessors	Study of the key principles of digital electronics, features of digital signals, ways of organizing the interaction of elements, nodes, and devices of digital systems. Basic information about binary logic, digital signals, codes, synchronization, symbols on diagrams. Principles of construction and application of operational and permanent storage devices, the basics of programming microprocessor systems.	4	LO4	EEC6605 Basics of radio circuits and signals, EEC6634 Electronics and circuitry of radio engineering devices	EEC6666 Design and operation of mobile communication systems
46.	EEC6619 Broadcasting systems	Studying the principles of constructing the transmitting and receiving paths of digital television and radio broadcasting systems of the DVB-T2 standard and their elements, devices, television antenna-feeder path. Studying the principles of building VHF FM sound broadcasting, also systems MMDS, DRM, DAB.	6	LO3, LO4, LO12	EEC6651 Radio propagation and antenna feeder devices	RW6001 Final certification
47.	EEC6647 Mobile networks and systems	Students study the features of building modern mobile communication systems (2G-5G), providing various communication services, as well as the main standards of mobile communication systems, as well as the general principles of signal processing in various standards of mobile communication systems and networks, the principles of designing and planning mobile communication networks.	5	LO2, LO3, LO4, LO12	EEC6636 Telecommunication theory and teletraffic engineering	EEC6666 Design and operation of mobile communication systems
48.	EEC6648 Systems and devices for satellite and radio relay communication	Study of the structure and classification of satellite communication systems, their classification by orbits, by purpose and by their control. Satellite communication services, energy calculation of satellite communication systems, methods of multiple access and channel provision, types, and structure of satellite repeaters. Features of VSAT satellite communication networks and radio relay communication systems.	6	LO3, LO4, LO12	EEC6651 Radio propagation and antenna feeder devices	RW6001 Final certification
49.	EEC6649 Broadband and Internet of Things networks and systems	Studying the principles of building networks of the Internet of things and M2M, including the features of using the radio frequency spectrum, building access networks. Formation of students' theoretical and practical knowledge on the physical processes underlying the principles of operation of modern networks and radio access systems that ensure the transmission and reception of the necessary	6	LO3, LO4, LO12	EEC6668 Principles of organizing infocommunication systems and networks with AI	RW6001 Final certification

		information, the development and operation of emitting and receiving devices of radio access systems.				
50.	EEC6666 Design and operation of mobile communication systems	Study of network architecture, frequency planning, communication quality management and diagnostics. The discipline is aimed at mastering such skills as the development, implementation and effective operation of mobile communication systems.	5	LO3, LO4, LO12	EEC6638 Radio receivers, EEC6639 Radio transmitter devices, EEC6611 Digital devices and microprocessors, EEC6647 Mobile networks and systems	RW6001 Final certification
51.	PP6603 Professional Internship (2 курс)	Studying the characteristics of radio engineering devices, telecommunication systems, linear cable structures	4	LO2, LO3, LO11, LO12	EP6601 Educational Internship	PP6602 Professional Internship
52.	PP 6602 Professional Internship (3 курс)	Learning the basics of operation and design of networks and telecommunications systems.	4	LO2, LO3, LO11, LO12	PP6603 Professional Internship	PP6604 Pre-diploma Internship
53.	PP6604 Pre-diploma Internship	Collection of materials for writing a graduation project.	5	LO2, LO3, LO11, LO12	PP6602 Professional Internship	RW6001 Final certification
Cycle of major disciplines (MD) **Elective component (EC)**						
54.	MIN602 Minor 2	Additional educational program (minor) - a set of disciplines and (or) modules and other types of educational work, determined by students for study in order to form additional competencies	5	LO13	-	RW6001 Final certification
55.	MIN603 Minor 3	Additional educational program (minor) - a set of disciplines and (or) modules and other types of educational work, determined by students for study in order to form additional competencies	5	LO13	-	RW6001 Final certification
Final State Certification						
56.	RW6001 Final certification	Writing and defending a diploma thesis, diploma project or preparation and passing of a comprehensive exam	8	-	-	-

12. Curriculum of the educational program (Platonus)

Module code	Module name	Discipline cycle	Discipline component	Code of subject	Subject name	Academic credits	Academic study period	Exams	Differentiated	Term	Total	Lectures	Laboratory trainings	Practice	Studio lessons	Practice	Independent work of students with faculty staff	Independent work of students	1	2	3	4	5	6	7	8
																			15	15	15	15	15	15	15	15
Minor module for disciplines																									
General modules																									
1	OMM6002 Language and ICT skills development module	G	CS	LAN6001A	Foreign language	5	1	1			5/150			45			15	90	5.0							
2		G	CS	ICT6001	Information and Communication Technologies	5	1	1			5/150	15	30.0				15	90	5.0							
3		G	CS	LAN6001KR	Kazakh (Russian) language	5	1	1			5/150			45			15	90	5.0							
4		G	CS	LAN6002KR	Kazakh (Russian) language	5	2	2			5/150			45			15	90		5.0						
5		G	CS	LAN6002A	Foreign language	5	2	2			5/150			45			15	90		5.0						
6	OMM6001 Module of social and cultural development	G	CS	HK6002	History of Kazakhstan	5	1	1			5/150	15		30			15	90	5.0							
7		G	CS	SPS6007	Sociology-Political science	4	2	2			4/120	15		30			15	60		4.0						
8		G	CS	SPS6001	Philosophy	5	3	3			5/150	15		30			15	90			5.0					
9		G	CS	SPS6006	Cultural studies-Psychology	4	4	4			4/120	15		30			15	60				4.0				
1	OOM6003 Module of physical culture	G	CS	PhC6005	Physical Culture	4	2	2			4/120			45			15	60		4.0						
1		G	CS	PhC6006	Physical Culture	4	3	3			4/120			45			15	60			4.0					
1	OMM60014 Module of personal and social development	G		HUM6400	Inclusive education			8			5/150	15		30			15	90								
1		G		ECO6007	Foundation of economics and financial literacy			8			5/150	15		30			15	90								
1		G		LAW6007	Fundamentals of law and anti-corruption culture			8			5/150	15		30			15	90								
1		G	ES	JUR6413	Fundamentals safety of life activity	5	8	8			5/150	15		30			15	90								5.0
1		G		RM6001	Research metodology			8			5/150	15		30			15	90								
1		G		MGT6706	Startups and entrepreneurship			8			5/150	15		30			15	90								
1		G		JUR 6505	Ecology and sustainable development			8			5/150	15		30			15	90								
Modules of specialty/education programm																									
1	BM6600 Physics and Mathematics module	B	UC	PHY6002	Physics 1	6	1	1			6/180	15	30.0	15			15	105	6.0							
2		B	UC	MAT6081	Linear Algebra and Analytical Geometry	4	1	1			4/120	15		30			15	60	4.0							
2		B	UC	MAT6002	Mathematical analysis	6	2	2			6/180	30		30			15	105		6.0						
2		B	UC	PHY6004	Physics (2)	4	2	2			4/120	15	30.0				15	60		4.0						
2		B	UC	MAT6007	Theory of functions of a complex variable	4	3	3			4/120	15		30			15	60			4.0					
2	BM6601 Basic module	**B**	**UC**	**EP6601**	**Educational Internship**	**2**	**2**				**2/60**					60				2.0						
2		B	UC	EEC6604	Theory of Electromagnetic Waves	6	3	3			6/180	15	30.0	15			15	105			6.0					
2		B	UC	EEC6651	Radio propagation and antenna feeder devices	6	4	4			6/180	15	30.0	15			15	105				6.0				
2	BM6608 Radio Engineering, Electronics and Metrology module	B	UC	EEC6635	Basic Circuit Theory	6	3	3			6/180	15	30.0	15			15	105			6.0					
2		B	UC	EEC6634	Electronics and circuitry of radio engineering	7	3	3			7/210	30	30.0	15			15	120			7.0					
2		B	UC	EEC6636	Telecommunication theory and teletraffic	6	4	4			6/180	15	30.0	15			15	105				6.0				
3		B	UC	EEC6605	Basics of radio circuits and signals	4	4	4			4/120	15	30.0				15	60				4.0				
3		B	UC	EEC6637	Metrology and radio measurements	4	5	5			4/120	15	30.0				15	60					4.0			
3		B	UC	EEC6639	Radio transmitter devices	6	5	5			6/180	15	30.0	15			15	105					6.0			
3		B	UC	EEC6638	Radio receivers	6	6	6			6/180	15	30.0	15			15	105						6.0		
3	BM6605 Computer Simulation module	B	ES	EGR6600	Engineering and computer graphics	4	4	4			4/120	15	30.0				15	60				4.0				
3		B		EEC6608	Computer and mathematical modeling			4			4/120	15	30.0				15	60								

#	Module			Code	Discipline																					
3	BM6606 Module Modern telecommunication networks and systems	B	UC	EEC6668	Principles of organizing infocommunication	4	5	5		4/120	15	30.0				15	60					4.0			
3		B	UC	EEC6671	Introduction to Cisco Networking	6	5	5		6/180	15	30.0	15			15	105					6.0			
3		B	UC	EEC6673	Electromagnetic compatibility and RF	6	8	8		6/180	15	30.0	15			15	105								6.0
3	BM6607 Optical and radio engineering	B	ES	EEC6652	Theory and technology of radio navigation and	5	7	7		5/150	15	30.0				15	90						5.0		
4		B		EEC6653	Fiber optic communication systems			7		5/150	15	30.0				15	90								
4	PM6600 Professional module	A	UC	PP6603	**Professional Internship**	4	4			4/120				1							4.0				
4		A	UC	PP6602	**Professional Internship**	4	6			4/120				1								4.0			
4		A	UC	LAN6003PA	Professionally oriented foreign language	3	7	7		3/90			30			15	45						3.0		
4		A	UC	PP6604	**Pre-diploma Internship**	5	8			5/150				1										5.0
4	PM6603 Digital devices module	A	UC	EEC6610	Digital signal processing	5	5	5		5/150	15	30.0				15	90					5.0			
4		A	UC	NET6601	The basics of routing and switching	6	6	6		6/180	15	30.0	15			15	105						6.0		
4		A	UC	EEC6611	Digital devices and microprocessors	4	6	6		4/120	15	30.0				15	60						4.0		
4	BM6606 Module Modern telecommunication networks and systems	A	UC	EEC6647	Mobile networks and systems	5	6	6		5/150	15	30.0				15	90					5.0			
4		A	UC	EEC6666	Design and operation of mobile	5	7	7		5/150	15	30.0				15	90						5.0		
5		A	UC	EEC6619	Broadcasting systems	6	7	7		6/180	15	30.0	15			15	105						6.0		
5		A	UC	EEC6649	Broadband and Internet of Things networks	6	7	7		6/180	15	30.0	15			15	105						6.0		
5		A	UC	EEC6648	Systems and devices for satellite and radio	6	7	7		6/180	15	30.0	15			15	105						6.0		
					Additional modules beyond qualification																					
					Modules of choice																					
5	Additional educational program	B	ES	MIN601	Minor 1	5	5	5		5/150	15	30.0				15	90					5.0			
5		A	ES	MIN602	Minor 2	5	6	6		5/150	15	30.0				15	90						5.0		
5		A	ES	MIN603	Minor 3	5	7	7		5/150	15	30.0				15	90							5.0	

	Weekly average workload at hours																0	0	0	0	0	0	0	0
1	**General education subjects(GER)**	**56**	**12**	**0**	**0**	**1530**	**75**	**30**	**390**	**0**	**0**	**165**	**870**	**20**	**18**	**9**	**4**	**0**	**0**	**0**	**5**
	Core subjects(GER/CS)	51	11	0	0	1530	75	30	390	0	0	165	870	20	18	9	4	0	0	0	0
	University component(GER/UC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Electives(GER/ES)	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
2	**Base requirements(BS)**	**107**	**20**	**0**	**0**	**2940**	**300**	**450**	**240**	**0**	**6**	**270**	**1620**	**10**	**12**	**23**	**20**	**25**	**6**	**5**	**6**
	Core subjects(BS/CS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	University component(BS/UC)	93	17	0	0	2790	285	420	240	0	6	255	1530	10	12	23	16	20	6	0	6
	Electives(BS/ES)	14	3	0	0	150	15	30	0	0	0	15	90	0	0	0	4	5	0	5	0
3	**Profession requirements(VRS)**	**69**	**11**	**0**	**0**	**2070**	**150**	**300**	**90**	**0**	**3**	**165**	**975**	**0**	**0**	**0**	**4**	**5**	**24**	**31**	**5**
	Core subjects(VRS/CS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	University component(VRS/UC)	59	9	0	0	1770	120	240	90	0	3	135	795	0	0	0	4	5	19	26	5
	Electives(VRS/ES)	10	2	0	0	300	30	60	0	0	0	30	180	0	0	0	0	0	5	5	0
4	**Disciplines for the formation of professional competencies(BDFPC)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Core subjects(BDFPC/CS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	University component(BDFPC/UC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Electives(BDFPC/ES)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	**Disciplines of personal development and the formation of leadership qualities(BDPD)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Core subjects(BDPD/CS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	University component(BDPD/UC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Electives(BDPD/ES)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total on curriculum	232		0	0	6540	525	780	720	0	4	600	3465	30	30	32	28	30	30	36	16

6	**Additional courses**		Number of		Academic period		Number of hours		Number of
7	**Module of final certification (MoFC)**		**8**				**240.0**		
	Total including FC		**240**				**7200.0**		

F-72, Educational program

13. Additional Educational Programs (Minor)

The name of the AEP (Minor), indicating the list of disciplines forming the Minor	Number of credits AEP / number of credits in the discipline	Description, Competencies generated by the AEP, learning outcomes
The name of the AEP (Minor)	**15**	
- Code and name of the discipline (discipline cycle)	5	
- Code and name of the discipline (discipline cycle)	5	
- Code and name of the discipline (discipline cycle)	5	