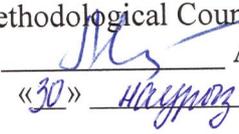


AGREED

by the Chairman of the Educational and Methodological Council of «ITU» JSC

  
A. K. Mustafina  
«30» науроз 2023 у.

APPROVED

by the Rector of the «International Information Technology University» JSC

  
A.K. Khikmetov  
«30» науроз 2023 у.



## ACADEMIC PROGRAM

### 6B06203 - Mobile telecommunication technologies

(academic program code and name)

Education area code and classification: 6B06 – Information and communication technologies

Training direction code and classification: 6B062 – Telecommunications

Group of academic programs: B059 – Communications and communications technologies

Level according to ISCED: 6

Level according to NQF: 6

Level according to IQF: 6

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

Training period: 4 years

Number of credits: 240

AGREED

Deputy Director  
Institute of Space Technique and Technology»

  
N.M. Saterov  
«27» науроз 2023 у.



AGREED

President  
«ASTEL» JSC

  
V.Y. Breusov  
«27» науроз 2023 у.



AGREED

Director  
«Argus Contact» LLP  
Akhmetov Zh.K.

  
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AGREED

President of the Association of Innovative Companies of the SEZ  
«Park of Innovative Technologies»

  
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Almaty, 2023

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**List of abbreviations and acronyms**

CD	Cycle of core disciplines
CC	Core 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
OC	Optional 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
AP	Academic program
GPM	General professional module
SQF	Sectoral qualifications framework
GEC	General education competence
M	Cycle of majors
PI	Professional internship
PS	Professional standard
PE	Postgraduate education
PC	Professional competence
PM	Professional module
LO	Learning outcome
QMS	Quality Management System

## 1. Description of the educational program

This educational program «6B06203 – Mobile telecommunication technologies» is developed on the basis of the main regulatory documents that determine the content of training in the direction 6B062 – «Telecommunications»:

- The Law of the Republic of Kazakhstan «On Education» dated July 27, 2007 No. 319-III (with amendments and additions as of 01.01.2022);
- State compulsory standard of higher and postgraduate education (Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 604 dated October 31, 2018 (with amendments and additions dated 23.07.2021);
- National qualifications framework (NQF). Approved by the protocol of March 16, 2016 by the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations;
- Sectoral Qualifications Framework (SQF). Approved by the minutes of the meeting of the Industry 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;
- The rules for organizing the educational process on credit technology of education, approved by order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152;
- The classifier of areas for training personnel with higher and postgraduate education (order of the Ministry of Education and Science of the Republic of Kazakhstan No. 569 dated October 13, 2018 (with amendments and additions as of 05.06.2020));
- Regulation on the development and approval of educational programs P-35 (Revision 3), approved by Protocol №3 from 18.11.2020 by the Rector of JSC «International Information Technology University».

The program is designed to implement the principles of the democratic nature of education management, expanding the boundaries of academic freedom and the powers of educational institutions, which will ensure the training of specialists who are competitively capable in the labor market for innovative and knowledge-intensive industries in the field of telecommunications.

The educational program ensures the application of an individual approach to students, the transformation of professional competencies from professional standards and qualification standards into learning outcomes. It provides student-centered education - the principle of education, which implies a shift in emphasis in the educational process from teaching to learning.

The educational program «6B06203 – Mobile telecommunication technologies» it is developed taking into account the needs of the labor market based on the analysis of the labor functions of professional standards.

## 2. Aim and objectives of the academic program

**The purpose of the EP:** training of practice-oriented specialists in the field of wireless communications possessing theoretical and practical knowledge, skills, and abilities that meet the needs of the global and domestic markets for telecommunications services, able to compete effectively and quickly adapt to the constantly changing labor market conditions.

### AP objectives:

1. Provide training for practice-oriented specialists in the field of wireless communications.
2. Create conditions for striving for personal and professional growth.

3. To form the ability to analyze socially significant problems and processes, the ability to use the basic provisions and methods of the humanities, social, economic and technical sciences in various types of professional activities.

4. Operate wireless network equipment, know the problems and ways to solve them, conduct experimental research and measurement work, implement experimental research programs, including the choice of technical means and processing of results.

5. Be able to classify, measure, evaluate, design, calculate the parameters of blocks and nodes of wireless communication systems and process the results in accordance with the terms of reference, provide technical support and maintenance of the software of intelligent radio systems.

6. To form students' skills in operating wireless network equipment, know the problems and ways to solve them, conduct experimental research and measurement work by modeling using modern computer technologies, applying the knowledge gained in practice and correctly interpreting the results.

7. Be able to use various scientific and technical literature, use international standards, rules and recommendations, as well as national professional standards in professional activities.

### 3. Passport of the academic program

#### 3.1 General information

No	Field name	Note
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 Academic Program	6B06203 – Mobile telecommunication technologies
5.	Aim of the Academic Program	The purpose of the educational program «6B06203 – Mobile telecommunication technologies» training of practice-oriented specialists in the field of wireless communications possessing theoretical and practical knowledge, skills, and abilities that meet the needs of the global and domestic markets for telecommunications services, able to compete effectively and quickly adapt to the constantly changing labor market conditions.
6.	Type of the Educational Program	New Academic Program
7.	Qualifications of the graduate of the Academic Program:	<p><b>Sphere of professional activity of the AP graduate:</b> The sphere of professional activity of the EP «6B06203 – Mobile telecommunication technologies» is the field of science and technology, which is based on the use of electromagnetic vibrations and radio waves for transmitting, receiving and processing information, aimed at creating and ensuring the functioning of devices and systems for exchanging information at a distance, converting information using radio-electronic means.</p> <p><b>Objects of professional activity of the AP graduates:</b> The objects of professional activity of graduates of the EP «6B06203 – Mobile telecommunication technologies» are radio-electronic means that ensure the transmission and reception of radio signals, radio-technical systems, complexes and devices, methods and means of their design, modeling, preparation for production and maintenance.</p> <p><b>Subject of professional activity:</b> The subjects of the bachelor's professional activity in the EP «6B06203 – Mobile telecommunication technologies» are organizations related to the operation of broadcasting, radar and radio navigation, space communications, mobile communications, receiving and transmitting TV and radio centers and radio control.</p> <p><b>Professional activities of the AP graduate:</b></p>

		<ul style="list-style-type: none"> <li>- design and operation of radio communication systems, including radio relay and satellite;</li> <li>- construction and operation of antenna-feeder devices;</li> <li>- design, construction and operation of radio access systems;</li> <li>- design and operation of radar and navigation systems;</li> <li>- design, construction and operation of mobile communication systems;</li> <li>- design and operation of telecommunications systems;</li> <li>- operation of mobile means of communication;</li> <li>- development of electronic systems;</li> <li>- operation of modern microprocessors and microcontrollers.</li> </ul> <p><b>Functions of the professional activity of the AP graduate:</b></p> <ul style="list-style-type: none"> <li>- design;</li> <li>- operation;</li> <li>- service and installation;</li> <li>- setup and maintenance;</li> <li>- testing.</li> </ul>
8.	Level according to the International Standard Classification of Education	6
9.	Level according to the National Classifications Framework	6
10.	Level according to the Sectoral Qualifications Framework	6
11.	Number of credits	240 ECTS credits
12.	Academic degree awarded	Bachelor's degree in Information and Communication Technologies of the educational program «6B06203 – Mobile telecommunication technologies»
13.	List of generalized competencies of the educational program	<p><b>GC1.</b> Ability to reasonably, logically correctly, and clearly build verbal and written speech, including in a foreign language, to defend one's own point of view, ideological and civic position in interpersonal interaction and intercultural environment.</p> <p><b>GC2.</b> Ability to demonstrate knowledge and understanding of the main methods of analyzing socially significant problems and processes, the main provisions and methods of the humanities, social and economic sciences in various types of professional and social activities, the basic concepts of the theory of written and verbal communication in the state language and the language of interethnic communication.</p> <p><b>GC3.</b> Ability to demonstrate knowledge and understanding of the basics of the legal system and legislation of the Republic of Kazakhstan, international standards and recommendations, national professional standards, the table of the distribution of the radio frequency spectrum of the Republic of Kazakhstan, and to comply with the norms of business ethics, own ethnic and legal norms of behavior.</p> <p><b>GC4.</b> Ability to navigate in various social situations, to work in a team, correctly defend one's point of view, propose new solutions, to find compromises, correlate one's opinion with the opinion of the team, strive for professional and personal growth.</p> <p><b>GC5.</b> Ability to possess the basics of economic knowledge, a scientific understanding of management, marketing, finance, info-communication technologies; to know the methods of physical education and health promotion, to understand the goals and methods of state regulation of the economy, the role of the public sector in the economy.</p> <p><b>GC6.</b> Ability to analyze socially significant problems and processes, to use the basic provisions and methods of humanitarian, social, economic, and technical sciences in various types of professional activities.</p> <p><b>GC7.</b> Ability to take into account modern trends in the development of electronics, measuring and computing technology, information technology in professional activities, to master the basic techniques of signal processing and presentation of experimental data.</p> <p><b>GC8.</b> Ability to collect, process, analyze and systematize scientific and technical information on research topics, use the achievements of</p>

		<p>domestic and foreign science, engineering, and technology, to be competent in choosing methods of mathematical modeling to solve engineering problems, including using standard software packages.</p> <p><b>GC9.</b> Ability to draw up completed design work and monitor the compliance of developed projects and technical documentation with standards, specifications, and other regulatory documents; implement the results of developments in production, prepare reports and participate in the work of the quality management system at the enterprise.</p> <p><b>GC10.</b> Ability to participate in the development of organizational and technical documentation and established reporting according to approved forms, to perform tasks in the field of certification of technical means, systems, processes, equipment, and materials, and metrological support of production, to organize the protection of intellectual property rights.</p> <p><b>GC11.</b> Ability to operate the equipment of wireless networks, know the problems and ways to solve them, carry out experimental research and measurement work, implement experimental research programs, including the choice of technical means and the processing of results.</p> <p><b>GC12.</b> Ability to classify, measure, evaluate, design, calculate the parameters of blocks and nodes of wireless communication systems and process the results in accordance with the terms of reference, provide technical support and software maintenance for intelligent radio systems.</p> <p><b>GC13.</b> Ability to work on detecting problems in the operation of network devices and operating systems, locate and maintain all network components, document problems and develop recommendations for troubleshooting emerging faults, know the current trends in the development of wireless communication systems.</p>
<p>14.</p>	<p>List of generalized learning outcomes of the educational program</p>	<p><b>LO1.</b> 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.</p> <p><b>LO2.</b> 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.</p> <p><b>LO3.</b> 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.</p> <p><b>LO4.</b> 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.</p> <p><b>LO5.</b> 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.</p> <p><b>LO6.</b> 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.</p> <p><b>LO7.</b> 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.</p>

		<p><b>LO8.</b> 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.</p> <p><b>LO9.</b> 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.</p> <p><b>LO10.</b> 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.</p> <p><b>LO11.</b> 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.</p> <p><b>LO12.</b> 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.</p> <p><b>LO13.</b> To be able to apply the acquired knowledge in the chosen additional educational program.</p>
15.	Form of training	Day department
16.	Language of instruction	Russian, English
17.	AP strategic partners	«Institute of Space Technology and Technology» SLLP, «ASTEL» JSC, Association of Innovative Companies of the SEZ «Park of Innovative Technologies», «Argus Contact» LLP and others.
18.	Professional Standard for EP	<ol style="list-style-type: none"> <li>1. Technical support and maintenance of communication networks</li> <li>2. Technical support of electronics</li> <li>3. Development of IoT systems</li> <li>4. Network administration</li> <li>5. Assistant engineers for telecommunications and broadcasting</li> <li>6. Administration and coordination of communication networks</li> <li>7. Installation of information and communication equipment</li> </ol>
19.	Developer (s) and authors of the academic program:	<p>«International Information Technology University», Department of Radio Engineering, Electronics and Telecommunications:</p> <ul style="list-style-type: none"> <li>- Bakhtiyarova Yelena Azhibekovna, C.T.Sc, associate Professor;</li> <li>- Aitmagambetov Altay Zufarovich, C.T.Sc, Professor;</li> <li>- Kulakayeva Aigul Yergalievna, Master of RET, senior lecturer.</li> <li>- Serikbolova Albina Askarovna, PhD, assistant Professor.</li> </ul>

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

Dublin descriptors	Competences of the EP graduate	Competences expressed in expected learning outcomes	Evaluation criteria	Name of the estimation method
<b>General educational competencies</b>				
1. Knowledge and understanding	Demonstrate knowledge and understanding of the main ways of analyzing socially significant problems and processes,	Reasonably and clearly build your oral and written speech in the state and in the language	Speak clearly and express your thoughts	Creative task
			Correctly, completely and	Creative task

	socially significant problems and processes, the main provisions and methods of the humanities, social and economic sciences in various types of professional and social activities, as well as know the basic concepts of the theory of written and oral communication in the state language and in the language of interethnic communication	state and in the language of interethnic communication	Correctly, completely and convincingly answer questions	Creative task		
			Manage business and paperwork	Essay		
		Demonstrate and apply humanitarian, socio-economic and legal knowledge in an interdisciplinary context to solve professional problems	Use the basics of philosophical knowledge to form a worldview position	Debate		
			Master the skills of physical culture	Delivery of standards		
			Know the basics of the legal system and legislation	Creative task		
		Know the state language and one of the foreign languages at the level necessary to solve the problems of interpersonal and intercultural interaction and professional tasks	Possess verbal communication skills	Creative task		
			Know the state and foreign languages when communicating in writing	Essay		
			Know the methods of scientific research and academic writing	Essay		
		2. Putting into practice knowledge and ability to understand	Be able to develop arguments, apply knowledge and solve problems	Ability for self-organization, self-education and professional improvement	Strive for professional and personal growth	Creative task
					Public performance	Creative task
Be able to find compromises	Creative task					
The ability to critically reflect on accumulated experience	Know how to make arguments			Creative task		
	Apply knowledge and problem solve			Creative task		
Apply basic knowledge to solve professional problems	Be able to negotiate			Creative task		
	Strive for professional and personal growth			Creative task		
	Understand the implications of the principles and culture of academic integrity			Creative task		
3. Ability to make judgments, evaluate ideas and formulate conclusions	Must be able to express their own judgment and be able to interpret information to communicate their own understanding, skills and performance to colleagues			Be competent in production and non-production costs	Ability to understand the problem presented	Report
					Ownership of the material	Report
		Be competent in matters of ensuring safe living conditions	Objective perception of the problem	Creative task		

			Analysis of the initial situation	Creative task
4. Communication skills	Must have the ability to establish maximum trusting relationships with colleagues, work in a team, communicate information, ideas, problems and solutions	Ability to work in a team	Maintaining partnerships	Creative task
			Maintain electronic communications	Creative task
		Be tolerant of social and cultural differences	Able to work in a team	Creative task
			Capable of taking an active civic stand	Creative task
5. Self-learning	Must be able to independently study the materials necessary for continuing education in the specialty	Ability for self-organization and self-education	Possession of skills of self-organization and self-education	Creative task
			Use the provisions and methods of self-organization and self-education in professional activities	Report
		Be able to use regulatory documents in their activities	Be able to read technical literature	Creative task
			Know international standards and recommendations	Report
<b>Basic competencies</b>				
1. Knowledge and understanding	Willingness to take into account modern trends in the development of electronics, measuring and computer technology, infocommunication technologies in their professional activities, to master the basic techniques of signal processing	Demonstrate and apply mathematical, natural science knowledge to solve basic problems	Solve professional problems	Settlement and graphic work
			Set up laboratory experiments	Report
			Rethink past experience	Creative task
		To know the current trends in the development of electronics, measuring and computing equipment, infocommunication technologies in their professional activities	Reveal the essence of problems	Report
			Calibrate measuring instruments	Creative task
			Take measurements	Creative task
			Interpret measurement results	Report
		Master the basic techniques of digital signal processing (DSP)	Know simulation software	Report
			Analyze simulation results	Creative task
			Know modern DSP methods	Report
2. Putting into practice knowledge and ability to understand	The ability to collect, process, analyze and systematize scientific and technical information on research topics, use the achievements of domestic and foreign	Able to apply basic knowledge to solve professional problems in the field of wireless communication	Design of nodes of radio engineering systems	Report
			Modeling of radio engineering systems	Report
			Solve professional problems	Settlement and graphic work

	science, engineering and technology, be competent in choosing mathematical modeling methods for solving engineering problems, including using standard application software packages	Demonstrate the basic concepts and laws of electrical and radio circuits	Know the basic laws of electrical circuits	Creative task		
			Know the laws of radio circuits in various operating modes	Creative task		
			Read circuit diagrams	Creative task		
		Analyze and systematize scientific and technical information on the research topic		Solution of engineering problems	Settlement and graphic work	
				Work with scientific and technical literature	Report	
				Work with national standards	Creative task	
				Work with international standards, rules and guidelines	Presentation	
3. Ability to make judgments, evaluate ideas, and formulate conclusions	The ability to participate in the development of organizational and technical documentation and established reporting in accordance with approved forms, to perform tasks in the field of certification of technical means, systems, processes, equipment and materials, and metrological support of production	Know the principles of building radio engineering systems for transmitting information	Know the principles of networking	Creative task		
			Know current trends in the development of electronics	Report		
			Know current trends in the development of measuring and computer technology	Report		
		Know the element base of circuitry, determine the main parameters of electronic and measuring devices		Read and understand diagrams	Report	
				Interpret measurement results	Project	
				Be able to work with measuring instruments	Report	
				Know national standards	Creative task	
				Know how to use reference materials	Creative task	
		4. Communication skills	Must have the ability to self-organize, establish the most trusting relationships with colleagues, work in a team, communicate information, ideas, problems and ways to solve them	Possess self-organization skills	Maintaining partnerships	Project
					Know the problems and how to solve them	Creative task
Have the ability to establish trusting relationships with colleagues, work in a team	Work in a team			Creative task		
	Be tolerant of social and cultural differences			Creative task		

		Know the main directions, problems and methods of self-organization	Maintaining partnerships	Project
			Upgrade your skills	Report
			Solve problems	Creative task
5. Self-learning	Must be able to independently study the scientific and technical literature necessary to continue education in the field of training	Be able to use normative and technical documents in their professional activities	Strive for professional and personal growth	Report
			Know how to use reference materials	Report
			Development of equipment operation methods	Report
		Be proficient in preparing technical reports based on the results of work performed	Be able to prepare reports, acts, etc.	Report
			Develop technical documents	Report
			Read scientific and technical literature	Report
<b>Professional competencies</b>				
1. Knowledge and understanding	Willingness to take into account modern trends in the development of electronics, measuring and computer technology, to have the skills to operate wireless network equipment, to know the problems and ways to solve them, to conduct experimental research and measurement work	Demonstrate and apply mathematical, natural science knowledge to solve professional problems	Solve professional problems	Settlement and graphic work
			Set up laboratory experiments	Report
			Rethink past experience	Creative task
		Be proficient in the operation of wireless network equipment, know the problems and ways to solve them	Reveal the essence of problems	Creative task
			Calibrate measuring instruments	Creative task
			Take measurements	Creative task
			Interpret measurement results	Report
		Conduct experimental research and measurement work	Know simulation software	Report
			Analyze simulation results	Creative task
			Know modern DSP methods	Report
2. Putting into practice knowledge and ability to understand	Able to classify, measure, evaluate, design, calculate the parameters of blocks and nodes of wireless communication systems and process the results obtained, demonstrating knowledge in the field of radio wave propagation, electromagnetic compatibility, allocation of radio frequency (RF) and orbital frequency resources (OFR)	Able to apply professional knowledge to solve problems in the professional field	Wireless System Design	Report
			Modeling Wireless Systems	Report
			Solve professional problems	Settlement and graphic work
		Calculate the parameters of blocks and nodes of wireless communication systems and process the results obtained, switching systems, transmission, reception and processing of information	Know classifications of wireless communication systems	Creative task
			Be able to work with normative and technical documents	Creative task
			Know the use of RFS and ORD	Report

		Analyze and systematize scientific and technical information in professional activities	Solution of engineering problems	Settlement and graphic work	
			Work with scientific and technical literature	Report	
			Work with national standards	Presentation	
			Work with international standards and recommendations	Presentation	
3. Ability to make judgments, evaluate ideas, and formulate conclusions	The ability to develop design and technical documentation, draw up completed design work, monitor the compliance of developed projects and technical documentation with standards, specifications and other regulatory documents; implement the results of developments in production, prepare documentation and participate in the work of the quality management system at the enterprise	Have skills in operating radio and telecommunications equipment, conduct laboratory research by modeling using modern computer technologies	Know the principles of networking	Presentation	
			Apply the acquired knowledge in practice	Creative task	
			Know current trends in the development of mobile technology	Report	
			Know how to use reference materials	Creative task	
			Know modeling techniques	Report	
			Operation of radio equipment	Creative task	
		Understand the basic principles of construction and operation of antenna technology, mobile communication networks and systems, radio access systems, satellite and radio relay communications, television and radio broadcasting, radio navigation and radar		Know the principles of building mobile technology	Creative task
				Be able to work with measuring instruments	Report
				Develop regulatory and technical documentation	Creative task
				Know and develop national standards	Creative task
4. Communication skills	Possess the ability of self-organization, self-education and establish the most trusting relationship with colleagues, work in a team, communicate information, ideas, problems and ways to solve them	Possess professional skills for self-organization and self-education	Maintaining partnerships	Presentation	
			Know the problems and how to solve them	Creative task	
		Establish trusting relationships with colleagues, work in a team	Work in a team	Project	
			Be tolerant of social and cultural differences	Creative task	
		Know the main directions, problems and methods of self-organization and self-education		Maintaining partnerships	Presentation
				Upgrade your skills	Report
				Solve professional problems	Creative task
5. Self-learning	To be able to independently study the scientific and technical	Be able to use normative and technical documents	Strive for professional and personal growth	Creative task	



## 3.3 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
<b>GENERAL EDUCATION MODULES</b>				
OMM 6600 - Historical and social module	18	<p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- be able to connect and compare individual phenomena and events of the past with the general paradigm of the world-historical development of human society; the ability to objectively understand and explain historical events; meaningful citizenship based on the principles of patriotism, tolerance;</li> <li>- know about the formation of the main approaches to the consideration of problems: being, matter, consciousness, nature and society; the technique and logic of scientific research, how to create strategies for cognitive activity.</li> <li>- demonstrate a sense of political will and be able to identify specific ways in which an individual can participate fully in politics; the ability to transfer sociological knowledge to others; and the skills and attitudes needed to engage community members.</li> <li>- use scientific thinking to interpret psychological phenomena and demonstrate psychological information literacy.</li> </ul>	<ol style="list-style-type: none"> <li>1. Oral exam</li> <li>2. Test</li> <li>3. Midterm exam</li> <li>4. Computational and graphic work</li> <li>5. Exam</li> </ol>	HK 6002 - History of Kazakhstan SPS 6001 - Philosophy SPS 6003- Political science SPS 6002- Sociology SPS 6005- Psychology SPS 6004- Culturology
OMM 6601 – General education module	18	<p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- know about the use of software packages; about the architecture of computer systems, operating systems and networks; the principles of information and communication technologies and e-learning;</li> <li>- be able to apply an industrial environmental approach to critically evaluate the workplace or production process, find ways to improve energy use and reduce waste streams;</li> <li>- demonstrate an understanding of the relationship between the broader environment and the relevant components of workplace health and safety in relation to the concept of ecosystem health;</li> <li>- be able to conduct a case study when evaluating a process or industry from the point of view of industrial ecology in order to make recommendations for reducing the environmental impact.</li> </ul> <p>As a result of studying this module, the student must:</p>	<ol style="list-style-type: none"> <li>1. Oral exam</li> <li>2. Test</li> <li>3. Midterm exam</li> <li>4. Computational and graphic work</li> <li>5. Exam</li> </ol>	ICT 6001 - Information and communication technologies (in English) ECO 6002 - Economics and organization of production PhC 6005 - 6006 – Physical Culture LAN 6001A - Foreign Language LAN 6002A - Foreign Language
	20			

OMM 6602 – Languages module		<p>- be able to distinguish and use grammatical phenomena such as the present, past, future, tenses and questions, and correctly use general and professional vocabulary on the topics being studied, understand authentic speech on the topics being studied;</p> <p>- have the ability to make judgments, write literacy, maintain information, collect basic information, make reports, independently study and use explanatory dictionaries.</p>	<p>1. Oral exam 2. Test 3. Midterm exam 4. Computational and graphic work 5. Exam</p>	LAN 6001KR - - Kazakh language (Russian Language) LAN 6002KR - Kazakh language (Russian Language)
<b>BASIC MODULES</b>				
BM 6600 - Physics and Mathematics module	24	<p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- be able to solve systems of linear equations using matrix operations and apply and graphically illustrate arithmetic operations for vectors on the plane, in three-dimensional space, and in <math>R^n</math>; formulate and geometrically describe equations of lines and planes in three-dimensional space in both parametric and nonparametric form;</li> <li>- use derivatives to find the intervals at which a given function increases or decreases, the maxima and minima of functions, the inflection points of functions and determine the concavity of curves and formulate the basic concepts and principles of mechanics, thermodynamics and electricity and magnetism;</li> <li>- apply knowledge of physical principles and equations to solve physical problems in mechanics, thermodynamics, electricity and magnetism, and to solve physical problems in optics and light, quantum mechanics and atomic physics;</li> <li>- know methods of differentiation and integration of complex variable functions; methods of decomposition of functions of a complex variable into a Laurent series;</li> <li>- application of deductions for solving practical problems.</li> </ul> <p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- be able to differentiate and use grammatical phenomena such as passive verbs, nouns, articles, reported speech and modal verbs; create a general and professional vocabulary on the topics being studied and understand genuine speech on the topics being studied; work with the simplest measuring devices;</li> <li>- have computer skills and programming skills.</li> </ul> <p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- to know the principle of operation and differences between different types of amplifying devices, filters, signal converters, generators, to distinguish their parameters and characteristics; calculation methods and calculate the parameters</li> </ul>	<p>1. Oral exam 2. Test 3. Midterm exam 4. Computational and graphic work 5. Exam</p>	<p>MAT 6081- Linear Algebra and Analytical Geometry</p> <p>MAT 6002- Mathematical analysis</p> <p>PHY 6002 - Physics (1)</p> <p>PHY 6003 - Physics (2)</p> <p>MAT 6007- Theory of functions of a complex variable</p>
BM 6601 – Basic module	6	<p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- be able to differentiate and use grammatical phenomena such as passive verbs, nouns, articles, reported speech and modal verbs; create a general and professional vocabulary on the topics being studied and understand genuine speech on the topics being studied; work with the simplest measuring devices;</li> <li>- have computer skills and programming skills.</li> </ul> <p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- to know the principle of operation and differences between different types of amplifying devices, filters, signal converters, generators, to distinguish their parameters and characteristics; calculation methods and calculate the parameters</li> </ul>	<p>1. Oral exam 2. Test 3. Midterm exam 4. Exam</p>	<p>LAN 6002DA - English for STEM</p> <p>PP 6600- Educational Internship</p> <p>EEC 6634 - Electronics and circuitry of radio engineering devices</p> <p>EEC 6637- Metrology and radio measurements</p>
BM 6602 – Radio Engineering, Electronics and	45	<p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- to know the principle of operation and differences between different types of amplifying devices, filters, signal converters, generators, to distinguish their parameters and characteristics; calculation methods and calculate the parameters</li> </ul>		

Metrology module		<p>and characteristics of circuits; to measure and analyze the parameters and characteristics of circuits;</p> <ul style="list-style-type: none"> <li>- be able to read the electrical circuit diagrams of amplifying devices, generators, converter, determine their parameters; reproduce the basic concepts, laws and methods of analysis of electrical circuits; evaluate calculation methods and calculate the parameters and characteristics of the circuit; measure and analyze the parameters and characteristics of the circuit; evaluate the probabilities and the parameters and characteristics of the circuit; evaluate the measurement intervals of measurement error, measurement error and control;</li> <li>- read the diagrams of various radio transmitting devices of electronic equipment, their individual nodes and cascades and carry out the necessary technical calculations, including using computer technology.</li> </ul>	<ol style="list-style-type: none"> <li>1. Oral exam</li> <li>2. Test</li> <li>3. Midterm exam</li> <li>4. Computational and graphic work</li> <li>5. Exam</li> </ol>	<p>EEC 6636 - Telecommunication theory and teletraffic engineering</p> <p>EEC 6604 - Theory of Electromagnetic Waves Transmission</p> <p>EEC 6635 - Basic Circuit Theory</p> <p>EEC 6605- Basics of radio circuits and signals</p> <p>EEC 6638 - Radio receivers</p> <p>EEC 6639 - Radio transmitter devices</p>
BM 6605 – Computer Simulation module	4	<p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- be able to use image transformation methods; use the basic method of descriptive geometry, engineering graphics; use theory and ways to solve positional and metric problems and read technical drawings; create images using the AutoCAD system; determine geometric shapes and dimensions of parts using a drawing.</li> <li>- create and improve modern radio engineering facilities using MatLab and link mathematical modeling methods with the practical implementation of modern radio engineering facilities;</li> <li>- know pointers, recursion, structures, standard template library.</li> </ul>	<ol style="list-style-type: none"> <li>1. Oral exam</li> <li>2. Test</li> <li>3. Midterm exam</li> <li>4. Computational and graphic work</li> <li>5. Exam</li> </ol>	<p>EGR 6600- Engineering and computer graphics</p> <p>EEC 6608- Computer and mathematical modeling</p>
BM 6606 – Module Modern telecommunication on networks and systems	18	<p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- have an idea about the main directions of development of mobile communication systems; basic concepts of Ethernet, such as data transmission medium, services and principles of operation;</li> <li>- be able to evaluate and describe the importance of addressing schemes and naming at various levels of data networks in IPv4 and IPv6 environments; develop, calculate and apply subnet masks and addresses in IPv4 and IPv6 networks according to specified requirements;</li> </ul>	<ol style="list-style-type: none"> <li>1. Oral exam</li> <li>2. Test</li> <li>3. Midterm exam</li> <li>4. Computational and graphic work</li> <li>5. Exam</li> </ol>	<p>NET 6600 - Introduction to networking technologies</p> <p>EEC 6672- Modern telecommunication technologies and information transmission systems</p>

		<ul style="list-style-type: none"> <li>- understand the principles of operation and settings of network address translation (NAT) for IPv4 networks, as well as the ability to troubleshoot related problems;</li> <li>- know modern telecommunication technologies and information transmission systems;</li> <li>- use the regulatory documents of the ITU, RCC and CA RK in the design, implementation and operation of RTS and networks for various purposes.</li> </ul>			EEC 6673 - Electromagnetic compatibility and RF spectrum management
BM 6607 – Optical and radio systems module	10	<p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- be competent in the operation of antenna technology, understand the laws of radio wave propagation, know the principle of operation of fiber optic lines;</li> <li>- know the basics of the construction and operation of radio navigation and radar systems for various purposes, the classification of radio navigation and radar systems.</li> </ul>	<ol style="list-style-type: none"> <li>1. Oral exam</li> <li>2. Test</li> <li>3. Midterm exam</li> <li>4. Computational and graphic work</li> <li>5. Exam</li> </ol>	EEC 6651 - Radio propagation and antenna feeder devices EEC 6652 - Theory and technology of radio navigation and radar systems EEC 6653 - Fiber optic communication systems	
<b>PROFESSIONAL MODULES</b>					
PM 6600 – Professional module	16	<p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- participate in discussions on the topics studied, express opinions, present ideas, agree/disagree, provide arguments, propose solutions;</li> <li>- know the technological processes of transmission, signal processing of telecommunications systems and radio engineering devices of telecommunications systems on the topic of the thesis.</li> </ul>	<ol style="list-style-type: none"> <li>1. Oral exam</li> <li>2. Test</li> <li>3. Midterm exam</li> <li>4. Computational and graphic work</li> <li>5. Exam</li> </ol>	LAN 6003PA- Professionally oriented foreign language PP 6601 - Professional Internship PP 6602 - Professional Internship PP 6603 - Pre-diploma Internship	
PM 6605 - Digital device module	14	<p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- understand settings for device maintenance and management tasks, including Cisco Discovery Protocol (CDP), LLDP (Link Layer Discovery Protocol), NTP (Network Time Protocol), syslog, device backup and restore, password recovery, and management iOS;</li> <li>- apply the MatLab mathematical package in digital signal processing tasks and application software packages for the design of radio engineering devices;</li> </ul>	<ol style="list-style-type: none"> <li>1. Oral exam</li> <li>2. Test</li> <li>3. Midterm exam</li> <li>4. Computational and graphic work</li> <li>5. Exam</li> </ol>	NET 6601 - The basics of routing and switching EEC 6610- Digital signal processing	

<p>PM 6604- Module Modern mobile systems</p>	<p>24</p>	<p>- know the functions of microprocessor systems by introducing additional peripheral devices into them.</p> <p>As a result of studying this module, the student must:</p> <ul style="list-style-type: none"> <li>- be able to analyze the task in order to determine the composition, structure of data, restrictions on them and the choice of solutions and develop algorithms for solving problems;</li> <li>- understand the principle of building a network and broadband access system and the Internet of Things, mobile communication networks and systems, broadcasting systems;</li> <li>- to know the purpose, types and main types of satellite systems and services, their principles of operation, design, operational characteristics, electrical parameters and apply analytical and numerical methods of analysis of satellite systems for a variety of tasks and frequency ranges, including using modern software.</li> </ul>	<p>1. Oral exam 2. Test 3. Midterm exam 4. Computational and graphic work 5. Exam</p>	<p>EEC 6611 - Digital devices and microprocessors</p> <p>EEC 6649 - Broadband and Internet of Things networks and systems</p> <p>EEC 6647 - Mobile networks and systems</p> <p>EEC 6648 - Systems and devices for satellite and radio relay communication</p> <p>EEC 6619- Broadcasting systems</p>
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## 3.4. List of modules and learning outcomes

№	Discipline Code and Name	Brief description of the discipline (30-50 words)	Labor intensity of discipline in credits	Learning outcomes formed (codes)	Prerequisites	Postrequisites
<b>Cycle of general education disciplines (GED)</b>						
<b>Required component (RC)</b>						
1	HK 6002 - History of Kazakhstan	The course examines the modern history of Kazakhstan as part of the history of mankind, the history of Eurasia and Central Asia. The modern history of Kazakhstan is a period in which a holistic study of historical events, phenomena, facts, processes, identification of historical patterns that took place on the territory of the great step in the twentieth century and to the present day.	5	LO1-LO3	-	RW6001
2	SPS 6001- Philosophy	The principles of understanding philosophy as a methodology of human activity, readiness for self-knowledge, Amateur activity, development of cultural wealth as a factor of harmonization of personal and interpersonal relations are studied.	5	LO1-LO3	-	RW6001
3	LAN 6001A - 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 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.	5	LO1; LO2	-	LAN 6002A
4	LAN 6002A - 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	5	LO1; LO2	LAN 6001A	LAN 6002DA

		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	LAN 6001KR - Kazakh (Russian) language	The course "Kazakh/Russian language" is aimed at improving language, speech, communicative competencies. Its task is to improve the language abilities of students, to develop skills and abilities in four types of speech activity (speaking, listening, reading, writing). The content of the typical curriculum of the general education discipline "Kazakh/Russian language" includes topics of seminar (practical) classes and independent work of students. Training is conducted at 3 levels: A, B, C.	5	LO1; LO2	LAN 6001KR	RW6001
6	LAN 6002KR - Kazakh (Russian) language	the course "Kazakh/Russian language" is aimed at improving language, speech, communicative competencies. Its task is to improve the language abilities of students, develop skills in four types of speech activity (speaking, listening, reading, writing). The curriculum is based on communication-oriented concept, which includes elements of problem-based and communicative-individualized learning. Three basic linguo-methodological provisions were chosen as the basic principles: 1) the communicative orientation of training, taking into account the actual spheres of verbal communication; 2) taking into account the consistency in the study of lexical units, their semantic interconnectedness and stylistic conditionality of functioning in various contexts and situations; 3) the formation of a system of language, speech and communication tasks with a focus on the educational and professional needs of students."	5	LO1-LO2	LAN 6001KR	RW6001
7	ICT 6001 - Information and communication technology (in English)	Modern methods and means of communication in everyday and professional activities are studied; application of information technologies to search, collect, store, process and disseminate the information is taught.	5	LO4; LO10	-	EEC 6608
8	SPS 6005- Psychology	The 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	2	LO1; LO2	-	RW6001

		personal, family, professional, business, social (working with people of different age and social categories).				
9	SPS 6003 - Political science	The course 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.	2	LO1; LO2	-	RW6001
10	SPS 6002- Sociology	Development of sociological imagination, understanding of the basic concepts of sociology as a science. Obtaining full knowledge of sociological subject areas, research methods and directions. The course will discuss in detail the main sociological theories and the most effective ways to gain in-depth knowledge about various aspects of our modern society. The course examines the structure of ideas that contextualize our lives, the ways in which these ideas are institutionalized in formal and informal social organizations, and how this institutionalization forms a social structure that constrains and ensures change. Students will study scientific social knowledge that will help them gain experience in the formation of models of social relations; in addition, they will learn to respect the good values of both Kazakhstan and the rest of the world, the skills of social communication, interpersonal relations, respect for different cultures of Kazakhstan and the world community.	2	LO1; LO2	-	SPS 6004
11	SPS 6004 - Culturology	Knowledge in the field of cultural studies can serve as a basis for studying the entire complex of social sciences and humanities. 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	2	LO1; LO2	SPS 6002	RW6001

		discussions in various formats; case study, project method.				
12	PhC 6005- PhC 6006 - Physical Culture	The area of social activity, aimed at maintaining and strengthening human health, in the process of conscious motor activity. This is a part of culture, which is a set of values and knowledge created and used by society for the purpose of physical and intellectual development of a person's abilities, improvement of his physical activity and the formation of a healthy lifestyle, social adaptation through physical education, physical training and physical development.	8	LO3	PhC 6001	PhC 6004
<b>Cycle of general education disciplines (GED)</b>						
<b>University component (UC) and (or) Optional component (OC)</b>						
13	ECO 6002- Economics and organization of production	The study of organizational and managerial decisions in non-standard conditions, as well as in conditions of different opinions. Ability to calculate economic indicators, understanding the meaning of the principles and culture of academic integrity.	5	LO2-LO4	-	RW6001
<b>Cycle of basic disciplines</b>						
<b>University component</b>						
14	EEC 6634 - 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 semiconductor and optoelectronic devices, parameters, characteristics, operating modes and operating principles of diodes, transistors, thyristors, photoemitters, photodetectors, optocouplers and integrated circuits.	7	LO6-LO7	PHY 6004	EEC 6637
15	LAN 6002DA -	Formation and development of students' skills in listening, speaking, reading, and writing in English on topics related to entrepreneurship, as well as the development of social skills such as making presentations. The approach to learning is communicative, interactive, student-centered, result-oriented and relies heavily on students' independent work.	4	LO1-LO2	LAN 6002A	LAN 6003PA
16	MAT 6081 - Linear Algebra and Analytical Geometry	The study of vectors, vector space, linear transformations and systems of linear equations, as well as other elements of linear algebra and analytical geometry using examples from real life and various sciences.	4	LO2	-	MAT 6002
17	MAT 6002 - Mathematical analysis	Familiarization of students with important branches of calculus and its applications in IT. Ability to apply mathematical methods and tools to solve various applied problems. Study of fundamental methods for studying	6	LO2	MAT 6008	MAT 6007

		infinitesimal variables using analysis based on the theory of differential and integral calculations.				
18	PHY 6002 - 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	LO2	-	PHY 6004
19	EEC 6635 - Basic Circuit Theory	The study of physical laws and processes occurring in electric circuits of direct, harmonic and non-harmonic current, methods for analyzing transient and steady processes occurring in linear circuits with lumped parameters; modes of operation of quadripoles and filters, physical processes occurring in electrical circuits with distributed parameters and in non-linear DC circuits.	6	LO2; LO6-LO7	PHY 6004	EEC 6605
20	EEC 6636 - Telecommunication theory and teletraffic engineering	Studying the issues of formation, conversion, and transmission of signals over communication channels, 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.	6	LO6-LO7	EEC 6605	EEC 6610
21	PHY 6004 - Physics (2)	The study of the laws, principles, postulates and equations of ray optics, quantum optics, the theory of relativity, atomic and nuclear physics, familiarization with the basics of modern physics and quantum mechanics, the use of physics equations for solving specific physical problems, the use of physics methods for research, analysis and laboratory works in order to verify the work and the implementation of the laws of physics in nature and technology.	4	LO2	PHY 6002	EEC 6635
22	MAT 6007.- Theory of functions of a complex variable	The study of mathematical apparatus necessary for the application of mathematical methods in practice and in research; familiarization of students with the concepts, facts and methods that make up the theoretical foundations of complex analysis.	4	LO2	MAT 6002	EEC 6636
23	EEC 6604 - Theory of	Study of the main issues of the theory of electromagnetic fields and waves,	6	LO8-LO9	PHY 6004	EEC 6651

	Electromagnetic Waves Transmission	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.				
24	EEC 6605 - 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	LO2; LO6	EEC 6635	EEC 6610
25	PP 6600 - Educational Internship	Studying the basics of using computer technology, the basics of programming, applications for radio engineering and telecommunication systems.	2	LO6-LO7	ICT 6001	PP 6601
26	EEC 6637 - 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	LO6-LO7; LO9	EEC 6634	EEC 6650
27	EEC 6638 - 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	LO5, LO7-LO10	EEC 6636	EEC 6619
28	EEC 6639 - 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	LO5, LO7-LO10	EEC 6636	EEC 6638
29	EEC 6672 - Modern telecommunication technologies and information	The study of the main parameters and characteristics of new generation telecommunication networks, the basics of their structural construction, considering modern trends in the development of communication	6	LO8	NET 6602	EEC 6649

	transmission systems	networks, in an in-depth study of functional diagrams, methods for designing and integrating telecommunication networks and systems. The study of modern systems and methods of information transfer.				
30	NET 6602 - Introduction to networking technologies	Learning the basics of networking and covering topics such as: local area network, connecting to a local network, connecting to the global Internet, network protocols and services, cables and contacts, wireless technologies, wireless network, security in wired and wireless networks, search, and elimination problems with wired and wireless networks.	6	LO10-LO12	ICT 6001	NET 6601
31	EEC 6673 - 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	LO9; LO11-LO12	EEC 6651	RW6001
32	EEC 6651 - 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	LO7-LO8	EEC 6604	EEC 6650
<b>Cycle of core disciplines</b>						
<b>Optional component</b>						
<b>Elective Discipline 1-Minor 1</b>						
33	MIN601-Minor 1	Additional educational program (Minor) (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	PO13		
<b>Elective Discipline 2</b>						
34	EEC 6608 - Computer and mathematical modeling	The study of algorithms and technology for solving differential and difference equations for building a mathematical model and their computer simulation using the	4	LO6; LO10; LO12	ICT 6001	EEC 6610

		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.				
35	EGR 6600 - 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	LO10; LO12	ICT 6001	RW6001
<b>Elective Discipline 3</b>						
36	EEC 6652 - 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	4	LO7	EEC 6636	RW6001
37	EEC 6653 - Fiber optic communication 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.	4	LO8	EEC 6604	RW6001
<b>Cycle of majors University component</b>						
38	EEC 6610 - 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 digital filters and the modeling of these objects and processes using MatLab software.	4	LO6-LO7	EEC 6636	EEC 6611
39	EEC 6611 - 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	LO7	EEC 6610	EEC 6607

40	LAN 6003PA- Professionally oriented foreign language	Orienting students to topics of professional interest, such as future trends in IT, the computer as a friend, the computer as an enemy, minimizing the negative impacts of IT, magnetic storage, optical storage, flash memory, programming languages, web design, graphics design, etc. Designed to increase students' language awareness, improve their speaking skills and professional English communication skills.	3	LO1-LO2	LAN 6002DA	RW6001
41	EEC 6647 - 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.	6	LO7; LO9; LO11- LO12	NET 6602	EEC 6650
42	EEC 6648 - 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	LO7; LO11- LO12	EEC 6651	RW6001
43	PP6601 - Professional Internship (2nd year)	Studying the characteristics of radio engineering devices, telecommunication systems, linear cable structures	4	LO9-LO12	PP6600	PP6602
43	PP6602 - Professional Internship (3rd year)	Learning the basics of operation and design of networks and telecommunications systems.	4	LO9-LO12	PP6601	PP6603
45	PP6603 -Pre-diploma Internship	Collection of materials for writing a graduation project.	5	LO9-LO12	PP6602	RW6001
46	EEC 6649 - 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 information, the development and	6	LO7; LO11- LO12	NET 6602	RW6001

		operation of emitting and receiving devices of radio access systems.				
47	NET 6601 - 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	PO10-LO12	NET 6602	RW6001
48	EEC 6619 - 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	LO7; LO11-LO12	EEC 6651	RW6001
<b>Cycle of majors</b>						
<b>Optional component</b>						
<b>Elective Discipline 4-Minor 2</b>						
49	MIN602-Minor 2	Additional educational program (Minor) (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	PO13		
<b>Elective Discipline 5-Minor 3</b>						
50	MIN603-Minor 3	Additional educational program (Minor) (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	PO13		
<b>Final State Examination</b>						
51	RW6001	Writing and defending a diploma thesis, diploma project or preparation and passing of a comprehensive exam.	8			

## 4. Curriculum of the educational program

№	Module code	Module name in three languages (kaz / rus / eng)	Discipline Code	Discipline name in three languages (kaz / rus / eng)	Cycles (GD, CD, M)	Components (RC, OC, UC)	Total number of credits (ECTS)	Total number of academic hours	Number of classroom hours				Number of SIS hours		Form of control (Midterm, End-of-term, examination, CP defense, differential test, DP)	Prerequisites (Discipline Code)
									classroom hours	lectures	practical classes (sem.)	laboratory classes	Total number of SIS hours	Including TSIS		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 year																
1 semester																
1.	ОММ 6602/ОМ М 6602/ОМ М 6602	Тілдер модуль/Языковой модуль/Languages module	LAN6001A/ LAN6001A/ LAN6001A	Шет тілі/Иностранный язык/Foreign language	ЖББП/ ООД/Г ЕД	ОК	5	150	45	45	45	90	15	15	Аралас/Комбинированный/Composite exam	LAN 6002A
2.	ОММ 6602/ОМ М 6602/ОМ М 6602	Тілдер модуль/Языковой модуль/Languages module	LAN6001K R/LAN6001 KR/LAN6001KR	Қазақ (орыс) тілі/Казахский (русский) язык/Kazakh (Russian) language	ЖББП/ ООД/Г ЕД	ОК	5	150	45	45	45	90	15	15	Аралас/Комбинированный/Composite exam	LAN 6002K R
3.	ВМ 6600/ВМ 6600/ВМ 6600	Физико-математикалық модуль/Физико-математический модуль/Physics and Mathematics module	МАТ6081/ МАТ6081/ МАТ6081	Сызықтық алгебра және аналитикалық геометрия/Линейная алгебра и аналитическая геометрия/Linear Algebra and Analytical Geometry	БП/БД/ ВД	ВК	4	120	45	15	30	60	15	15	Жазбаша/Письменный/Write п exam	МАТ 6002
4.	ВМ 6600/ВМ 6600/ВМ 6600	Физико-математикалық модуль/Физико-математический модуль/Physics and Mathematics module	PHU6002/P HY6002/PH Y6002	Физика 1/Физика 1/Physics 1	БП/БД/ ВД	ВК	6	180	60	15	30	105	15	15	Жазбаша/Письменный/Write п exam	PHU 6004

2 semester																	
Total number for a semester:																	
1	ОММ 6600/ОМ М 6600/ОМ М 6600	Тарихи-элеуметтік модуль/Историко- социальный модуль/Historical and social module	НК6002/Н К6002/НК6 002	Казахстан тарихы/ История Казахстана/History of Kazakhstan	ЖББП/ ООД/Г ЕД	ОК	5	150	45	15	30	135	30	345	60	Аралас/К омбиниро ваный/С omposite exam	RW600 1
2	ОММ 6601/ОМ М 6601/ОМ М 6601	Жалпы білім беру модуль/Общобразовател ьный модуль/General education module	PhC6005/Ph C6005/PhC 6005	Дене шындықтыру/Физическая культура/Physical Culture	ЖББП/ ООД/Г ЕД	ОК	4	120	45	15		45		60	15	Аралас/К омбиниро ваный/С omposite exam	PhC 6003
3	ОММ 6600/ОМ М 6600/ОМ М 6600	Тарихи-элеуметтік модуль/Историко- социальный модуль/Historical and social module	SPS6002/SP S6002/SPS6 002	Әлеуметтану/Социология/ Sociology	ЖББП/ ООД/Г ЕД	ОК	2	60	30	15		15		15	15	Аралас/К омбиниро ваный/С omposite exam	SPS 6004
4	ОММ 6600/ОМ М 6600/ОМ М 6600	Тарихи-элеуметтік модуль/Историко- социальный модуль/Historical and social module	SPS6003/SP S6003/SPS6 003	Саясаттану/Политология/ Political science	ЖББП/ ООД/Г ЕД	ОК	2	60	30	15		15		15	15	Аралас/К омбиниро ваный/С omposite exam	RW600 1
5	ОММ 6602/ОМ М 6602/ОМ М 6602	Тілдер модуль/Языковой модуль/Languages module	LAN6002A/ LAN6002A/ LAN6002A	Шет тілі/Иностранный язык/Foreign language	ЖББП/ ООД/Г ЕД	ОК	5	150	45			45		90	15	Аралас/К омбиниро ваный/С omposite exam	LAN 6002D A
6	ОММ 6602/ОМ М 6602/ОМ М 6602	Тілдер модуль/Языковой модуль/Languages module	LAN6002K R/LAN6002 KR/LAN60 02KR	Қазақ (орыс) тілі/Казахский (русский) язык/Kazakh (Russian) language	ЖББП/ ООД/Г ЕД	ОК	5	150	45			45		90	15	Аралас/К омбиниро ваный/С omposite exam	RW600 1

7	ОММ 6601/ОМ М 6601/ОМ М 6601	Жалпы білім беру модуль/Общобразователь ный модуль/General education module	ICT6001/IC T6001/ICT6 001	Ақпараттық- коммуникациялық технологиялар/Информац ионно- коммуникационные технологии/Information and Communication Technologies	ЖББП/ ООД/G ED	ОК	5	150	45	15	30	90	15	Аралас/К омбиниро ваный/С omposite exam	ЕЕС 6608
8	ВМ 6600/ВМ 6600/ВМ 6600	Физико- математикалық модуль/Физико- математический модуль/Physics and Mathematics module	PHU6004/P HY6004/PH Y6004	Физика (2)/Физика (2)/Physics (2)	БП/БД/ BD	ВК	4	120	45	15	30	60	15	Жазбаша/ Письменн ый/Writte n exam	ЕЕС 6635
9	ВМ 6600/ВМ 6600/ВМ 6600	Физико- математикалық модуль/Физико- математический модуль/Physics and Mathematics module	МАТ6002/ МАТ6002/ МАТ6002	Математикалық анализ/Математический анализ/Mathematical analysis	БП/БД/ BD	ВК	6	180	60	30	30	105	15	Жазбаша/ Письменн ый/Writte n exam	МАТ 6007
10	ВМ 6601/ВМ 6601/ВМ 6601	Негізгі модуль/Базовый модуль/Basic module	PP6600/PP6 600/PP6600	Учебная практика/Учебная практика/Educational Internship	БП/БД/ BD	ВК	2	60	30	30	30	15	15	Басқа/Др угое/Other exam	PP 6601
				<b>Total number for a semester:</b>			<b>40</b>	<b>1200</b>	<b>420</b>	<b>105</b>	<b>60</b>	<b>630</b>	<b>150</b>		
				<b>TOTAL NUMBER FOR THE YEAR:</b>			<b>60</b>	<b>1800</b>	<b>615</b>	<b>135</b>	<b>90</b>	<b>975</b>	<b>210</b>		
<b>2 year</b>															
<b>3 semester</b>															
1.	ОММ 6601/ОМ М 6601/ОМ М 6601	Жалпы білім беру модуль/Общобразователь ный модуль/General education module	PhC6006/Ph C6006/PhC 6006	Дене шынықтыру/Физическая культура/Physical Culture	ЖББП/ ООД/G ED	ОК	4	120	45	45	45	60	15	Аралас/К омбиниро ваный/С omposite exam	PhC 6004

2.	ОММ 6600/ОМ М 6600/ОМ М 6600	Тарихи-әлеуметтік модуль/Историко- социальный модуль/Historical and social module	SPS6001/SP S6001/SPS6 001	Философия/Философия/P hilosophy	ЖББП/ ООД/G ED	ОК	5	150	45	15	30	90	15	Аралас/К омбинро ваный/С omposite exam	RW60 01
3.	ВМ 6602/ВМ 6602/ВМ 6602	Радиотехника, электроника және метрология модуль/Модуль Радиотехники, электроника и метрологии/Radio Engineering, Electronics and Metrology module	ЕЕС6634/Е ЕС6634/ЕЕ С6634	Радиотехникалық құрылығдардың электроникасы мен сұлбатехникасы/Электрон ика и схемотехника радиотехнических устройств/Electronics and circuitry of radio engineering devices	БП/БД/ BD	ВК	7	210	75	30	15	120	15	Жазбаша/ Письменн ый/Writte n exam	ЕЕС 6637
4.	ВМ 6602/ВМ 6602/ВМ 6602	Радиотехника, электроника және метрология модуль/Модуль Радиотехники, электроника и метрологии/Radio Engineering, Electronics and Metrology module	ЕЕС6635/Е ЕС6635/ЕЕ С6635	Электр тізбектерінің теориясы/Теория электрических цепей/Basic Circuit Theory	БП/БД/ BD	ВК	6	180	60	15	15	105	15	Жазбаша/ Письменн ый/Writte n exam	ЕЕС 6605
5.	ВМ 6600/ВМ 6600/ВМ 6600	Физико- математикалық модуль/Физико- математический модуль/Physics and Mathematics module	МАТ6007/ МАТ6007/ МАТ6007	Комплекс айнымалылар функцияларының теориясы/Теория функций комплексного переменного/Theory of functions of a complex variable	БП/БД/ BD	ВК	4	120	45	15	30	60	15	Жазбаша/ Письменн ый/Writte n exam	ЕЕС 6636
6.	ВМ 6602/ВМ 6602/ВМ 6602	Радиотехника, электроника және метрология модуль/Модуль Радиотехники, электроника и метрологии/Radio Engineering, Electronics and Metrology module	ЕЕС 6604/ЕЕС 6604/ЕЕС 6604	Электромагниттік толқындардың таратылу теориясы/Теория передачи электромагнитных волн/Theory of Electromagnetic Waves Transmission	БП/БД/ BD	ВК	6	180	60	15	15	105	15	Жазбаша/ Письменн ый/Writte n exam	ЕЕС 6651

4 semester																	
		Total number for a semester:															
1.	ОММ 6600/ОМ М 6600/ОМ М 6600	Тарихи-элеуметтік модуль/Историко-социальный модуль/Historical and social module	SPS6004/SPS6004/SPS6004	Мәдениеттану/Культурология/Cultural studies	ЖББП/ООД/GED	ОК	2	60	60	30	15	15	90	540	90	Аралас/Комбинированный/Composite exam	RW6001
2.	ОММ 6600/ОМ М 6600/ОМ М 6600	Тарихи-элеуметтік модуль/Историко-социальный модуль/Historical and social module	SPS6005/SPS6005/SPS6005	Психология/Психология/Psychology	ЖББП/ООД/GED	ОК	2	60	60	30	15	15	90	540	90	Аралас/Комбинированный/Composite exam	RW6001
3.	ВМ 6605/ВМ 6605/ВМ 6605	Компьютерлік модельдеу модулі/Модуль Компьютерное моделирование/Computer Simulation module	ЕЕС 6608/ЕЕС 6608/ЕЕС 6608	Компьютерлік және математикалық модельдеу/Компьютерное и математическое моделирование/Computer and mathematical modeling	БП/БД/BD	КВ (КВ 3)	4	120	120	45	15	30	90	540	90	Аралас/Комбинированный/Composite exam	ЕЕС 6610
4.	ВМ 6605/ВМ 6605/ВМ 6605	Компьютерлік модельдеу модулі/Модуль Компьютерное моделирование/Computer Simulation module	ЕГР6600/ЕГР6600/ЕГР6600	Инженерлік және компьютерлік графика/Инженерная компьютерная графика/Engineering and computer graphics	БП/БД/BD	КВ (КВ 3)	4	120	120	45	15	30	90	540	90	Аралас/Комбинированный/Composite exam	RW6001
5.	ВМ 6602/ВМ 6602/ВМ 6602	Радиотехника, электроника және метрология модулі/Модуль Радиотехники, электроники и метрологии/Radio Engineering, Electronics and Metrology module	ЕЕС6636/ЕЕС6636/ЕЕС6636	Электр байланыс теориясы және телеграфика/Теория электрической связи и телеграфика/Telecommunication theory and teletraffic engineering	БП/БД/BD	ВК	6	180	180	60	15	30	90	540	90	Жазбаша/Письменный/Write p exam	ЕЕС 6610

6.	BM 6602/BM 6602/BM 6602	Радиотехника, электроника және метрология модулі/Модуль Радиотехники, электроники и метрологии/Radio Engineering, Electronics and Metrology module	ЕЕС 6605/ЕЕС 6605/ЕЕС 6605	Радиотехникалық тізбектер мен сигналдардың негіздері/Основы радиотехнических цепей и сигналов/Basics of radio circuits and signals	БП/БД/ BD	БК	4	120	45	15	30	60	15	Жазбаша/ Письменный/ Written exam	ЕЕС 6610
7.	BM 6607/ BM 6607/ BM 6607	Телекоммуникациялық желілер және жүйелер модулі/Модуль Телекоммуникационные сети и системы/Module networks and systems	ЕЕС6651/Е ЕС6651/ЕЕ С6651	Радиотолқындардың таралуы және антенна-фидерлік құрылғылар/Распространение радиоволн и антенно-фидерные устройства/Radio propagation and antenna feeder devices	БП/БД/ BD	БК	6	180	60	15	30	105	15	Жазбаша/ Письменный/ Written exam	ЕЕС 6650
8.	PM 6600/PM 6600/PM 6600	Кәсіби модуль/Профессиональный модуль/Professional module	PP6601/PP6 601/PP6601	Өндірістік тәжірибе/Производственная практика/Professional Internship	БП/П Д/СМ	БК	4	120	45	45	60	60	15	Басқа/Другое/ Other exam	PP6602
				<b>Total number for a semester:</b>			28	840	315	90	120	420	105		
				<b>TOTAL NUMBER FOR THE YEAR:</b>			60	1800	645	180	210	960	195		
<b>3 year</b>															
<b>5 semester</b>															
1.	BM 6606/BM 6606/BM 6606	Заманауи телекоммуникациялық желілер және жүйелер модулі/Модуль Современные телекоммуникационные сети и системы/Module	NET6602/N ET6602/NE T6602	Желілік технологияларға кіріспе/Введение в сетевые технологии/Introduction to networking technologies	БП/БД/ BD	БК	6	180	60	15	30	105	15	Компьютерлік тестілеу/ Компьютерное тестирование/Comp	NET 6601

		Modern telecommunication networks and systems																uter testing	
2.	PM 6605/PM 6605/PM 6605	Компьютерлік модельдеу модуль/Модуль Компьютерное моделирование/Computer Simulation module	ЕЕС 6610/ЕЕС 6610/ЕЕС 6610	Сигналдарды цифрлық өңдеу/Цифровая обработка сигналов/Digital signal processing	БП/П Д/СМ	ВК	4	120	45	15	15	30	60	15				Жазбаша/ Письменный п exam	ЕЕС 6607
3.	BM 6602/BM 6602/BM 6602	Радиотехника, электроника және метрология модуль/Модуль Радиотехника, электроника и метрологии/Radio Engineering, Electronics and Metrology module	ЕЕС6639/Е ЕС6639/ЕЕ С6639	Радиотарагушы құрылғылар/Радиопередающие устройства/Radio transmitter devices	БП/БД/ BD	ВК	6	180	60	15	15	30	105	15				Жазбаша/ Письменный п exam	ЕЕС 6638
4.	BM 6602/BM 6602/BM 6602	Радиотехника, электроника және метрология модуль/Модуль Радиотехника, электроника и метрологии/Radio Engineering, Electronics and Metrology module	ЕЕС6637/Е ЕС6637/ЕЕ С6637	Метрология және радиоөлшеу/Метрология и радиоизмерения/Metrology and radio measurements	БП/БД/ BD	ВК	4	120	45	15	15	30	60	15				Жазбаша/ Письменный п exam	ЕЕС 6650
5.			MIN601/ MIN601/ MIN601	Майнор 1/ Майнор 1/ Майнор 1	БП/БД/ BD	КВ	5	150	45	15	15	30	90	15				Жазбаша/ Письменный п exam	
				<b>Total number for a semester:</b>			25	750	255	75	30	150	420	75					

6 semester															
1	PM 6605/PM 6605/PM 6605	Компьютерлік модельдеу модулі/Модуль Компьютерное моделирование/Computer Simulation module	ЕЕС 6611/ЕЕС 6611/ЕЕС 6611	Цифрлық құрылғылар мен микропроцессорлар/Цифровые устройства и микропроцессоры/Digital devices and microprocessors	БП/П Д/СМ	ВК	4	120	45	15	30	60	15	Жазбаша/ Письменный экзамен exam	ЕЕС 6611
2	BM 6606/BM 6606/BM 6606	Заманауи телекоммуникациялық желілер және жүйелер модулі/Модуль Современные телекоммуникационные сети и системы/Module Modern telecommunication networks and systems	ЕЕС6672/Е ЕС6672/ЕЕ С6672	Заманауи телекоммуникациялық технологиялар мен аппаратты ғарау жүйелері/Современные телекоммуникационные технологии и системы передачи информации/Modern telecommunication technologies and information transmission systems	БП/БД/ BD	ВК	6	180	60	15	30	105	15	Жазбаша/ Письменный экзамен exam	ЕЕС 6649
3	BM 6601/BM 6601/BM 6601	Негізгі модуль/Базовый модуль/Basic module	LAN6002D A/LAN6002 DALAN60 02DA	STEM арналған ағылшын тілі/Английский язык для STEM/English for STEM	БП/БД/ BD	ВК	4	120	45	45		60	15	Аралас/Комбинированный/Composite exam	LAN 6003P A
4	BM 6602/BM 6602/BM 6602	Радиотехника және метрология модулі/Модуль Радиотехники, метрологии и радиоинженериясы/Engineering, Electronics and Metrology module	ЕЕС6638/Е ЕС6638/ЕЕ С6638	Радиотехника және метрология құрылғылар/Радиоприёмные устройства/Radio receivers	БП/БД/ BD	ВК	6	180	60	15	30	105	15	Жазбаша/ Письменный экзамен exam	ЕЕС 6619

5	PM 6605/PM 6605/PM 6605	Телекоммуникациялык желлер және жүйелер модулі/Модуль Телекоммуникационные сети и системы/Module Telecommunication networks and systems	NET6601/N ET6601/NE T6601	Маршрутизациялау және коммутиациялау нетіздері/Основы маршрутизации и коммутиации/The basics of routing and switching	БПЦ/П Д/СМ	ВК	6	180	60	15	15	30	105	15	Компьютерлік тестілеу/ Компьютерное тестирование/Computer testing	RW60 01
6			MIN602/ MIN602/ MIN602	Майнор 2/ Майнор 2 Майнор 2	БПЦ/П Д/СМ	КВ	5	150	45	15	30	90	15	Жазбаша/ Письменный экзамен/Written exam		
7	PM 6600/PM 6600/PM 6600	Кәсіби модуль/Профессиональный модуль/Professional module	PP6602/PP6 602/PP6602	Өндірістік тәжірибе/Производственн ая практика/Professional Internship	БПЦ/П Д/СМ	ВК	4	120	45	45	60	60	15	Бакалавр/ угос/Other exam	PP660 3	
				<b>Total number for a semester:</b>			35	1050	360	75	135	150	585	105		
				<b>TOTAL NUMBER FOR THE YEAR:</b>			60	1800	615	150	165	300	1005	180		
<b>4 year</b>																
<b>7 semester</b>																
1	BM 6607/ BM 6607/ BM 6607	Телекоммуникациялык желлер және жүйелер модулі/Модуль Телекоммуникационные сети и системы/Module Telecommunication networks and systems	EEС6652/Е ЕС6652/EE С6652	Радионавигациялык және радиолокациялык жүйелердің теориясы мен техникасы/Теория и техника радионавигационных и радиолокационных систем/Theory and	БП/БД/ BD	КВ (КВ 4)	4	120	45	15	30	60	15	Жазбаша/ Письменный экзамен/Written exam	RW600 1	

2	BM 6607/ BM 6607/ BM 6607	Телекоммуникациялык желлер және жүйелер модулі/Модуль Телекоммуникационные сети и системы/Module networks and systems	ЕЕС6653/Е ЕС6653/ЕЕ С6653	Ташыкты-оптикалык байланыс жүйелери/Волоконно- оптические системы связи/Fiber optic communication systems	БП/БД/ BD	КВ (КВ 4)	4	120	45	15	30	60	15	Жазбаша/ Письменн ый/Writte п exam	RW600 1
3	PM 6604/PM 6604/PM 6604	Заманауи мобилъді жүйелер модулі/Модуль Современные мобильные системы/Module Modem mobile systems	ЕЕС 6619/ЕЕС 6619/ЕЕС 6619	Телерадио хабарларын таратуу жүйелери/Системы телерадиовещания/Broadc asting systems	БП/П Д/СМ	ВК	6	180	60	15	30	105	15	Жазбаша/ Письменн ый/Writte п exam	RW600 1
4	PM 6604/PM 6604/PM 6604	Заманауи мобилъді жүйелер модулі/Модуль Современные мобильные системы/Module Modem mobile systems	ЕЕС6649/Е ЕС6649/ЕЕ С6649	Кенжолакты колжеткізу желлері мен жүйелері және Интернет заггар/Сети и системы широкополосного доступа и Интернета вещей/Broadband and Internet of Things networks and systems	БП/П Д/СМ	ВК	6	180	60	15	30	105	15	Жазбаша/ Письменн ый/Writte п exam	RW60 01
5	PM 6604/PM 6604/PM 6604	Заманауи мобилъді жүйелер модулі/Модуль Современные мобильные системы/Module Modem mobile systems	ЕЕС6647/Е ЕС6647/ЕЕ С6647	Мобилъді байланыс желлері мен жүйелери/Сети и системы мобильной связи/Mobile networks and systems	БП/П Д/СМ	ВК	6	180	60	15	30	105	15	Жазбаша/ Письменн ый/Writte п exam	ЕЕС 6650
6	PM 6600/PM 6600/PM 6600	Кәсіби модуль/Профессиональн ый модуль/Professional module	LAN6003P ALAN6003 PALAN60 03PA	Кәсіби бағытталган шет тілі/Профессионально- ориентированный иностранный	БП/П Д/СМ	ВК	3	90	30	30		45	15	Аралас/К омбиниро ванный/С omposite exam	RW600 1



2	BM 6606/BM 6606/BM 6606	Заманауи телекоммуникациялық желілер және жүйелер модулі/Модуль Современные телекоммуникационные сети и системы/Module Modern telecommunication networks and systems	ЕЕС6650/Е ЕС6650/ЕЕ С6650	Электромагниттік үйлесімділік және радиожылжитік спектрді пайдалануды басқару/Электромагнитна я совместимость и управление использованием радиочастотного спектра/Electromagnetic compatibility and RF spectrum management	БП/БД BD	ВК	6	180	60	15	15	30	105	15	Жазбаша/ Письменн ый/Writte n exam	RW60 01
3	PM 6600/PM 6600/PM 6600	Кәсіби модуль/Профессиональн ый модуль/Professional module	PP6603/PP6 603/PP6603	Диплом алдындағы тәжірибе/Преддипломная практика/Pre-diploma Internship	БПЦ/П Д/СМ	ВК	5	150	45	45	90	15	90	15	Басқа/Др угое/Othe r exam	-
4			RW6001/R W6001/RW 6001	Дипломдық жұмысты, дипломдық жобаны жазу және қорғау немесе кешенді емтиханды дайындау және тапсыру/Написание и защита дипломной работы, дипломного проекта или подготовка и сдача комплексного экзамена/Writing and defending a diploma thesis, diploma project or preparation and passing of a comprehensive exam	ҚА/ИА/ FE	OK	8	240				150	90	135	Басқа/Др угое/Othe r exam	-
				<b>Total number for a semester:</b>			24	720	150	30	90	30	435	135		
				<b>TOTAL NUMBER FOR THE YEAR:</b>			60	1800	510	120	180	210	1050	240		
				<b>TOTAL:</b>			240	7200	2385	585	990	810	3990	825		

Summary table of indicators of the academic program's number of credits in the context of cycles of disciplines and semesters

Cycles of disciplines / Semester	1 sem.	2 sem.	3 sem.	4 sem.	5 sem.	6 sem.	7 sem.	8 sem.	Total ECTS Credits	Note (AP structure according to the National Mandatory Standards of Higher and Post-Graduate Education)
Cycle of general education disciplines (GED)	10	28	9	4				5	56	* No more than 56 cr.
- including the required component (GED RC)	10	28	9	4				5	56	* No more than 51 cr.
- including optional component (GED OC)	0	0	0	0				0		* Not less than 5 cr.
Cycle of core disciplines (CD)	10	12	23	20	21	16	4	6	112	* No more than 112 cr.
- including the university component (CD UC)	10	12	23	16	16	16	4	6	99	
- including optional component (CD OC)	0	0	0	4	5	0	4	0	13	
Cycle of majors (M)				4	4	19	32	5	64	* Not less than 60 cr.
- including the university component (M UC)				4	4	14	27	5	54	
- including optional component (M OC)				0	0	5	5	0	10	
Professional internship (PI)										
Additional types of training										
Final attestation (FA)								8	8	8 cr.
<b>TOTAL number of credits for the academic program</b>	<b>20</b>	<b>40</b>	<b>32</b>	<b>28</b>	<b>25</b>	<b>35</b>	<b>36</b>	<b>24</b>	<b>240</b>	Not less than 240 cr.

## 5. Minors

Name of Minors, indicating the list of disciplines that form them	Number of Minor credits/number of discipline credits	Semesters	Document issued on the basis of the results of mastering Minors
<b>Mobile telecommunication technologies</b>	<b>15</b>		<b>Certificate</b>
EEC 6637–Metrology and radio measurements	5	5	
EEC 6605–Basics of radio circuits and signals	5	6	
EEC 6647–Mobile networks and systems	5	7	

### 6. Developer Approval Sheet

Code and name of the academic program "6B06203 - Mobile telecommunication technologies"

No.	Academic program Developers (position, academic degree, full name)	Date	Signature	Note
1	Assistant Professor of the Department of Radio Engineering, Electronics and Telecommunications, C.T. Sc., Bakhtiyarova Yelena Azhibekovna			
2	Professor of the Department of Radio Engineering, Electronics and Telecommunications, C.T. Sc., Aitmagambetov Altay Zufarovich			
3	Senior lecturer of the Department of Radio Engineering, Electronics and Telecommunications, Master of RET, Kulakayeva Aigul Yergalievna			
4	Assistant Professor of the Department of Radio Engineering, Electronics and Telecommunications, PhD, Serikbolova Albina Askarovna			