

**MINISTRY OF LABOR AND SOCIAL PROTECTION OF THE  
POPULATION OF THE REPUBLIC OF KAZAKHSTAN**

**“DEVELOPMENT OF LABOR SKILLS AND STIMULATION OF  
WORKPLACES” PROJECT**

**EDUCATION PROGRAM**

**1306000-Radioelectronics and communications (by type)**  
(code and name of the specialty)

**Professional Qualification Level: Applied Bachelor**

**Duration of training: 2 years 10 months.**

**Astana, 2018**

The education program was reviewed and recommended by the Republican Educational and Methodological Council of the Ministry of Education and Science of the Republic of Kazakhstan

*Record No. 3 dated "18" August 2018*

**Authors-developers:**

1. Nursultan Tabyldyevich Kayupov – Team Head of EP developers, expert on business service analysis on management of business information and knowledge about the customer “Kar-Tel” LLP;

2. Almagul Amerovna Bralimova – Senior expert on business service analysis on management of business information and knowledge about the customer “Kar-Tel” LLP;

3. Iliyas Beisenbayevich Smagulov - leading specialist on business service analysis on management of business information and knowledge about the customer “Kar-Tel” LLP;

4. Moldir Islamkyzy Kajupova – the laboratory expert of the 2<sup>nd</sup> category of RGP “Kazakhstan Institute of Metrology”.

5. Yesperdi Nurdauletovich Kozhabekov – a teacher of special disciplines of first category of the “College of energy and communications”.

**Experts:**

Larisa Alexandrovna Ostashova – a teacher of special disciplines of the second category of the “College of transport and communications”

## TABLE OF CONTENTS

	Introduction	5
1	Abbreviations and symbols	6
2	Passport of the education program	7
3	Competency profile	8
4	List of modules and learning outcomes	11
4.1	Specification of Basic Module BM 1. Application of professional vocabulary, the preparation of business papers in the field of professional activity	30
4.2	Specification of Basic Module BM 2. Development and improvement of physical qualities	32
4.3	Specification of Basic Module BM 3 Application of the foundations of social sciences for socialization and adaptation in society and the workforce	34
4.4	Specification of Basic Module BM 4. Reading of drawings.	36
4.5	Specification of Basic Module BM 5. Application of basic knowledge of economics in professional activities	38
4.6	Specification of Basic Module BM 6. Understanding the history, role and place of Kazakhstan in the world community	40
4.7	Specification of Basic Module BM 7. Application of digital devices and microprocessor systems in communication technology	42
4.8	Specification of Basic Module BM 8. Compliance with safety regulations and labor protection.	44
4.9	Specification of Professional Module PM 1. Organization of work on the assembly, installation and dismantling of electronic equipment.	46
4.10	Specification of Professional Module PM 2. Organization of work on setting up and adjusting devices, units and devices of electronic equipment	49
4.11	Specification of Professional Module PM 3. Organization of work on the repair of electronic equipment.	51
4.12	Specification of Professional Module PM 4. Organization of work on the diagnosis of electronic equipment	54
4.13	Specification of Professional Module PM 5. Planning standard tests of devices, units and devices of electronic equipment.	57
4.14	Specification of Professional Module PM 6. Organization of work on checking the status of the equipment received from the repair of mobile communications	60
4.15	Specification of Professional Module PM 7. Monitoring of the causes and nature of defects	63
	Specification of Professional Module PM 8. Development and	

4.16	execution of design and technical documentation and other regulatory and technical documents in accordance with the requirements of standards, GOST, SSDD and other regulatory and technical documents	66
4.17	Specification of Professional Module PM 9. Development of prospective technical requirements for the designed electronic equipment	69
4.18	Specification of Professional Module PM 10. Organization of work of the structural unit	72
4.18	Specification of Professional Module PM 11. Development of mobile information and communication networks and mobile communication systems	74
5	Education Process Plan	77

## INTRODUCTION

The President of the country N.A.Nazarbayev in a message to the people of Kazakhstan 2018: “It is necessary to develop modern standards in all major professions. In these standards, employers and businesspersons clearly consolidate what knowledge, skills and competences should have the employees. You need, based on the requirements of the professional standards, to develop new or update existing educational programs”.

This educational program is developed based on the basic normative documents defining the training content by specialty - 1306000 Radio engineering and communication (by types)”:

- State standard “Information technology of telecommunications networks, ST RK 34.007-2002;
- State compulsory standard for technical and vocational education, approved by the Government Decree of the Republic of Kazakhstan dated August 23, 2012, No. 1080 (as amended as of 15.08.2017);
- National Qualifications framework, approved by the Protocol dated March 16, 2016;

A distinctive characteristic of this educational program is compliance with requirements of professional social order through the creation of generic and professional competences associated with essential practical activity.

Based on the present Educational Program the education organization develops working programs and curricula, using appropriate methodological recommendations for the working educational and planning documentation.

The program is designed to implement the principles of democratic administration of education, expanding the boundaries of academic freedom and the authority of the educational institutions that will ensure the adaptation of the system of technical and vocational education to the changing needs of society, the economy and the labor market. The program flexibility will take into account the ability and needs of the individual, production and society.

The educational program includes the use of modular competence-based approach based on developing and evaluating competence of students of the educational institutions in the form of basic educational outcomes, use of a module training.

## LIST OF SYMBOLS AND ABBREVIATIONS

BC	Basic competence
BM	Basic module
HE	Higher education
SCES	The State compulsory education standard
DP	Diploma project
EQF	European qualification framework
SSDD	Single system for design documentation
ETF	The European Training Foundation
K&S	Knowledge and skills
FC	Final certification
NCO	National classifier of occupations
NQF	National Qualifications framework
NSC	National qualifications system
GHM	General Humanitarian Module
GCEA	General classifier of types of economic activity
GM	General module
EP	Education program
GPM	General Professional Module
SQF	Sectorial Qualifications framework
IC	Intermediate certification
PS	Professional standard
GE	Graduate education
PC	Professional competence
DD	Design documentation
PM	Professional module
PP	Professional practice
WG	Working Group
RK	The Republic Of Kazakhstan
LO	Learning outcome
SM	Special module
QMS	The quality management system
SEM	Socio-economic module
TVET	Technical and vocational education training
TVET&PSE	Technical and Vocational Education and Post-Secondary Education
AC	Assessment criterion
C	Consultation
O	Optional
COMPUTERS	Electron-calculating machine

## PASSPORT OF THE EDUCATIONAL PROGRAM

**Name (specialty code and name):** -1306000 Radio Engineering and communications (by types)

**Name and code:** 1306164 -“Applied Bachelor of mobile communication systems”

**Purpose of the educational program:** Ensuring of integrated and qualitative training of qualified competitive specialists in the field of mobile communication systems based on the formation and development of professional and personal qualities and skills required for the future specialist for organization of work on the technical operation and maintenance of information security and perform wiring station equipment of information and communication networks and mobile communication systems.

**Level of education:** technical and vocational

**Professional qualification:** Applied Bachelor

**Skill levels on NQF/SQF:** 5

**Professional Area activity \*:** Radio Electronics

**Type (s) of employment:**

- Organization of works on technical exploitation and maintenance of information and communication networks for mobile communications;
- Development of a set of methods and means of information protection in information and communication networks and mobile communication systems;
- Development of guidance on technical operation of telecommunication systems of mobile communication;
- Planning of the electrical installations of the station of mobile communication equipment;
- Organization of the production activity of the structural unit;
- Development of projects on mobile telecommunication networks and communication systems for enterprises and small and medium-sized businesses.

**Object (s) of professional activity:** Mobile operators; the national telecommunications company.

**Program Feature\*\*\*\*:** The possibility to use dual forms of training credit system.

**Form of study:** full-time

**Training dates:** 2 years10 months.

**Language of instruction:** Kazakh, Russian

**The volume of credits/hours:** 165 credits/4950 hours

**Requirements for students\*\*\*\*\*:** persons with basic secondary education

\*Specifies the parameters of the SQF (methodical recommendations on the development and design of sectoral qualification frameworks, Astana, 2016g).

\* Specify FP (methodical recommendations on the design and execution of professional standards, Astana, 2017)

Specifies the system objects (objects), phenomena, processes, and technology that aims activities.

\*\*\*\*Specifies the dual education/distance training/credit technology

\*\*\*\*\* Specifies the previous education: basic secondary/secondary/technical and vocational education

## Competency profile

<p><b>Purpose of the training :</b> Ensuring integrated and qualitative training of qualified competitive specialists in the field of mobile communication systems based on the formation and development of professional and personal qualities and skills required for the future specialist for planning and technical exploitation and maintenance of information security and perform wiring station equipment information and communication networks and mobile communication systems .</p>	<p><b>After the successful completion of the program</b> the trainee will be able to plan and organize work on the operation, maintenance and technical and information security information and communication networks and mobile communication systems.</p>
<p>The name of the section, section, group, class and subclass according to OKED * (professional standard):</p>	<p>Section: information and communication            Section: (61)            Group: (612) wireless telecommunications activities            Class: (6120) wireless telecommunications activities</p>
<p>The scope of competencies (core labor standard or professional functions analysis profession) **</p>	<ul style="list-style-type: none"> <li>-Organization of works on technical exploitation and maintenance of information and communication networks for mobile communications;</li> <li>-Development of a set of methods and means of information protection in information and communication networks and mobile communication systems;</li> <li>-Development of guidance on technical operation of telecommunication systems of mobile communication;</li> <li>-Planning of the electrical installations of the station of mobile communication equipment;</li> <li>-Organization of the production activity of the structural unit;</li> <li>-Development of projects of mobile telecommunication networks and communication systems for enterprises and small and medium-sized businesses.</li> </ul>



<b>Basic Competence</b>		
<b>Competency code</b>	<b>Competence (in line with labor functions)</b>	<b>Module</b>
BC 1	Application of professional vocabulary to make business papers in the field of professional activity.	BM 1. The use of professional vocabulary, the preparation of business papers in the field of professional activity.
BC 2	Develop and improve physical qualities	BM 2. Development and improvement of physical qualities.
BC 3	Apply the foundations of social sciences for socialization and adaptation in society and the work places	BM 3. Application of the foundations of social sciences for socialization and adaptation in society and the work places
BC 4	Reading drawings	BM 4. Reading of drawings
BC 5	Apply basic knowledge of economics in professional activities	BM 5. Application of basic knowledge of economics in professional activities
BC 6	Understand the history, role and place of Kazakhstan in the world community	BM 6. Understanding the history, role and place of Kazakhstan in the world community
BC 7	Application of digital devices and microprocessor systems in communication technology	BM 7. The use of digital devices and microprocessor systems in communication technology
BC 8	Comply with safety regulations and labor protection	BM 8. Compliance with safety regulations and labor protection
<b>Professional competence</b>		
PC 1.	Perform installation, configuration and initial installation of wired and wireless access networks	PM 1. Installation, configuration and initial installation of wired and wireless access networks
PC 2.	Perform information protection in information and communication networks and mobile communication systems	PM 2. Perform information protection in information and communication networks and mobile communication systems
PC 3.	Perform work to ensure the performance of systems and equipment of mobile	PM 3. Performance of work to ensure the health of systems and equipment of

	communication networks	mobile communication networks
PC 4.	Carry out work on the installation and maintenance of the equipment of telecommunication systems and subscriber access lines	PM 4. Works on installation and maintenance of equipment of telecommunication systems and subscriber access lines
PC 5.	Perform network equipment administration	PM 5. Perform network equipment administration
PC 6.	Monitor and diagnose mobile telecommunication systems	PM 6. Monitoring and diagnostics of mobile telecommunication systems
PC 7.	Carry out a set of works on wiring station equipment for mobile communications	PM 7. A set of works on the wiring of station equipment for mobile communications
PC 8.	Perform work on installations of subscriber access equipment of telecommunication systems and information and communication communication networks	PM 8. Installation of subscriber access equipment of telecommunication systems and information and communication communication networks
PC 9.	Service of mounted lines and terminal equipment of subscriber access systems and information and communication communication networks	PM 9. Service of mounted lines and terminal equipment of subscriber access systems and information and communication communication networks
PC 10.	Organization of work of the structural unit	PM 10. Organization of work of the structural unit
PC 11.	Development of mobile information and communication networks and mobile communication systems	PM 11. Development of mobile information and communication networks and mobile communication systems

\* The general classification of economic activities (GCEA) is a document intended for classification and coding of all economic activities.

\*\* A brief description of labor functions that allow you to achieve the main objectives of the specialty/profession. Number of functions depends on the complexity of the profession.

## LIST OF MODULES AND LEARNING OUTCOMES

Module name	Learning outcomes (in accordance with the professional tasks)	Assessment Criteria of learning outcomes	Disciplines forming the module
<b>Basic modules</b>			
BM 1. Application of professional vocabulary drafting of business papers in the field of professional activity.	LO 1. To know the grammar and terminology of the Kazakh (Russian) and foreign language for communication in the sphere of their professional activities.	1. Knowing of lexical and grammatical material in the specialty necessary for professional communication	Professional Kazakh (Russian) language Professional foreign language
		2. Understanding the value of written and oral communication in the state and other languages	
		3. Implementation of interpersonal contacts and communication of participants in the educational process in terms of multilingualism	
	LO 2. To know the translation technique (with a dictionary) of professionally-oriented texts.	1. Using dictionaries for translating texts	
		2. Application of specialty terminology in the state and other languages	
		3. Reading and translation (with a dictionary) texts of professional orientation.	
	LO 3. To demonstrate the ability for successful oral and written communication in	1 Manifestation of the ability for successful oral and written communication in the state and other languages.	

	the state and other languages	2. Application of communication skills to establish and develop relations of cooperation and partnership	
		3. Use written and verbal communication to exchange information, establish and maintain business relationships	
BM 2. Develop and improve physical qualities.	LO 1. To strengthen health and abide by the principles of a healthy lifestyle.	1. Understanding and adhering to the fundamentals and culture of a healthy lifestyle	Physical education
		2. Characteristics of the physiological basis of the respiratory, circulatory and energy supply systems under muscle loads	
		3. Performing a set of exercises for general physical training	
	LO 2. To improve physical qualities and psycho-physiological abilities	1. Characteristics of the basics of physical activity and methods of its regulation	
		2. Selection and application of methods and means of physical culture to improve the basic physical qualities	
		3. Implementation of control standards and tests provided by the program	
LO 3. To provide	1. Understanding the		

	first aid for injuries and accidents	causes of injury during exercise	
		2. Using injury prevention methods	
		3. Providing medical care for injuries	
BM 3. Application of the foundations of social sciences for socialization and adaptation in society and the work place	LO 1. To know the basic concepts and information of philosophy, political science, cultural studies and sociology	1. Understanding the essence and essence of the concepts, categories and information of philosophy, political science, cultural studies and sociology	Basic Philosophy Cultural Studies Law basics
		2. Identification of problems and interrelations of the main categories and concepts of philosophy, political science, cultural studies and sociology	
		3. Analysis of various points of view	
	LO 2. To understand international political processes, the geopolitical situation and moral values, and the norms that form tolerance and an active personal stance.	1. Characteristics of the structure of the political system, history and the current state of the world and traditional religions	
		2. Determining differences in extremist, radical and terrorist ideologies	
		3. Tolerant perception of social, ethnic, religious and cultural differences	
	LO 3. To know basic concepts and information about the main branches of law	1. Possession of the basic provisions of criminal, civil and family law and information about	

		taxes	
		2. Understanding of responsibility for administrative and corruption offenses and respect for the principles of law and order	
		3. Protection of rights in accordance with the labor law	
BM 4. Reading of drawings.	LO 1. To know the rules of design SSDD	1 Possession of basic concepts of basic technological drawing.	Technical drawing
		2. Understanding of unified system design documentation	
		3. Formulation of design rules	
	LO 2. To issue SSDD in accordance with the main standards of SSPD	1. Determining the purpose of the scale. Drawing technical details	
		2. Possession of skills design SSDD.	
		3. Execution of drawings in accordance with the main standards SSPD	
	LO 3. To perform design on the plane.	1 Reading assembly drawings and circuit diagrams	
		2 Possession of design skills on the plane	
		3. Execution of schemes of drawings with projection on the plane.	
BM 5. Application of basic	LO 1. To determine the forms and types of ownership, types	1. Understanding of the patterns and principles of market	Fundamentals of Economics

knowledge of Economics in professional activity	of plans, basic economic indicators of enterprises	economy, tax policy, sources of inflation, milestones and content planning	
		2. The necessary economic calculations with the application of mathematical methods to determine basic economic indicators of enterprises	
		3. Definition of basic economic indicators of enterprises	
	LO 2. To understand trends in the world economy, the main tasks of the State transition to the “green” economy	1. The development trends characteristic in the world economy	
		2. Understanding of the basic tasks of the State transition to the “green” economy	
		3. Application of basic methods of calculating gross domestic product and gross national product to move States toward a green economy	
	LO 3. To determine the possibility of success and business risk	1. Characteristics of objectives, factors, conditions, organizational-legal forms of business activities	
		2. Understanding of the factors determining the success of business activity	
		3. Writing a business plan	
	BM 6. Understanding	LO 1. To name the basic historical	

of the history, role and place of Kazakhstan in the world community	events	antiquity to the present time
		2. Disclosure of the role and place of the Kazakh people in all-Turkish community, in the system of nomadic civilization, in the development of historical and cultural community of peoples of the Eurasian world
		3. Compiling the chronology of major historical events
	LO 2. To establish cause-and-effect relationships of historical events	1. Understanding the facts, processes and phenomena of historical events
		2. Definition of the basic facts, processes and phenomena, reflecting and describing the integrity and consistency of the history of Kazakhstan
		3. Determination of cause-and-effect relationships of historical events
	LO 3. To assess achievement of independent Kazakhstan	1. Understanding the essence and purpose of political and social developments in the Republic of Kazakhstan since independence obtaining
		2. Characteristics of achievements of the independent Kazakhstan



		3. Evaluation of the achievements of the independent Kazakhstan	
BM 7. Application of digital devices and microprocessor systems in communication technology	LO 1. To work with the information on the Internet	1. Understanding of the technical aspects of the use of the Internet and the notion of copyright	Computer technology
		2. Adherence to the principles of the Internet community and the behavior code on the Internet	
		3. Determining the accuracy of the information	
	LO 2. To communicate in the Internet	1. Evaluation and analysis of sites	
		2. Managing social networking, avatar, and reputation in the network.	
		3. Get information on the code of the digital world, the virtual world, on aggression on the Internet	
	LO 3. To implementation of digital consumption	1. Understanding of online advertising, online fraud	
		2. Understanding phishing, online games	
		3. Use of Internet-shops, signs of reliability, consumer rights	
BM 8. Compliance with safety regulations and labor protection.	LO 1. To know basic concepts, techniques of first aid and emergency protection methods	1. Understanding of the legal, regulatory, technical and organizational foundations on safety in Emergency	Occupational safety and prevention of accidents

	Situations
LO 2. To follow the safety regulations, fire safety and security anti-terrorism requirements	2. Master the fire and safety rules, rules of conduct, methods and means for the protection of people in an emergency (accident, catastrophe, disaster)
	3. Recognition of major natural and technogenic hazards
	1. Assessing the risk of hazards associated with violations of safety regulations, fire safety, requirements to ensure anti-terrorist protection and emergencies
	2. To master requirements to ensure fire safety during maintenance of telecommunication networks.
	3. Safety measures and precautions during maintenance of telecommunication networks.
LO 3. To apply first aid techniques, methods of protection in emergencies	1. Formation and deepening of knowledge and understanding of the need to use first aid techniques, methods of protection in situations of danger for life in emergency situations in their professional activities

		2. The consistent perception, evaluation, comparison and analysis of the information and use it for practical settlement of professional issues	
		3. Application of practical skills for security in dangerous situations of everyday life and in emergency situations of different nature	

### Professional Modules

PM 1. Installation, configuration and initial installation of wired and wireless access networks	1. To model data networks with the provision of communication services	1. Construction of computer networks and topological models	Installation of equipment for wireless networks; The transmission network of data; Digital and fiber-optic systems; Perform installation of equipment telecommunication subscriber access
		2. Modeling data networks	
		3. Planning activities for the installation of data networks	
	2. To develop and create an information and communication network with the provision of	1. Development of network diagrams with the provision of services	
		2. Planning work on the creation of	

	communication services	information and communication networks	
		3. Implementation control work on the creation of information and communication networks	
	3. To develop and create multi-service networks	1. Development of multiservice networks	
		2. Planning for the creation of multiservice networks	
		3. Implementation control work on the creation of multiservice networks	
	PM 2. Implementation of a set of works on wiring station equipment for mobile communications	1. To plan work on electrical measurements of subscriber access lines	
2. Selection of tools for electrical measurements of lines			
3. Distribution of work on electrical measurements among personnel			
2. To schedule electrical measurements of network access parameters		1. Selection of instruments for electrical measurements of network access parameters	
		2. Determination of the frequency of electrical	

		measurements	
		3. Distribution of work on electrical measurements among personnel	
	3. To determine the scope of work for the wiring of station mobile equipment	1. Drawing up a list of works on electrical measurements of station mobile equipment	
		2. Selection of instruments for electrical work on station equipment	
		3. Distribution of work on electrical measurements among personnel	
PM 3. Performance of work to ensure the performance of systems and equipment of mobile communication networks	1. To monitor equipment of information and communication networks to assess its performance	1. Application of monitoring systems of equipment information and communication networks	Fundamentals of technical operation and maintenance of communication equipment; Automated control systems; Telecommunications system maintenance; Basics of Electronics and Circuitry
		2. Checking the technical status of information and communication networks	
		3. Evaluation of the state of information and communication equipment networks	
	2. To control the quality of technical maintenance of information and communication equipment networks	1. Preparation of a plan for bypassing equipment for assessing the quality of service	
		2. Checking the technical condition of equipment	

		3. Evaluation of the quality of equipment maintenance	
	3. To issue recommendations on how to optimize the process of maintenance of equipment of information and communication networks	1. Analysis of the assessment of the quality of maintenance of equipment	
		2. Determination of optimal processes for improving the quality of maintenance	
		3. Drafting recommendations for improving the quality and optimizing the process of equipment maintenance	
PM 4. Works on installation and maintenance of equipment of telecommunication systems and subscriber access lines	1. To phase installation plans for mobile communication systems	1. Definition of a list of installation works for mobile communication systems	Installation of wireless equipment; Data networks; Digital and fiber optic systems; Installation of subscriber access equipment of telecommunication systems
		2. Selection of materials and equipment required for the installation	
		3. Description of the stages of installation works for mobile communication systems	
	2. To develop schemes, installation and maintenance of structured cable systems	1. Building scheme of installation of structured cabling systems	
2. The schema definition of the operation of cable systems			

		3. Formation of technical requirements for the installation works of cable systems	
	3. To organize regular monitoring of equipment operation of telecommunication systems and subscriber access lines	1. Determining the list of equipment and subscriber access lines in need of verifying	
		2. The formation of the timetable for the health monitoring of telecommunication systems	
		3. Planning of verification of subscriber access lines	
PM 5. Performance of work on protection of information in information and communication networks and mobile communication systems	1. To determine the best ways to ensure information security;	1. Determination of the actual level of information security;	Basics of information security; The theory of complex information protection methods; Computer science; Digital transmission systems; Data transmission in information management systems; Hardware protection
		2. Analysis of current remedies for relevance;	
		3. Selection of protection tools to improve the quality of information security;	
	2. To conduct a selection of protective equipment in accordance with the identified threats in mobile communication systems;	1. Analysis of identified threats in mobile communication systems;	
		2. Determination of the characteristics of the remedies necessary to eliminate the identified threats;	
		3. The introduction	

		of selected tools to ensure information security;	
	3. To develop security policies and information encryption methods to ensure secure data exchange.	1. Development of methods for encrypting information;	
		2. Determining the level of security of data exchange channels;	
		3. Development of a security policy for data exchange channels.	
PM 6. Monitoring and diagnostics of mobile telecommunication systems	1. To monitor the monitoring of the performance of telecommunications systems equipment;	1. Monitoring the progress of monitoring;	Цифровые и волоконно-оптические системы; Обслуживание систем телекоммуникаций; Прикладная информатика и вычислительная техника.
		2. Monitoring the verification of the technical condition of the systems;	
		3. Evaluation of monitoring to improve the skills of the subordinate;	
	2. To analyze the results of determining the type and location of damage;	1. Determination of the causes of damage;	
		2. Selection of methods for repairing damage of different types;	
		3. Selection of materials and devices to eliminate damage;	
	3. To form teams and analyze printouts in	1. Formation of teams in various operating systems;	



	various systems.	2. Determining the state of the system according to the indicators in printout	
		3. Conclusion recommendations for optimizing the system.	
PM 7. Perform network equipment administration	1. To prepare plans for setting up, addressing and working in networks of various topologies	1. Planning work on setting up networks of various topologies	Communication networks and switching systems; Digital switching systems; Setting up network equipment; Data transfer in information management systems
		2. Configuring addressing in networks	
		3. Control over the smooth operation of networks	
	2. To carry out preventive, diagnostic work and prompt troubleshooting of network equipment	1. Planning preventive work network equipment	
		2. Diagnosing faults in network equipment	
		3. Troubleshooting network equipment	
	3. To manage the interaction of telecommunications networks of various technologies (SDH, WDM)	1. Configuring SDH technology network interactions	
		2. Configuring WDM technology network interactions	
		3. Control of telecommunications networks	
PM 8. Installation of subscriber access equipment of telecommunication systems and information and communication	1. To determine installation sites for subscriber access equipment	1. Collection of data on the actual locations of subscriber access equipment	Installation of subscriber access equipment of telecommunication systems; Fundamentals of technical operation and
		2. Analysis of the territory coverage with subscriber access equipment	

communication networks		3. Definition of blind zones for further installation of subscriber access equipment	maintenance; Digital transmission systems of communication equipment;
	2. To draw up installation diagrams of subscriber access equipment of telecommunication systems and information and communication networks	1. Pyritization of installation zones for subscriber access equipment	
		2. Determining the type of installation scheme for the selected zone	
		3. Mapping the installation for the selected type	
	3. To determine the types of interfaces of information and communication networks for mobile communications	1. Analysis of information and communication networks to determine the implemented interface	
		2. Selection of optimal interfaces for the corresponding information and communication network	
		3. Implementation of the selected interface	
		4. Bypassing the planned equipment for assessing the functionality	
		5. Evaluation of the functionality and performance of equipment	
	4. To assess the quality of the installation of equipment for	1. Preparation of a plan for bypassing installed equipment for inspections	

	information and communication mobile networks	2. Check installed equipment for faults 3. Determination of faults to eliminate	
PM 9. Service of mounted lines and terminal equipment of subscriber access systems and information and communication networks	1. To check the functioning of subscriber access equipment	1. Establishment of a plan for checking the functioning of equipment	Fundamentals of information and automation; The economics of the industry; Technical drawing; Automation of production processes; Radio scripts; Framework of standardization and certification; Professional practice
		2. Bypassing the planned equipment for assessing the functionality	
		3. Evaluation of the functionality and performance of equipment	
	2. To test equipment switching systems	1. Application of tools for testing switching systems	
		2. Analysis of test results	
		3. Evaluation of the performance of switching systems	
	3. To assess the quality of the installation of equipment information and communication networks for mobile communications	1. Drawing up a plan for bypassing installed inspection equipment	
		2. Check installed equipment for faults	
		3. Determination of faults to eliminate	
PM 10. Organization of work of the structural unit	1. To prepare a work plan and assign responsibilities to the personnel of the structural unit based on knowledge of the psychology of the individual and team	1. Definition of the list of tasks, assessment of competence and personal qualities of employees to perform the tasks facing the unit	Basics of informatization and production automation; Industry economics; Technical drawing; Automation of production
		2. Assessment of the volume and timing of the unit	

		3. Planning and distribution of work units for personnel	processes; Radio materials; Fundamentals of standardization and certification; Professional practice
	2. To rationally organize the work of the unit	1. Analyze the needs of employees to improve work efficiency, apply modern management technologies of the organization's division	
		2. Determine the optimal work sites for each employee, applying management skills in the field of professional activity.	
		3. Providing the necessary funds to ensure the efficiency of the employee	
	3. To manage conflict situations, stresses and risks.	1. Forming a team so as to prevent conflicts	
		2. Apply the principles of business communication in a team	
		3. Application of the foundations of conflictology	
PM 11. Development of mobile information and communication networks and mobile communication systems	1. To make basic scenarios for establishing connections in subscriber access networks	1. Analysis of the requirements of customers for the project 2. Creation of a draft project on the establishment of subscriber access networks Industrial training; Industry economics and	Industrial training; Industry economics and business fundamentals; Fundamentals of technical operation and maintenance of

	<p>business fundamentals; Fundamentals of technical operation and maintenance of communication equipment; Installation of subscriber access equipment of telecommunication systems</p>	<p>communication equipment; Installation of subscriber access equipment of telecommunication systems</p>
	3. Conclusion of basic connection scenarios	
2. To carry out the development of projects of switching stations, nodes and telecommunication networks for enterprises and companies of small and medium business.	1. Drawing up a project plan based on customer requirements	
	2. Calculation of the number of nodes and telecommunication networks of switching stations	
	3. Approval of developed projects for enterprises and small and medium-sized businesses.	
3. To implement the approved project in a timely manner.	1. Determination of the volume and timing of delivery of projects	
	2. Development of technical documentation of projects	
	3. Phased implementation of project tasks	

## Specification of Basic Module BM 1

### "Application of professional vocabulary, writing business papers in the field of professional activity"

<b>Scope of competence</b>	
<b>Title and code of the module</b>	Application of professional vocabulary, writing business papers in the field of professional activity
<b>Purpose of the module</b>	After studying this module, the student will be able to apply professional vocabulary in the field of professional activity.
<b>Level of professional qualification</b>	Applied bachelor
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1) To know the grammar and terminology of the Kazakh (Russian) and foreign languages for communication in the sphere of their professional activities.</li> <li>2) To know the translation technique (with a dictionary) of professionally-oriented texts</li> <li>3) To conduct professional dialogical speech in Kazakh (Russian) and foreign languages.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Knowing of lexical and grammatical material in the specialty necessary for professional communication.</li> <li>2. Understanding the value of written and oral communication in Kazakh (Russian) and foreign languages.</li> <li>3. The use of communication skills to establish and develop relations of cooperation and partnership.</li> <li>4. Writing texts using various presentation forms.</li> <li>5. Reading and translating (with a dictionary) texts of professional orientation.</li> <li>6. Independent compilation of coherent, logical reasoned statements in accordance with the proposed topic.</li> <li>7. Understanding of the discussion topics and participation in its discussion.</li> <li>8. Drawing up in Kazakh (Russian) and foreign languages a summary, autobiography, description, statement, complaint, power of attorney, receipt.</li> <li>9. Compliance with the basic requirements for</li> </ol>

	the text of the document. 10. Creation of documents on the computer that meet modern requirements and established regulations.
<b>Prerequisites</b>	The Kazakh language, Russian language, foreign language.
<b>Modules forming the discipline</b>	Professional Kazakh (Russian) language Professional foreign language.
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intense (credits /academic hours)</b>	6 credits /180 hours
<b>Duration of the module</b>	3,4,5 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process Teaching methods</b>	Lecture, independent work, practical lesson, labs. Active teaching methods: presentation, interview, essay, discussion, didactic, educational games, training
<b>Control Forms</b>	Pass fail exam, exam
<b>Required Resources</b>	Presentations, videos, posters, etc.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	PM 02-PM 07

**Specifications for the basic module 2**  
**“Development and improvement of physical qualities”**

<b>Scope of competence</b>	
<b>Title and code of the module</b>	Development and improvement of physical qualities
<b>Purpose of the module</b>	After studying this module, the tutor will be able to Develop and improve physical qualities.
<b>Level of professional qualification</b>	4
<b>Learning outcomes by module</b>	<ol style="list-style-type: none"> <li>1. To strengthen health and abide by the principles of a healthy lifestyle.</li> <li>2. To improve physical qualities and psycho-physiological abilities.</li> <li>3. To provide first medical aid in case of injuries and non-frequent cases.</li> </ol>
<b>A summary of the content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Understanding and adhering to the fundamentals and culture of a healthy lifestyle</li> <li>2. Characterization of the physiological bases of the activity of the respiratory, circulatory and energy supply systems under muscle loads</li> <li>3. Performing a set of exercises for general physical training.</li> <li>4. Characteristics of the basics of physical activity and methods of its regulation</li> <li>5. Selection and application of methods and means of physical culture to improve the basic physical qualities</li> <li>6. Implementation of control standards and tests provided by the program.</li> <li>7. Understanding the causes of injury during exercise</li> <li>eight. . The use of methods of injury prevention.</li> <li>9. Providing medical care for injuries.</li> </ol>
<b>Prerequisites</b>	Physical education
<b>Disciplines forming the module</b>	Physical education
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intensity (credits /</b>	6 credits / 180 hours



<b>academic hours)</b>	
<b>Duration of the module</b>	1 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process Teaching methods.</b>	Lecture, independent work, practical lessons  Oral interaction, testing, presentation, report, post, interviews, essays, creative task, colloquium, project work, case-study
<b>Forms of control</b>	Exam, pass/fail exam
<b>Required resources</b>	Personal computer, software. Interactive board. TV. Audio-video equipment. Sports equipment, trainers and equipment. Library Fund. Kydyrmoldina A. Dene, turbis_ men sport tyrleriniң physiologыq negizderi: okulyk azastan Respublikasyny Bilim zhyne rylym ministerlili. Almaty 2014 Mұhamedzhanova Ұ. Dene shynықтыru pәninen okytu әdistemesi. Оқu құrali. Astana. Folio. 2011 Dene shynықтыru dayyndуғыny ң presidenttik tetiler- Kazakstan Respubliki khalkyn saуқтыrudуң negizi. Ідіstemelik оқu құralы. Astana 2014 Zheleznyak Yu.D. Theory and methods of sports games. 2014 Lyakh, Zdanevich. Physical culture 10-11 grade 2012.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	PM1-PM9

**Specification for the basic module 3**  
**“Application of the foundations of social sciences for socialization and adaptation in society and the work place”**

<b>Scope of competence</b>	
<b>Title and code of the module</b>	Application of the foundations of the social sciences for socialization and adaptation in society and the workforce.
<b>Purpose of the module</b>	After studying this module, the tutor will be able to apply the fundamentals of the social sciences for socialization and adaptation in society and at the work place.
<b>Level of professional qualification</b>	4
<b>Learning outcomes by module</b>	<ol style="list-style-type: none"> <li>1. To know the basic concepts and information of philosophy, political science, cultural studies and sociology.</li> <li>2. To understand the international political processes, the geopolitical situation and moral values and norms that form tolerance and an active personal position.</li> <li>3. To know basic concepts and information about the main branches of law.</li> </ol>
<b>A summary of the content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Understanding the essence and essence of the concepts, categories and information of philosophy, political science, cultural studies and sociology.</li> <li>2. Identification of problems and interrelations of the main categories and concepts of philosophy, political science, cultural studies and sociology</li> <li>3. Analysis of various points of view.</li> <li>4. Characteristics of the structure of the political system, history and the current state of world and traditional religions.</li> <li>5. Definition of differences extremist, radical and terrorist ideologies.</li> <li>6. Tolerant perception of social, ethnic, confessional and cultural differences.</li> <li>7. Possession of the basic provisions of criminal, civil and family law and information about taxes.</li> <li>8. Understanding of responsibility for administrative and corruption offenses and observance of the principles of law and order.</li> </ol>

	9. Protecting your rights in accordance with labor laws.
<b>Prerequisites</b>	History of Kazakhstan
<b>Disciplines forming the module</b>	Basic philosophy Culturology The basis of the economy. Basis of law Fundamentals of sociology and political science
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intensity (credits / academic hours)</b>	6 credits / 180 hours
<b>Duration of the module</b>	Semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process Teaching methods</b>	Lecture, independent work, practical lessons  Oral interaction, testing, presentation, report, post, interviews, essays, creative task, colloquium, project work, case-task
<b>Forms of control</b>	Pass fail exam,
<b>Required resources</b>	Personal computer, software. Interactive board. Electronic textbook. Sybanbaev K.U. Philosophy. Almaty: Economy 2013 Kishibekov D Philosophy. Almaty: Karasai 2011 Razdykov S.Z. Basics of political science. Textbook. Astana: Folio 2012 Rakhimbaeva A.S. Basics of political science. Course of the lecture. A.Foliant 2012. E-book, Political Science: Summaries, Lectures, author: Mukhaev RT, Zaitsev AV M 2004. Karakuzova Zh.K. Culturology: A: Tome 2014 Kairbekov B.G. National customs and traditions. A: Empire.KZ.2012. Video: <a href="http://www.ata-mura.kz">http://www.ata-mura.kz</a>
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	PM 1 – PM 9

**Specification for basic module 4.  
“Reading of drawings”**

<b>Scope of competence</b>	
<b>Title and code of the module</b>	Reading of drawings
<b>Purpose of the module</b>	After studying this module, the tutor will be able to read the drawings.
<b>Level of professional qualification</b>	4
<b>Learning outcomes by module</b>	<ol style="list-style-type: none"> <li>1. To know the rules of design documentation</li> <li>2. To issue design documentation in accordance with the main standards of SSDD.</li> <li>3. Perform design on the plane.</li> </ol>
<b>A summary of the content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Basic concepts of basic technological drawing.</li> <li>2. Understanding of a unified design documentation system.</li> <li>3. Formulation of the rules of registration.</li> <li>4. Determine the purpose of the scale of the implementation of drawing technical details</li> <li>5. Possession of skills of design documentation</li> <li>6. Execution of drawings in accordance with the main standards SSDD.</li> <li>7. Reading assembly drawings and circuit diagrams.</li> <li>8. Possession of design skills on the plane.</li> <li>9. Execution of drawings with projection on the plane.</li> </ol>
<b>Prerequisites</b>	
<b>Disciplines forming the module</b>	Technical drawing
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intensity (credits / academic hours)</b>	2 credits/60 hours
<b>Duration of the module</b>	Semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process</b>	Lecture, independent work, practical lessons
<b>Teaching methods</b>	Oral interaction, testing, presentation, report, post, interviews, essays, creative task,

	colloquium. project work, case-task
<b>Forms of control</b>	Pass fail exam
<b>Required resources</b>	Personal computer, software. Interactive whiteboard. Electronic textbook. Bogolyubov S.K. "Drawing" Moscow 1989. Saparov V.E. Maksimov N.A. "System of standards in telecommunications and electronics" Moscow 1985. SSDD "Symbols conditional graphically in schemes" Moscow, 1985. State Standards Moscow, 1986 Volume 1,2,3. Baranov B.S. "Fundamentals of drawing" Moscow, 1985. Mironov RS Mironov B.G. "Collection of tasks for drawing" Moscow, 1984. Egorov S.A. "Drawing and Technical Drawing" Moscow, 1985. Simonenko V.D. "Textbook for drawing 9 cl." Moscow, 2007. Kuprikov M.Y., Markhina L.P. "Line of CMB in drawing" ed. Drofa 2008 Yakovlev G.N. "Geometry" Moscow, 1987
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	PM 1 –PM 9

**Specification of the Basic Module 5.**  
**“Application of basic knowledge of economics in professional activities”**

<b>Scope of competence</b>	
<b>Title and code of the module</b>	Application of basic knowledge of economics in professional activities
<b>Purpose of the module</b>	After studying this module, the tutor will be able to apply the basic knowledge of the economy in professional activities.
<b>Level of professional qualification</b>	4
<b>Learning outcomes by module</b>	<ol style="list-style-type: none"> <li>1. To determine the forms and types of property, types of plans, basic economic indicators of the enterprise.</li> <li>2. To understand the development trends of the world economy, the main objectives of the state’s transition to a green economy.</li> <li>3. To determine the possibility of success and risk business.</li> </ol>
<b>A summary of the content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Understanding of the laws and principles of a market economy, tax policy, sources of inflation, the main stages and content of planning.</li> <li>2. Performing of the necessary economic calculations using mathematical methods to determine the main economic indicators of the enterprise.</li> <li>3. Determination of the main economic indicators of the enterprise.</li> <li>4. Characteristics of trends in the global economy.</li> <li>5. Understanding the main objectives of the transition of the state to a "green" economy.</li> <li>6. Application of the main methods of calculating gross domestic product and gross national product for the state’s transition to a green economy.</li> <li>7. Characteristics of goals, factors, conditions, organizational and legal forms of entrepreneurial activity.</li> <li>8. Understanding the factors that determine the success of business activities.</li> </ol>

	9. Drawing up a business plan
<b>Prerequisites</b>	Basics of Economics
<b>Disciplines forming the module</b>	Economics of communication enterprises and fundamentals of entrepreneurial activity.
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intensity (credits / academic hours)</b>	3 credits / 90 hours
<b>Duration of the module</b>	Semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process</b> <b>Teaching methods</b>	Lecture, independent work, practical lessons  Oral interaction, testing, presentation, report, post, interviews, essays, creative task, Colloquium. project work, case-task
<b>Forms control</b>	Pass fail exam
<b>Required resources</b>	Personal computer, software. Interactive whiteboard. Electronic textbook. Gabit J.H.H. Microeconomics- Astana, Foliant, 2012. Bekmoldin S.K. Economic Theory-Astana, Foliant, 2012. Chayzhunusova G.ZH. Basics of Economics. Astana, Foliant 2011. Shulenbaeva S. Workshop on the basics of a market economy, Foliant, 2011. Khamitova G. Economics and fundamentals of entrepreneurship, Foliant, 2011. Bekbolsynova A. Taxes and taxation, Foliant, 2014. Nurpeys E. Basics of Macroeconomics, Foliant, 2011. Khojaniyazov Zh. T. Basics of a Market Economy, Foliant, 2011
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	PM 7 – PM 9

**Specification of the Basic Module 6.**  
**“Understanding the history, role and place of Kazakhstan in the world community”**

<b>Scope of competence</b>	
<b>Title and code of the module</b>	Understanding of the history, role and place of Kazakhstan in the world community.
<b>Purpose of the module</b>	After studying this module, the tutor will be able to Understand the history, role and place of Kazakhstan in the world community.
<b>Level of professional qualification</b>	4
<b>Learning outcomes by module</b>	<ol style="list-style-type: none"> <li>1. To name the main historical events.</li> <li>2. To establish causal relationships of historical events.</li> <li>3. To assess the achievements of independent Kazakhstan.</li> </ol>
<b>A summary of the content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Understanding the essence of historical events that took place from antiquity to the present</li> <li>2. Disclosure of the role and place of the Kazakh people in the common Turkic community, in the system of the nomadic civilization, in the development of the historical and cultural community of the peoples of the Eurasian world.</li> <li>3. Compiling a chronology of major historical events</li> <li>4. Understanding the facts, processes and phenomena of historical events</li> <li>5. Determination of the main facts, processes and phenomena that reflect and characterize the integrity and consistency of the history of Kazakhstan</li> <li>6. Establishing causal relationships of historical events</li> <li>7. Understanding the nature and purpose of the political and social changes taking place in the Republic of Kazakhstan after independence.</li> <li>8. Characteristics of the achievements of independent Kazakhstan.</li> <li>9. Evaluation of the achievements of independent Kazakhstan.</li> </ol>
<b>Prerequisites</b>	History of Kazakhstan



<b>Disciplines forming the module</b>	History of Kazakhstan
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intensity (credits / academic hours)</b>	3 credits / 90 hours
<b>Duration of the module</b>	Semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process</b> <b>Teaching methods</b>	Lecture, independent work, practical lessons  Oral interaction, testing, presentation, report, post, interviews, essays, creative task, Colloquium. project work, case-task
<b>Forms of control</b>	Pass fail exam, exam
<b>Required resources</b>	Personal computer, software. Interactive whiteboard. Electronic textbook. Z.O. Artykbaev 12 lectures on the history of Kazakhstan. Folio 2013. Zholdasbayev S. History of Kazakhstan of the Middle Ages. Textbook, 2nd ed., Revised- Almaty: Atamura 2012 Turmanova B.K. Bermanova S.T. History of Kazakhstan. Tutorial. A: Folio 2013. Kasymbaev Zh.K. History of Kazakhstan (XVIIIv-1914) Textbook. Almaty: Mektep, 2012. Kabuldinov Z.E., Kayipbaeva A.T. History of Kazakhstan (XVIIIv-1914) Textbook for grade 8 of secondary school. 2nd ed., Pererab. Almaty: Atamura, 2012. R. Sausenova. History of Kazakhstan. Almaty: Mektep, 2011. Igibaev S. History of Kazakhstan in sources and materials. Astana: Foliant 2013.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Culturology, Fundamentals of Sociology and Political Science.

### Specification of the basic module 7

#### “Application of digital devices and microprocessor systems in communication technology”

<b>Scope of competence</b>	
<b>Title and code of the module</b>	Application of digital devices and microprocessor systems in communication technology.
<b>Purpose of the module</b>	After studying this module, the tutor will be able to use digital devices and microprocessor systems in communication technology.
<b>Level of professional qualification</b>	4
<b>Learning outcomes by module</b>	<ol style="list-style-type: none"> <li>1. To determine the principle of construction and operation of digital devices and microprocessor systems.</li> <li>2. To distinguish the principle of operation of a typical microprocessor and microcontroller.</li> <li>3. To synthesize combinational and sequential digital.</li> </ol>
<b>A summary of the content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Understanding the basics of universal software packages</li> <li>2. Implementation of computer simulation of digital devices using programs</li> <li>3. The formulation of logical elements and functions in different standards</li> <li>4. The definition of the principle of operation of the structure, the main combinational digital devices</li> <li>5. Possession of technical characteristics, design features and purpose of electrical equipment</li> <li>6. Assembly of semiconductor diodes and other electronics elements, separate blocks of digital devices</li> <li>7. Determination of the possibility of microprocessor tools in solving problems of controlling the operation of station equipment of electronic exchanges of various systems.</li> <li>8. The use of information technology in solving production problems.</li> <li>9. Implementation of special computer programs for working with external devices of electronic PBX.</li> </ol>
<b>Prerequisites</b>	Basics of Informatics, Physics, Chemistry, Mathematics.

<b>Disciplines forming the module</b>	Computer science. Digital devices and microprocessor systems.
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intensity (credits / academic hours)</b>	2 credits / 60 hours
<b>Duration of the module</b>	semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process</b> <b>Teaching methods</b>	Lecture, independent work, practical classes.  Oral interaction, testing, presentation, report, post, interviews, essays, creative task, Colloquium. project work, case-study
<b>Forms of control</b>	Pass fail exam, exam
<b>Required resources</b>	Personal computer, software. Interactive whiteboard. Electronic textbook. Computer programs. Goldenberg L.M. and others. Digital devices and microprocessor systems. Tasks and exercises: Proc. manual for universities. L.M. Goldenberg, V.A. Malev, G.B. Malko M: Radio and Communication, 1992. Kalabekov B.A. Digital devices and microprocessor systems. M: Hotline-Telecom, 2000. O.N. Lebedev. Memory chips and their application.-M: Radio and communication, 1990. Logic IC KR1533, KR15554: Reference book / Petrovsky I.I., Pribylsky A.V., Troyan A.A., Chuvelev V.S.- M: TOO " BINOM ”, 1993. Opadchiy Yu.F., Gludkin OP, Gurov A.I. Analog and digital electronics.- M: Hot Line-Telecom, 1999. Ugryumov E.P. Digital circuit technology.- SPb: BHV- St. Petersburg, 2000. Usatenko S.T., Kachenyuk T.K., Terekhova N.V. Execution of electrical circuits for SSDD.-M: Publishing house of standards, 1989. Nsanov M.A. Digital devices and microprocessor systems. Astana: Foliant, 2010.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Digital and fiber optic transmission systems, Digital switching systems, Communication networks and switching systems.

**Specification of the basic module 8**  
**“Compliance with safety regulations and labor protection”**

<b>Scope of competence</b>	
<b>Title and code of the module</b>	Compliance with safety regulations and labor protection.
<b>Purpose of the module</b>	After studying this module, the trainee will be able to follow the rules of safety and labor protection.
<b>Level of professional qualification</b>	4
<b>Learning outcomes by module</b>	<ol style="list-style-type: none"> <li>1. To comply with the principle of priority of preserving human health and safety during the labor process.</li> <li>2. To comply with safety regulations, electrical safety and fire safety.</li> <li>3. To apply first aid techniques, methods of protection in emergency situations.</li> </ol>
<b>A summary of the content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Legal regulations in the field of occupational safety and health.</li> <li>2. Ensuring the safety of the workplace.</li> <li>3. Compliance with the requirements of industrial sanitation.</li> <li>4. Assessment of the risk of hazards associated with violations of safety regulations, electrical safety and fire safety.</li> <li>5. Provision of materials, equipment, equipment and fire extinguishing equipment when servicing telecommunications networks.</li> <li>6.. Compliance with safety precautions and precautions when performing maintenance of telecommunications networks.</li> <li>7. Consistent perception, evaluation, comparison and analysis of information and its use for the practical solution of professional tasks</li> <li>8. Demonstration of first-aid techniques, methods of protection in the face of danger to life in emergency situations in their professional activities.</li> <li>9. The use of practical skills to ensure safety in dangerous situations of everyday life and in emergency situations of different nature</li> </ol>
<b>Prerequisites</b>	Physics, chemistry
<b>Disciplines forming the</b>	Occupational Safety and prevention of accidents.

<b>module</b>	Production training. Professional practice.
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intensity (credits RK/ academic hours)</b>	2 credits /60 hours
<b>Duration of the module</b>	semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process</b> <b>Teaching methods</b>	Lecture, independent work, practical.  Oral interaction, testing, presentation, report, post, interviews, essays, creative task, colloquium, project work, case-task
<b>Forms control</b>	Pass fail exam
<b>Necessary resources</b>	Personal computer, software. Interactive whiteboard. Electronic textbook. Kukin P.P., Lapin V.L., Ponomarev N.L., Serdyuk N.I. Life Safety. Safety of technological processes and production (OT). M: Graduate School 2002. Baklashov N.I., Kitaeva N.ZH., Terekhov B.D. Labor protection at communication enterprises and environmental protection.- M: Radio and communication. 1989 Labor protection in electrical installations. Under. ed. B.A. Knyazevsky. M: 1981 TB rules when working on the wired broadcast stations.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Technological practice, pre-diploma practice.

**Specification of Professional Module PM 1**  
**“Implementation of works on installation, configuration and initial installation of wired and wireless access networks”**

<b>Scope of competence</b>	Organization of works on technical exploitation and maintenance of information and communication networks of mobile communication
<b>Title and code of the module</b>	PM 1. Development of a plan of work for installation, configuration and basic installation of networks wired and wireless access
<b>Purpose of the module</b>	After studying this module the trainee will be able to draw up a plan of works on installation, configuration and basic installation of wired and wireless access networks
<b>Level of professional qualification</b>	5
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To simulate data transmission networks with the provision of communication services;</li> <li>2. To develop and create an information and communication network with the provision of communication services;</li> <li>3. To develop and create multi-service networks.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Construction of computer networks and topological models;</li> <li>2. Modeling of data transmission networks;</li> <li>3. Planning for the installation of data transmission networks;</li> <li>4. Development of schemes of service delivery networks;</li> <li>5. Planning of works on creation of information and communication networks;</li> <li>6. Monitoring the implementation of the work on creation of information and communication networks;</li> <li>7. Develop schemes for multiservice networks;</li> <li>8. Planning of works on creation of multiservice networks;</li> <li>9. Monitoring implementation of the work on the establishment of multi-service networks.</li> </ol>
<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences
<b>Module forming disciplines</b>	Installation of equipment for wireless networks;

	The transmission network of data; Digital and fiber-optic systems; Perform installation of equipment telecommunication subscriber access.
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intense (credits /academic hours)</b>	12 credits/360 hours
<b>Duration of the module</b>	3 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process</b> <b>Teaching methods</b>	Lecture, independent work, practice lesson  Oral interaction, testing, project activity, task, test, case study
<b>Control Forms</b>	Exam, pass/fail exam
<b>Required Resources</b>	Personal computer, software, equipped laboratories: electrician tool sets: VDE jaws (pliers, side cutters, long-nose pliers, etc.); the device for insulation removal of 0.2-6mm <sup>2</sup> ; pliers for crimping 0.5-6.0 mm <sup>2</sup> mites crimping 0.5-10.0 mm <sup>2</sup> ; voltage tester; a hammer; chisel; a set of files (flat file, round file, triangle file); a cordless drill; drill network; perforator; a set of bits for a screwdriver; crown for metal D - 22mm, 20 mm; set of drills for metal (D1-10mm); swivel chair; Allen key with interchangeable heads 8-14 mm; hacksaw for metal; bolt cutter; nippers for working with a wire tray, 600mm; clamp F-shaped; control and measuring instruments (tape measure, metal ruler, metal square, metal bubble level); means of individual protection, multimedia equipment, Internet resources, server provision, copying, scanning and printing equipment, educational and methodical literature: 1. V.N. Kamnev Reading of diagrams and drawings of electrical installations;

	<p>2. Portnov E.I. Electrical connection and installation;</p> <p>3. Jim Geyer. Wireless network. The first step;</p> <p>4. S.V. Gordeichik, V.V. Dubrovin. “Wireless security””;</p> <p>5. L.N. Gulyaeva Technology of installation and adjusting electronic equipment and appliances;</p> <p>6. V.I. Kaganov, V.K. Bityukov Fundamentals of Radioelectronics and Communications;</p> <p>7. Yu.I.Voloshchenko, Yu.Yu. Martyushev I.N. Nikitina, etc. Fundamentals of Radioelectronics;</p> <p>8. A.D. Gumenyuk, V.I.Zhuravlev, Yu.Yu. Martyushev, etc. Fundamentals of electronics, radio engineering and communication; etc.</p>
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Record Keeping, Cultural Studies, Information Technologists, Fundamentals of Management, Fundamentals of Mechanics, Fundamentals of Modeling



**Specification of Professional Module PM 2**  
**“Implementation of a set of works on wiring station equipment for mobile communications”?**

<b>Scope of competence</b>	Wiring planning for mobile station equipment
<b>Name and code of the module</b>	PM 2. Implementation of a set of works on wiring station equipment for mobile communications
<b>Purpose of the module</b>	After studying this module, the student will be able to plan a range of works on the wiring of station equipment for mobile communications
<b>Level of professional qualification</b>	4
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To plan work on electrical measurements of subscriber access lines;</li> <li>2. To schedule electrical measurements of network access parameters;</li> <li>3. To determine the scope of work for the wiring of station mobile equipment.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Drawing up a list of works on electrical measurements of subscriber access lines;</li> <li>2. Selection of tools for electrical measurements of lines;</li> <li>3. Distribution of work on electrical measurements among personnel;</li> <li>4. Selection of instruments for electrical measurements of network access parameters;</li> <li>5. Determination of the frequency of electrical measurements;</li> <li>6. Distribution of work on electrical measurements among personnel;</li> <li>7. Compilation of a list of works on electrical measurements of station mobile equipment;</li> <li>8. Selection of devices for electrical work on station equipment;</li> <li>9. Distribution of work on electrical measurements among personnel.</li> </ol>
<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences
<b>Module forming disciplines</b>	Electrical practice; Power supply of communication devices; Electrical circuit theory; Measurement fundamentals; Fundamentals of electrical engineering; Electrical measurements of communication lines, certification and technical accounting.
<b>Module type</b>	Mandatory

<b>(mandatory, optional)</b>	
<b>Labor intense (credits RoK/academic hours)</b>	8 credits/240 hours
<b>The duration of the module</b>	3 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular/dual
<b>The form of organization of educational process. Teaching methods.</b>	Lecture, independent work, practice lesson  Oral interaction, testing, project activity, case study
<b>Control Forms</b>	Exam, pass/fail exam
<b>Required Resources</b>	Personal computer, software, laboratories: electrician's toolkits: VDE tongue tools (pliers, side cutters, long nose pliers, etc.); a device for stripping 0.2-6mm <sup>2</sup> ; crimping pliers 0.5-6.0 mm <sup>2</sup> crimping pliers 0.5-10.0 mm <sup>2</sup> ; voltage tester; hammer; chisel; a set of files (flat file, round file, triangular file); cordless drill; network drill; perforator; a set of bits for the screwdriver; metal crown D - 22mm, 20 mm; a set of drills for metal (D1-10mm); swivel chair; socket wrench with interchangeable heads 8-14 mm; hacksaw; bolt cutter; wire cutters for working with wire tray, 600mm; F-shaped clamp; control and measuring instruments (tape measure, metal ruler, metal square, metal level bubble); personal protective equipment multimedia equipment, Internet resources, server software, copying, scanning and printing equipment, teaching materials, etc.
<b>Language of Training</b>	Russian, Kazakh
<b>Post-requisites</b>	Record Keeping, Cultural Studies, Information Technologists, Fundamentals of Management, Fundamentals of Mechanics, Fundamentals of Modeling

**Specification of Professional Module PM 3**  
**"Performance of work to ensure the performance of systems and equipment of mobile communication networks"**

<b>Scope of competence</b>	Organization of works on technical operation and maintenance of information and communication networks of mobile communication
<b>Name and code of the module</b>	PM 3. Performance of work to ensure the performance of systems and equipment of mobile communication networks
<b>Purpose of the module</b>	After studying this module, the student will be able to monitor the quality of ensuring the performance of systems and equipment of mobile communication networks
<b>Level of professional qualification</b>	4
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To monitor equipment of information and communication networks to assess its performance;</li> <li>2. To control the quality of technical maintenance of information and communication equipment;</li> <li>3. To issue recommendations on how to optimize the process of maintenance of equipment of information and communication networks.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. The use of systems for monitoring the work of equipment information and communication networks;</li> <li>2. Checking the technical condition of information and communication networks;</li> <li>3. Assessment of the equipment of information and communication networks;</li> <li>4. Drawing up a plan for bypassing equipment for assessing the quality of service;</li> <li>5. Check the technical condition of the equipment;</li> <li>6. Assessment of the quality of equipment maintenance;</li> <li>7. Analysis of the assessment of the quality of equipment maintenance;</li> <li>8. Determination of optimal processes for improving the quality of maintenance;</li> <li>9. Preparation of recommendations for improving the quality and optimizing the process of equipment maintenance.</li> </ol>
<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences

<b>Modules forming the discipline</b>	Fundamentals of technical operation and maintenance of communication equipment; Automated control systems; Telecommunications system maintenance; Basics of electronics and circuitry.
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intense (credits /academic hours)</b>	6 credits/180 hours
<b>Duration of the module</b>	3 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process. Teaching methods.</b>	Lecture, independent work, practice lesson  Oral interaction, testing, project activity, task, case study
<b>Control Forms</b>	Pass fail exam, exam
<b>Required Resources</b>	Personal computer, software, laboratories: electrician's toolkits: VDE tongue tools (pliers, side cutters, long nose pliers, etc.); a device for stripping 0.2-6mm <sup>2</sup> ; crimping pliers 0.5-6.0 mm <sup>2</sup> crimping pliers 0.5-10.0 mm <sup>2</sup> ; voltage tester; hammer; chisel; a set of files (flat file, round file, triangular file); cordless drill; network drill; perforator; a set of bits for the screwdriver; metal crown D - 22mm, 20 mm; a set of drills for metal (D1-10mm); swivel chair; socket wrench with interchangeable heads 8-14 mm; hacksaw; bolt cutter; wire cutters for working with wire tray, 600mm; F-shaped clamp; control and measuring instruments (tape measure, metal ruler, metal square, metal level bubble); personal protective equipment, multimedia equipment, Internet resources, server software, copying, scanning and printing equipment, educational materials: 1. Aleksandrovskaya A.N. Organization of maintenance and repair of electrical and electromechanical equipment; 2. Lozhkovsky A.G. "Theory of mass service in

	telecommunications: a textbook; 3. Bukrina E.V. Communication networks and switching systems; 4. F. Meizda Electronic Measuring Instruments and Measurement Methods; 5. Schulz Y. Electrical measuring equipment. 1000 concepts for practitioners; 6. Meerson A.M Radio measuring equipment, etc.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Record Keeping, Cultural Studies, Information Technologists, Fundamentals of Management, Fundamentals of Mechanics, Fundamentals of Modeling

**Specification of Professional Module PM 4**  
**“Work on the installation and operation of the equipment of telecommunication systems and subscriber access lines”**

<b>Scope of competence</b>	Development of guidance on technical operation of telecommunication systems of mobile communication
<b>Name and code of the module</b>	PM 4. Planning and executing mounting works on quality control of equipment, information and communication systems and networks and subscriber access lines
<b>Purpose of the module</b>	After studying this module the trainee will be able to plan the installation and ensure that the work equipment of telecommunication systems and subscriber access lines
<b>Level of professional qualification</b>	4
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To prepare a phased plan for the installation of mobile telecommunications systems;</li> <li>2. To develop schemes for the construction, installation and operation of structured cable systems;</li> <li>3. To organize regular testing of the operation of equipment of telecommunication systems and subscriber access lines.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Definition of the list of installation works of mobile communication systems;</li> <li>2. Selection of materials and devices necessary for installation;</li> <li>3. Description of the stages of installation of mobile communication systems;</li> <li>4. Construction of the installation scheme of structured cable systems;</li> <li>5. Determination of the operation of cable systems;</li> <li>6. Formation of technical requirements for the installation of cable systems;</li> <li>7. Definitions of the list of equipments and subscriber access lines needing a performance check;</li> <li>8. Formation of the schedule for monitoring the performance of telecommunications systems;</li> <li>9. Planning for verification of subscriber access lines..</li> </ol>
<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences
<b>Module forming disciplines</b>	Installation of equipment for wireless networks; Transmission network of data; Digital and fiber-optic systems; Perform installation of equipment telecommunication subscriber access.
<b>Module type</b>	Mandatory

<b>(mandatory, optional)</b>	
<b>Labor intense (credits RK/academic hours)</b>	10 credits / 300 hours
<b>Duration of the module</b>	3 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular/dual
<b>Form of organization of educational process.</b>	Lecture, independent work, practice lesson
<b>Teaching methods.</b>	Oral interaction, testing, project activity, case study
<b>Control Forms</b>	Exam, test
<b>Required Resources</b>	<p>Personal computer, software, equipped laboratories: electrician tool sets: VDE jaws (pliers, side cutters, long-nose pliers, etc.); the device for insulation removal of 0.2-6mm<sup>2</sup>; pliers for crimping 0.5-6.0 mm<sup>2</sup> mites crimping 0.5-10.0 mm<sup>2</sup>; voltage tester; a hammer; chisel; a set of files (flat file, round file, triangle file); a cordless drill; drill network; perforator; a set of bits for a screwdriver; crown for metal D - 22mm, 20 mm; set of drills for metal (D1-10mm); swivel chair; Allen key with interchangeable heads 8-14 mm; hacksaw for metal; bolt cutter; nippers for working with a wire tray, 600mm; clamp F-shaped; control and measuring instruments (tape measure, metal ruler, metal square, metal bubble level); means of individual protection, multimedia equipment, Internet resources, server provision, copying, scanning and printing equipment, educational and methodical literature:</p> <ol style="list-style-type: none"> <li>1. Peter Misyul: Repair, adjustment and testing of radio and television equipment. Special technology;</li> <li>2. L.N.Gulyaeva Technology of installation and adjustment of radio-electronic equipment and instruments;</li> <li>3. A. Meerson Radio-measuring equipment;</li> <li>4. S.N. Liventsov Fundamentals of microprocessor technology: a textbook / S.N. Liventzov, A.D.</li> </ol>

	Vilnin, A.G. Goryunov; 5. A.V. Kuzin, M.A. Zhavoronkov. Microprocessor technology; etc.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Record Keeping, Cultural Studies, Information Technologists, Fundamentals of Management, Fundamentals of Mechanics, Fundamentals of Modeling



**Specification of Professional Module PM 5**  
**“Performance of work on information security in information and communication networks and mobile communication systems”**

<b>Scope of competence</b>	Development of a complex of methods and means of information protection in information and communication networks and mobile communication systems
<b>Name and code of the module</b>	PM 5. Performance of work on protection of information in information and communication networks and mobile communication systems
<b>Purpose of the module</b>	After studying this module, the student will be able to develop integrated methods and select information protection tools in infocommunication networks and mobile communication systems.
<b>Level of professional qualification</b>	4
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To determine the best ways to ensure information security;</li> <li>2. To conduct a selection of protective equipment in accordance with the identified threats in mobile communication systems;</li> <li>3. To develop security policies and information encryption methods to ensure secure data exchange.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Determination of the actual level of information security;</li> <li>2. Analysis of current remedies for relevance;</li> <li>3. Selection of protection tools to improve the quality of information security;</li> <li>4. Analysis of identified threats in mobile communication systems;</li> <li>5. Determination of the characteristics of the remedies necessary to eliminate the identified threats;</li> <li>6. Introduction of selected tools to ensure information security;</li> <li>7. Development of information encryption methods;</li> <li>8. Determining the level of security of data exchange channels;</li> <li>9. Development of security policy data exchange channels.to optimize system performance.</li> </ol>
<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences
<b>Modules forming the discipline</b>	Basics of information security; The theory of complex information protection methods; Computer science;

	Digital transmission systems; Data transmission in information management systems; Hardware Remedies.
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intense (credits RK/academic hours)</b>	6 credits/180 hours
<b>Duration of the module</b>	3 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular/dual
<b>Form of organization of educational process Teaching methods</b>	Lecture, independent work, practice lesson  Oral interaction, testing, project activity, practical task, case study
<b>Control Forms</b>	Exam, pass/fail exam
<b>Required Resources</b>	Personal computer, software, laboratories: electrician's toolkits: VDE tongue tools (pliers, side cutters, long nose pliers, etc.); a device for stripping 0.2-6mm <sup>2</sup> ; crimping pliers 0.5-6.0 mm <sup>2</sup> crimping pliers 0.5-10.0 mm <sup>2</sup> ; voltage tester; hammer; chisel; a set of files (flat file, round file, triangular file); cordless drill; network drill; perforator; a set of bits for the screwdriver; metal crown D - 22mm, 20 mm; a set of drills for metal (D1-10mm); swivel chair; socket wrench with interchangeable heads 8-14 mm; hacksaw; bolt cutter; wire cutters for working with wire tray, 600mm; F-shaped clamp; control and measuring instruments (tape measure, metal ruler, metal square, metal level bubble); personal protective equipment, multimedia equipment, Internet resources, server software, copying, scanning and printing equipment, educational materials: 1. Melnikov D. A. Information security of open systems: a textbook; 2. Y. Rodichev “Regulatory framework and standards in the field of information security”; 3. E. Baranova, A. Babash “Information Security and Information Security”;

	<p>4. Milenin N.K. Electronics and circuitry. Textbook and workshop for academic undergraduate;</p> <p>5. Bogomolov S.A. Basics of electronics and digital circuitry, etc.</p>
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Record Keeping, Cultural Studies, Information Technologists, Fundamentals of Management, Fundamentals of Mechanics, Fundamentals of Modeling

**Specification of Professional Module PM 6**  
**“Monitoring and diagnostics of mobile telecommunication systems”**

<b>Scope of competence</b>	Development of guidance on technical operation of telecommunication systems of mobile communication
<b>Name and code of the module</b>	PM 6. Monitoring and diagnostics of mobile telecommunication systems
<b>Purpose of the module</b>	After studying this module, the student will be able to monitor the monitoring and diagnostics of mobile telecommunication systems.
<b>Level of professional qualification</b>	4
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To monitor the monitoring of the performance of telecommunications systems equipment;</li> <li>2. To analyze the results of determining the type and location of damage;</li> <li>3. To form teams and analyze printouts in various systems.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Monitoring the progress of monitoring;</li> <li>2. Monitoring the verification of the technical condition of the systems;</li> <li>3. Evaluation of monitoring to improve the skills of the subordinate;</li> <li>4. Determining the causes of damage;</li> <li>5. Selection of methods for repairing damage of various types;</li> <li>6. Selection of materials and devices to eliminate damage;</li> <li>7. Formation of teams in various operating systems;</li> <li>8. Determining the state of the system according to the indicators in the printout;</li> <li>9. Conclusion recommendations for optimizing the system.</li> </ol>
<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences
<b>Modules forming the discipline</b>	Digital and fiber optic systems; Telecommunications system maintenance; Applied computer science and computing.
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intense (credits RoK/academic hours)</b>	5 credits/150 hours

<b>The duration of the module</b>	3 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process</b> <b>Teaching methods</b>	Lecture, independent work, practice lesson  Oral interaction, testing, project activity, practical task, case study
<b>Control Forms</b>	Exam, pass/fail exam
<b>Required Resources</b>	<p>Personal computer, software, laboratories: electrician's toolkits:  VDE tongue tools (pliers, side cutters, long nose pliers, etc.); a device for stripping 0.2-6mm<sup>2</sup>; crimping pliers 0.5-6.0 mm<sup>2</sup>  crimping pliers 0.5-10.0 mm<sup>2</sup>;  voltage tester;  hammer; chisel; a set of files (flat file, round file, triangular file);  cordless drill; network drill; perforator; a set of bits for the screwdriver; metal crown D - 22mm, 20 mm; a set of drills for metal (D1-10mm);  swivel chair; socket wrench with interchangeable heads 8-14 mm;  hacksaw; bolt cutter; wire cutters for working with wire tray, 600mm; F-shaped clamp;  control and measuring instruments (tape measure, metal ruler, metal square, metal level bubble);  personal protective equipment  multimedia equipment, Internet resources, server software, copying, scanning and printing equipment, educational materials:  1. Freeman R.L. Fiber-optic communication systems;  2. Sklyarov O.K. Modern fiber optic transmission systems. Equipment and elements;  3. Lozhkovsky A.G. "Theory of mass service in telecommunications: a textbook;  4. Zakharov, N.G. Computing: textbook / N.G. Zakharov, R.A. Saifutdinov;  5. Aliyev M.M. Digital computing and microprocessors;</p>

	6. Alekhina G.V. Computer systems and telecommunications; etc.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Records management, Cultural studies, Information technologists, Basics of management, Basics of mechanic modeling

**Specification of Professional Module PM 7**  
**“Performing network equipment administration”**

<b>Scope of competence</b>	Organization of works on technical operation and maintenance of information and communication networks of mobile communication
<b>Name and code of the module</b>	PM 7. Perform network equipment administration
<b>Purpose of the module</b>	After studying this module, the student will be able to administer network equipment.
<b>Level of professional qualification</b>	4
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To prepare plans for setting up, addressing and working in networks of various topologies;</li> <li>2. To carry out preventive, diagnostic work and prompt troubleshooting of network equipment;</li> <li>3. To manage the interaction of telecommunications networks of various technologies (SDH, WDM).</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Planning work on setting up networks of various topologies</li> <li>2. Setting up network addressing</li> <li>3. Control over the smooth operation of networks;</li> <li>4. Planning for preventive maintenance of network equipment;</li> <li>5. Diagnosing faults in network equipment;</li> <li>6. Troubleshooting network equipment;</li> <li>7. Configuring the interaction of networks technology SDH;</li> <li>8. Configuring the interaction of WDM technology networks;</li> <li>9. Control of telecommunications networks measurement</li> </ol>
<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences
<b>Module forming disciplines</b>	Communication networks and switching systems; Digital switching systems; Setting up network equipment; Data transfer in information management systems.
<b>Module type (mandatory, optional)</b>	Mandatory

<b>Labor intense (credits RK/academic hours)</b>	5 credits/150 hours
<b>Duration of the module</b>	3 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular/dual
<b>Form of organization of educational process</b> <b>Teaching methods</b>	Lecture, independent work, practice lesson  Oral interaction, testing, project activity, task, case study
<b>Control Forms</b>	Pass fail exam, exam
<b>Required Resources</b>	<p>Personal computer, software, laboratories:  electrician's toolkits:  VDE tongue tools (pliers, side cutters, long nose pliers, etc.); a device for stripping 0.2-6mm<sup>2</sup>;  crimping pliers 0.5-6.0 mm<sup>2</sup>  crimping pliers 0.5-10.0 mm<sup>2</sup>;  voltage tester;  hammer; chisel; a set of files (flat file, round file, triangular file);  cordless drill; network drill; perforator; a set of bits for the screwdriver; metal crown D - 22mm, 20 mm; a set of drills for metal (D1-10mm);  swivel chair; socket wrench with interchangeable heads 8-14 mm;  hacksaw; bolt cutter; wire cutters for working with wire tray, 600mm; F-shaped clamp;  control and measuring instruments (tape measure, metal ruler, metal square, metal level bubble);  personal protective equipment  multimedia equipment, Internet resources, server software, copying, scanning and printing equipment, educational materials:  1. N.K. Milenin Electronics and circuitry. Textbook and workshop for academic undergraduate;  2. S.A. Bogomolov Fundamentals of electronics and digital circuitry;  3. A. Sergeev "Fundamentals of local computer networks";  4. E. Tanenbaum, D. Weatherler "Computer Networks";  5. N.M. Izyumov, D.P. Linde Fundamentals of radio engineering;</p>



	<p>6. A.N. Nadolsky. Theoretical foundations of radio engineering. Tutorial;</p> <p>7. V.G.Kartashevsky, A.V.Roslyakov, L.N. Sutyagina Digital switching systems for GTS;</p> <p>8. Edited by S.D. Nimaeva. Digital switching systems;</p> <p>9. A.S. Groshev Informatics: Textbook for universities;</p> <p>O.A. Akulov, N.V. Medvedev. Computer science. Basic course, etc.</p>
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Record Keeping, Cultural Studies, Information Technologists, Fundamentals of Management, Fundamentals of Mechanics, Fundamentals of Modeling

**Specification of Professional Module PM 8**  
**“Installation of subscriber access equipment of telecommunication systems and information and communication communication networks”**

<b>Scope of competence</b>	Wiring planning for mobile station equipment
<b>Name and code of the module</b>	PM 8. Installation of subscriber access equipment of telecommunication systems and information and communication communication networks
<b>Purpose of the module</b>	After studying this module, the student will be able to draw up a work plan for installing subscriber access equipment of telecommunications systems and information and communication communication networks.
<b>Level of professional qualification</b>	4
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To determine the installation location of subscriber access equipment;</li> <li>2. To draw up installation diagrams of subscriber access equipment of telecommunication systems and information and communication networks;</li> <li>3. To determine the types of interfaces of information and communication networks for mobile communications.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Data on the actual locations of subscriber access equipment;</li> <li>2. Analysis of the territory coverage with subscriber access equipment;</li> <li>3. Definition of blind zones for the further installation of subscriber access equipment;</li> <li>4. Prioritization of installation zones for subscriber access equipment;</li> <li>5. Determination of the type of installation scheme for the selected zone;</li> <li>6. Drawing up the installation scheme for the selected type;</li> <li>7. Analysis of information and communication networks to determine the implemented interface;</li> <li>8. Selection of optimal interfaces for the corresponding information and communication network;</li> <li>9. Implementation of the selected interface.</li> </ol>

<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences
<b>Module forming disciplines</b>	Perform installation of equipment telecommunication subscriber access; Basics of technical operation and maintenance; Digital transfer of equipment system connection.
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intense (credits RK/academic hours)</b>	5 credits/150 hours
<b>Duration of the module</b>	3 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular/dual
<b>Form of organization of educational process</b> <b>Teaching methods</b>	Lecture, independent work, practice lesson  Oral questioning, testing, project activity, task, test case
<b>Control Forms</b>	Exam, pass/fail exam
<b>Required Resources</b>	Personal computer, software, laboratories: electrician's toolkits: VDE tongue tools (pliers, side cutters, long nose pliers, etc.); a device for stripping 0.2-6mm <sup>2</sup> ; crimping pliers 0.5-6.0 mm <sup>2</sup> ; crimping pliers 0.5-10.0 mm <sup>2</sup> ; voltage tester; hammer; chisel; a set of files (flat file, round file, triangular file); cordless drill; network drill; perforator; a set of bits for the screwdriver; metal crown D - 22mm, 20 mm; a set of drills for metal (D1-10mm); swivel chair; socket wrench with interchangeable heads 8-14 mm; hacksaw; bolt cutter; wire cutters for working with wire tray, 600mm; F-shaped clamp; control and measuring instruments (tape measure, metal ruler, metal square, metal level bubble); personal protective equipment, multimedia equipment, Internet resources, server software, copying, scanning and printing equipment, educational materials: 1. A.S. Groshev Informatics: Textbook for universities; 2. O.A.Akulov, N.V. Medvedev Computer

	science. Basic course; 3. V.A. Kudryashov. Telecommunication networks: a textbook for open source software, etc.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Record Keeping, Cultural Studies, Information Technologists, Fundamentals of Management, Fundamentals of Mechanics, Fundamentals of Modeling

### Specification of Professional Module PM 9

#### “Maintenance of mounted lines and terminal equipment of subscriber access systems and information and communication communication networks”

<b>Scope of competence</b>	Wiring planning for mobile station equipment
<b>Name and code of the module</b>	PM 9. Service of the mounted lines and the terminal equipment of subscriber access of systems and information and communication communication networks
<b>Purpose of the module</b>	After studying this module, the student will be able to control the quality of service of the mounted lines and the subscriber access terminal equipment of the systems and information and communication communication networks
<b>Level of professional qualification</b>	4
<b>Training Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To check the functioning of subscriber access equipment;</li> <li>2. To test equipment switching systems;</li> <li>3. To assess the quality of the installation of equipment information and communication networks for mobile communications.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Drawing up a plan for checking the functioning of the equipment;</li> <li>2. Bypassing the planned equipment for the evaluation of functionality;</li> <li>3. Evaluation of the functionality and performance of the equipment;</li> <li>4. The use of tools for testing switching systems;</li> <li>5. Analysis of test results;</li> <li>6. Evaluation of the performance of switching systems;</li> <li>7. Preparation of a plan to bypass the installed equipment for inspections;</li> <li>8. Check installed equipment for faults;</li> <li>9. Troubleshoot for troubleshooting.</li> </ol>
<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences
<b>Module forming disciplines</b>	Communication cable installation technology; Digital and fiber optic systems; Installation of cables and terminals; Installation of communication devices; Telecommunications system maintenance.
<b>Module type (mandatory,</b>	Mandatory

<b>optional)</b>	
<b>Labor intense (credits RoK/academic hours)</b>	8 credits/240 hours
<b>Duration of the module</b>	3 semesters
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process. Teaching methods</b>	Lecture, independent work , practice lesson  Oral questioning, testing, project activity, task, case study
<b>Control Forms</b>	Pass fail exam, exam
<b>Required Resources</b>	<p>Personal computer, software, laboratories:  electrician's toolkits:  VDE tongue tools (pliers, side cutters, long nose pliers, etc.); a device for stripping 0.2-6mm<sup>2</sup>;  crimping pliers 0.5-6.0 mm<sup>2</sup>  crimping pliers 0.5-10.0 mm<sup>2</sup>;  voltage tester;  hammer; chisel; a set of files (flat file, round file, triangular file);  cordless drill; network drill; perforator; a set of bits for the screwdriver; metal crown D - 22mm, 20 mm; a set of drills for metal (D1-10mm);  swivel chair; socket wrench with interchangeable heads 8-14 mm;  hacksaw; bolt cutter; wire cutters for working with wire tray, 600mm; F-shaped clamp;  control and measuring instruments (tape measure, metal ruler, metal square, metal level bubble);  personal protective equipment  multimedia equipment, Internet resources, server software, copying, scanning and printing equipment, educational materials:  1. A.N. Aleksandrovskaya Organization of maintenance and repair of electrical and electromechanical equipment;  2. A.G. Lozhkovsky "Theory of mass service in telecommunications: a textbook;  3. V.N. Sobolev Electrical circuit theory;  4. G.V. Zebeke Fundamentals of the theory of chains. Textbook for universities;  5. G.N. Sizykh Power supply of communication</p>

	devices; 6. V.E. Kitayev, A.A. Bokunyaev, M.F. Kolkanov. Power supply of communication devices; etc.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Record Keeping, Cultural Studies, Information Technologists, Fundamentals of Management, Fundamentals of Mechanics, Fundamentals of Modeling

**Specification of Professional Module PM 10**  
**“Organization of work of the structural unit”**

<b>Scope of competence</b>	Organization of production activities of the structural unit
<b>Name and code of the module</b>	PM 10. Organization of work of the structural unit
<b>Purpose of the module</b>	After studying this module, the student will be able to plan and organize the work of the structural unit.
<b>Level of professional qualification</b>	4
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To prepare a work plan for the structural unit based on the knowledge of the psychology of the individual and the team;</li> <li>2. To efficiently organize workplaces;</li> <li>3. To calculate the indicators characterizing the efficiency of the organization of servicing the main and auxiliary equipment.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Definition of the list of tasks facing the unit;</li> <li>2. Assessment of the volume and timing of the unit;</li> <li>3. Planning and distribution of work units for personnel;</li> <li>4. Analyze the needs of employees to improve work efficiency;</li> <li>5. Determine optimal work sites for each employee;</li> <li>6. Providing the necessary means to ensure the efficiency of the employee;</li> <li>7. Collection of indicators on the organization of equipment;</li> <li>8. Analysis of the collected indicators;</li> <li>9. Calculation of indicators of equipment maintenance efficiency.</li> </ol>
<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences, Psychology, Sociology
<b>Module forming disciplines</b>	Fundamentals of information and automation; The economics of the industry; Technical drawing; Automation of production processes; Radio scripts; Framework of standardization and certification; Professional practice.



<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intense (credits RK/academic hours)</b>	9 credits/270 hours
<b>Duration of the module</b>	3 semesters
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular/dual
<b>Form of organization of educational process Teaching methods</b>	Lecture, independent work, practice lesson  Oral questioning, testing, project activity, task, case study
<b>Control Forms</b>	Exam, pass/fail exam
<b>Required Resources</b>	Personal computer, software, equipped laboratories; individual protection means; multimedia equipment, Internet resources, server software, copying, scanning and printing equipment, educational and methodical literature: 1. V.N. Pantelev, V.M. Proshin Basics of production automation; 2. .N. Pantelev, V.M. Proshin. Basics of production automation. Laboratory works; 3. L.B. Basovsky Economy of branch - the Manual; 4. N.G. Pletenkina. Economics in the communications industry; 5. M.A. Gorelik, Ye.A. Golubitskaya Economy of communication; 6. I.S. Vyshnepolsky, Technical drawing: textbook for SPO; 7. A.G.Sergeyev, Standardization and certification: a textbook and a workshop for SPO, etc.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Record Keeping, Cultural Studies, Information Technologists, Basics of Management

**Specification of Professional Module PM 11**  
**“Development of mobile information and communication networks and mobile communication systems”**

<b>Scope of competence</b>	Development of mobile information and communication networks and communication systems for enterprises and small and medium-sized businesses
<b>Name and code of the module</b>	PM 11. Development of mobile information and communication networks and mobile communication systems
<b>Purpose of the module</b>	After studying this module, the student will be able to develop projects of mobile information and communication networks and mobile communication systems.
<b>Level of professional qualification</b>	4
<b>Learning Outcomes by Module</b>	<ol style="list-style-type: none"> <li>1. To create basic scenarios for establishing connections in subscriber access networks;</li> <li>2. To carry out the development of projects of switching stations, nodes and telecommunication networks for enterprises and companies of small and medium business;</li> <li>3. To implement the approved project in a timely manner.</li> </ol>
<b>Summary of Content (sections, themes)</b>	<ol style="list-style-type: none"> <li>1. Analysis of the requirements of customers for the project;</li> <li>2. Creating a draft project on the establishment of subscriber access networks;</li> <li>3. Conclusion of basic connection scenarios;</li> <li>4. Drawing up a project plan based on customer requirements;</li> <li>5. Calculation of the number of nodes and telecommunication networks of switching stations;</li> <li>6. Approval of the developed projects for enterprises and companies of small and medium business;</li> <li>7. Determination of the volume and timing of delivery of projects;</li> </ol>

	8. Development of technical documentation of projects; 9. Phased implementation of project tasks.
<b>Prerequisites</b>	Mathematics, Physics, Natural Sciences, Psychology, Sociology
<b>Module forming disciplines</b>	Industrial training; Industry economics and business fundamentals; Fundamentals of technical operation and maintenance of communication equipment; Installation of subscriber access equipment of telecommunication systems.
<b>Module type (mandatory, optional)</b>	Mandatory
<b>Labor intense (credits RK/academic hours)</b>	10 credits / 300 hours
<b>Duration of the module</b>	3 semester
<b>Form of teaching</b>	Full-time
<b>Education technology</b>	Modular
<b>Form of organization of educational process</b> <b>Teaching methods</b>	Lecture, independent work, practice lesson  Oral interaction, testing, project activity, task, test case
<b>Control Forms</b>	Exam, pass/fail exam
<b>Required Resources</b>	Personal computer, software, equipped laboratories; individual protection means; multimedia equipment, Internet resources, server software, copying, scanning and printing equipment, educational and methodical literature: 1. V.N. Pantelev, V.M. Proshin Basics of production automation; 2. .N. Pantelev, V.M. Proshin. Basics of production automation. Laboratory works; 3. L.B. Basovsky Economy of branch - the Manual; 4. N.G. Pletenkina. Economics in the communications industry; 5. M.A. Gorelik, Ye.A. Golubitskaya Economy of communication; 6. I.S. Vyshnepolsky, Technical drawing: textbook for SPO; 7. A.G.Sergeyev, Standardization and

	certification: a textbook and a workshop for SPO, etc.
<b>Language of instruction</b>	Russian, Kazakh
<b>Post-requisites</b>	Record Keeping, Cultural Studies, Information Technologists, Fundamentals of Management, Fundamentals of Mechanics, Fundamentals of Modeling

## MODEL TRAINING PLAN

### Post-secondary education in the field of “Radio electronics and communications (by types)”

Code and profile of education: 1300000 – Communication, telecommunications and information technology  
 Specialty: 1306000– Radioelectronics and communications (by types)  
 Qualification: 1306164 – Applied Bachelor in Mobile Communication Systems  
 Form of study: Full-time  
 Normative period of study: 2 years 10 months on base of general secondary education

Index	Modules of types of academic activity	Number of credits	Form of control		Total hours	The amount of training time (hours)						Distribution courses	
			Exam	Differentiated test		From them:							
						On the types of training			On the forms of organization training				
						Theoretical training	Laboratory and practical works, course projects and	Practical training *	Auditorium, contact	SRO			
SROP	SROS												
1	2	3	4	5	6	7	8	9	10	11	12	13	

<b>BM</b>	<b>Basic Modules</b>	<b>30</b>	<b>3</b>	<b>8</b>	<b>900</b>	<b>630</b>	<b>270</b>		<b>720</b>	<b>180</b>	<b>60</b>	<b>1-6</b>
BM 1	Application of professional vocabulary, the preparation of business papers in the field of professional activity	6	+	+	180	120	60		120	60	15	1-6
BM 2	Development and improvement of physical qualities	6	+	+	180	30	150		180			1-6
BM 3	Application of the foundations of social sciences for socialization and adaptation in society and the workforce	6		+	180	180			150	30	-	1-6
BM 4	Reading of drawings	2		+	60	30	30		30	30	15	1-6
BM 5	Application of basic knowledge of economics in professional activities	3		+	90	60			60	30	15	1-6
BM 6	Understanding the history, role and place of Kazakhstan in the world community	3		+	90	90	-		90	-	-	1-6
BM 7	The use of digital devices and microprocessor systems in communication technology	2	+	+	60	30	30		30	30	15	1-6
BM 8	Compliance with safety regulations and labor protection	2		+	60	60	-		60			1-6
<b>PM</b>	<b>Professional modules on working qualifications</b>	<b>36</b>	<b>+</b>	<b>+</b>	<b>1080</b>	<b>600</b>	<b>240</b>	<b>240</b>	<b>600</b>	<b>480</b>	<b>120</b>	<b>1-6</b>
PM 1	Installation, configuration and initial installation of wired and wireless access networks	12	+	+	360	150	120	90	150	210	60	1-6

PM 2	Implementation of a set of works on the wiring of station equipment for mobile communications	8	+	+	240	180	30	30	180	60	30	1-6
PM 3	Works on installation and maintenance of equipment of telecommunication systems and subscriber access lines	6	+	+	180	120	30	30	120	60	30	1-6
PM 4	Development of a set of methods and selection of information protection means in information and communication networks and mobile communication systems	10	+	+	300	150	60	30	150	150	60	1-6
<b>PM</b>	<b>Professional Qualification Modules of Midlevel Specialist</b>	<b>21</b>	<b>+</b>	<b>+</b>	<b>630</b>	<b>300</b>	<b>240</b>	<b>90</b>	<b>300</b>	<b>330</b>	<b>180</b>	<b>1-6</b>
PM 5	Performance of information protection in information and communication networks and mobile communication systems	6	+	+	180	90	60	30	90	90	60	1-6
PM 6	Monitoring and diagnostics of mobile telecommunication systems	5	+	+	150	90	60	-	90	60	-	1-6
PM 7	Performance of administration of network equipment	5	+	+	150	60	60	30	60	90	60	1-6
PM 8	Installation of subscriber access equipment of telecommunication systems and information and communication communication networks	5	+	+	150	60	60	30	60	90	60	1-6

PM	<b>Professional modules of applied bachelor qualifications</b>	<b>27</b>	+	+	<b>810</b>	<b>240</b>	<b>390</b>	<b>180</b>	<b>240</b>	<b>570</b>	<b>390</b>	<b>4-6</b>
PM 9	Service of mounted lines and terminal equipment of subscriber access systems and information and communication communication networks	8	+	+	240	60	120	60	60	180	120	4-6
PM 10	Organization of work of the structural unit	9	+	+	270	90	120	60	90	180	120	4-6
PM 11	Development of mobile information and communication networks and mobile communication systems	10	+	+	300	90	150	60	90	210	150	4-6
	<b>Total:</b>	<b>114</b>			<b>3420</b>	<b>1770</b>	<b>1140</b>	<b>510</b>	<b>1860</b>	<b>1560</b>	<b>750</b>	
pp	Professional practice (educational, industrial, pre-diploma) **	42			1260			1260	180	1080	300	1-6
DP	Diploma project***	9			270		270		60	210	30	6
IC	Intermediate certification	10			300	300			300			1-6
FC	Final certification	2			60	60			60			6
	<b>Total for mandatory training:</b>	<b>180</b> <b>(144</b> <b>+36)</b>			<b>5400</b> <b>(4320</b> <b>+1080)</b>	<b>2130</b>	<b>1410</b>	<b>1770</b>	<b>2460</b>	<b>2850</b>	<b>1080</b>	
C	Consultations	10			300	300				300		1-6
O	Optional	11			330	330				330		1-6
	<b>TOTAL:</b>	<b>201</b> <b>(165</b> <b>+36)</b>			<b>6030</b> <b>(4950</b> <b>+1080)</b>	<b>2760</b>	<b>1410</b>	<b>1770</b>	<b>2460</b>	<b>3480</b>	<b>1080</b>	



**Note:**

\* The component on choice takes into account the specific socio-economic development of a particular region and the needs of the labor market, as well as the individual interests of the student. The component of choice is formed on the basis of proposals of employers and partners of the education organization, subject-cycle commissions / departments.

\*\* When developing working curricula, professional practice can be integrated into professional modules.

\*\*\* When carrying out the final certification in the form of an exam, the diploma design hours are redistributed into professional modules.

\*\*\* При проведении итоговой аттестации в форме экзамена, часы дипломного проектирования перераспределяются в профессиональные модули.