

**DEPARTMENT OF LABOR AND SOCIAL PROTECTION OF
KAZAKHSTAN REPUBLIC POPULATION
PROJECT «DEVELOPMENT OF LABOR SKILLS AND STIMULATION
OF WORKPLACES»**

**EDUCATIONAL PROGRAMME
by specialty**

0919000 - High Voltage Networks
(code/code and the name of the specialty)

Level of professional qualification: mid-level specialist

Terms of training: 3years 10 months

Astana 2018

The educational programme was reviewed and recommended by the Educational and Methodological Council (name of the organization of education)

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Introduction

The present educational program for the specialty "0919000- High Voltage Networks" was developed in accordance with the State Obligatory Standard of Post-Secondary Education, approved by the Decree of the Government of the Republic of Kazakhstan No. 1080 of August 23, 2012; the national framework of qualifications of the Republic of Kazakhstan (joint order of the Minister of Labor and Social Protection of Population of the Republic of Kazakhstan of September 24, 2012 No. 373-o-m and the Minister of Education and Science of the Republic of Kazakhstan dated September 28, 2012 No. 444); the branch framework of qualifications in the field of "Electricity", approved by the protocol of November 17, 2016 No. 12-03-333; The project of the professional standard "Electrical equipment of power plants and ne (by types)" was developed by OYL "Kazakhstan Association of Oil and Energy Complexes" KAZENERGY", version 1, 2015, the date of the tentative revision of 2018 and taking into account the Order of the Minister of Education and Science of the Republic of Kazakhstan from 31 October 2017 № 553 "On the approval of standard curricula and model curricula for the specialties of technical and vocational education".

The program is designed to implement the principles of the democratic nature of education management, expand the boundaries of academic freedom and the authority of educational institutions, which 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 flexibility of the program will allow taking into account the abilities and needs of the individual, production, and society.

The modular-competence approach is based on the development of learning and evaluation of learning outcomes in terms of competencies of students, as well as on the possibility of using a differentiated approach to learning.

The competency-based program is in line with the concept of lifelong learning, as it aims to build highly qualified professionals who are able to adapt to the changing situation in the world of work, on the one hand, and to continue professional growth and education on the other. This approach to learning makes it possible to create a sense of success for each student, which is created by the organization of the learning process, in which the student can and must manage his own training, which teaches him to take responsibility for his own training, and further - for his own professional growth and career. Thus, the consumer will be satisfied with the education, he can improve it during his life, responding to changes in the labor market.

The developed educational program allows organizing educational process with use of credit technology for training.

Based on this EP, the education organization develops working curricula and programs with the use of appropriate methodological recommendations for working training and planning documentation.

LIST OF SYMBOLS AND ABBREVIATIONS

BC	Basic competence
BM	Basic module
HE	Higher education
SCES	State compulsory education standard
EQF	European qualification framework
KSA	Knowledge, skills, attainments
NCO	National Classification of Occupations
NQF	National Qualifications Framework
NSQ	National system of qualifications
HM	Humanitarian module
GCEA	General Classifier of Economic Activities
CM	Common module
EP	Educational program
GPM	General professional module
SFQ	The sectoral framework of qualifications
PS	Professional standard
PC	Professional competence
PM	Professional module
RK	The Republic of Kazakhstan
LO	Learning Outcome
SM	Special module
TVET	Technical and vocational education and training
AUTOCAD	Automated Computer Aided Drafting and Design
EC	Electronic Computer
CP	Course project
GP	Graduation project

PASSPORT OF THE EDUCATIONAL PROGRAMME

Name (code and name of the specialty): 0919000 - High Voltage Networks

Title and qualification code 0919013 – “Electrical technician”

Purpose of the educational program: Preparation of a specialist of a new formation with broad fundamental knowledge, initiative, performing work on the organization and control of maintenance, operation, and repair of electrical equipment for high voltage networks.

Level of education: техническое и профессиональное

Level of professional qualification: специалист среднего звена

Levels of qualifications for NRQF / SFQ:4

Sphere of professional activity *: Transmission and distribution of electrical energy (organization and performance of works on maintenance, operation, repair, adjustment and testing of electrical equipment of power plants, networks, and systems)

Types of work (by SFQ and PS)**

- Electrical installation of electrical equipment of stations, substations, and networks
- Maintenance and repair of electrical equipment
- Operation of medium and high voltage electrical equipment with the introduction of automatic device systems
- Organization of work to ensure the uninterrupted operation of high-voltage electrical equipment

Objects of professional activity (by NCO, the initial group) *** Power plants, energy companies, production workshops, equipment repair areas

Features of the program **:** Ability to use the dual form of training, credit training system.

Education form: full-time.

Terms of training: 3 years 10 months

Language of instruction: Kazakh / Russian

Volume of credits/hours: 219 credits /6588 hours

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

* It is indicated by the parameters of the SFQ (Methodological recommendations for the development and design of the branch framework ** To be indicated on the PS (Methodological recommendations on development and registration of professional standards, Astana, 2017)

*** The systems, objects, phenomena, processes, technologies for which, activity is directed, are indicated.

**** Identifies dual education / distance learning / credit technology

***** The previous education is indicated: basic secondary/general secondary/technical and vocational education

COMPETENCE PROFILE

<p>Purpose of training: performance of work on the organization and control of maintenance, operation, and repair of electrical equipment of high voltage networks</p>	<p>Result: after completion of the training program, the trainee will be able to perform work on the organization and control of maintenance, operation, and repair of electrical equipment of high voltage networks</p>	
<p>The names of the section, section, group, class, and subclass according to GSEA * (by PS)</p>	<p>Section D: Power supply, gas, steam and air conditioning</p> <p>Section [35]: Power supply, gas supply, steam and air conditioning</p> <p>Group [351]: Electricity production, transmission, and distribution:</p> <p>Class [3512]: Transmission of electricity</p>	
<p>Areas of competence (<i>on the basic labor functions of the professional standard or the analysis of the profession</i>) **</p>	<p>A. Electrical installation of electrical equipment of the station, substation, and networks</p> <p>B. Maintenance and repair of electrical equipment</p> <p>C. Operation of electrical equipment of medium and high voltage with the input of systems of automatic devices</p> <p>D. Organization of works to ensure the uninterrupted operation of high-voltage electrical equipment</p>	
<p>List of competences and modules in the context of the academic degree / qualification / profession</p>		
<p>Competency code</p>	<p>Competencies (in line with the labor functions)</p>	<p>Modules</p>
<p>Basic competencies</p>		
<p>PC 1</p>	<p>Perform installation of overhead power line supports, contact networks and open switchgear structures</p>	<p>PM 1 Installation of support for overhead power lines, contact networks and open switchgear structures</p>
<p>PC 2</p>	<p>Install and disassemble wires, ground wires and tension cables of overhead power lines and contact networks</p>	<p>PM 2 Installation and dismantling of wires, ground and tension cables of overhead power lines and contact networks</p>

PC 3	Perform work on diagnostic testing and measurement of parameters of the contact network and overhead power lines	PM 3 Performing diagnostic tests and measurements of parameters of contact network devices and overhead power lines
PC 4	Carry out maintenance of equipment stations, distribution systems and networks	PM 4 Carrying out maintenance of equipment of stations, distribution networks and systems
PC 5	Repair equipment of stations, distribution systems and networks	PM 5 Repair of station equipment, distribution networks and systems
PC 6	Perform commissioning of medium and high voltage electrical equipment	PM 6 Implementation of the commissioning of electrical equipment of medium and high voltage
PC 7	Perform commissioning of automatic devices	PM 7 Implementation of the commissioning of automatic devices
PC 8	Perform work on the planning, organization and automation of production	PM 8 Planning, organization and automation of production
PC 9	Perform work to ensure the safe operation of high-voltage equipment	PM 9 Performing work to ensure the safe operation of high-voltage equipment
Basic competencies		
BC 1	Apply professional vocabulary, draw up and design business documents in the field of activity for solving problems of interpersonal and intercultural interaction	BM 01 The use of professional vocabulary, the preparation of business papers in the field of professional activity
BC 2	Use the basics of philosophical knowledge, be aware of oneself and one's place in society, tolerate social, political, ethnic, confessional and cultural development.	BM 02 Application of the foundations of philosophical knowledge, social sciences for socialization and adaptation in society and the workforce.
BC 3	Understand the history, role and place of Kazakhstan in the world community	BM 03 Understanding the history, role and place of Kazakhstan in the world community, respectful and

		caring attitude to historical heritage and cultural traditions
BC 4	Understand the basic patterns and mechanisms of the functioning of the modern economic system	BM 04 Application of basic knowledge of the economy and knowledge of labor laws and regulations to protect their rights in their professional activities.
BC 5	Maintain and develop an adequate level of physical fitness to ensure full social and professional activities	BM 05 Development and improvement of physical qualities
BC 6	Perform, design, read design and technological documentation using application programs	BM 6. Performance, design, reading of design and technological documentation using application programs

* The general classifier of economic activities (OKED) is a document intended for the classification and coding of all types of economic activity.

** A brief description of the work functions that enable you to achieve the main purpose of the specialty/profession. The number of functions depends on the complexity of the profession.

LIST OF MODULES AND LEARNING OUTCOMES

Module name	Learning outcomes (in accordance with professional tasks)	Criteria for evaluation	Disciplines that form modules
Professional modules			
PM 1 Installation of support for overhead power lines, contact networks and open switchgear structures	LO 1 To perform preparation of overhead power line supports and open switchgear structures for assembly and installation	1. Characteristics of power systems and power grids	Drawing
		2. Classification of power plants and types of installation work	Fundamentals of technical mechanics
		3. Characteristics of the device overhead power lines and the appointment of structural elements	Theoretical foundations of electrical engineering
		4. Possession of ways to build overhead power lines	Electric cars and transformer tori
		5. Conducting preparatory work for the construction of overhead power lines and contact network	Electrical measurements
		6. Preparation of overhead power line supports and open switchgear structures for assembly and installation	Electrotechnical materials
	LO 2. To assemble the supports of overhead power lines and structures of open switchgears	1. Preparation and use of technical documentation for the installation of high voltage overhead lines	Basics of industrial electronics
		2. Purpose and	Computer Technology Basics
			Electrical equipment of power stations and substations
			Occupational Safety and Health

		content of technical documentation, requirements for its design	Theoretical bases of installation and dismantling of wires and cables	
		3. Execution of antiseptic parts of wooden supports and waterproofing of reinforced concrete structures		Theoretical bases of mounting supports and structures
		4. Painting of unidentified supports and structures of open substations;		
LO 3. To perform installation of overhead power line supports and open switchgear structures		1. Installation and dismantling of supports and structures of open substations	Educational practice	
		2. Perform editing power transmission lines		Mechanic-mechanical practice
		3. Painting the installed supports and structures of open substations	Electrical practice	
		4. The numbering of supports, fixing tables and posters on them		
		5. Installation of overhead power line supports and open switchgear structures		
LO 4. To read the drawings and diagrams		1. Possession of the basic rules for the development, design and reading of design and technological documentation		
		2. The use of basic		

		techniques of drawing, the rules of the drawings	
		3. Meeting the requirements of the unified system for design documentation (USDD)	
		4. Reading drawings of products, mechanisms and components of the equipment used	
PM 2 Installation and dismantling of wires, lightning protection and tension cables of overhead transmission lines and contact networks	LO 1. To roll out and reel steel ropes, cables and wires on drums	1. Rolling of steel ropes, wires and cables with the installation of drums	Power grids Organization of installation, repair and adjustment of high-voltage equipment
		2. Winding reels on wires and cables	
		3. Performing stitching drums with wound wires and cables	
	LO 2. To assemble insulators and fittings into insulating suspensions.	1. Compliance with safety regulations when performing work	
		2. Build insulators in insulating suspension	
		3. Assembly of reinforcement in insulating suspension	
	LO 3. To perform grounding and grounding of ground protection and tension cables of overhead power lines and contact	1. Installation of grounding and zeroing overhead power lines and contact networks;	
		2. Execution of penetration of	

	networks	earthing manually and with the help of mechanized tools	
		3. Coloring parts mounting attachments and grounding tires	
	LO 4. To tension and dismantle the cables on the supports of overhead power lines and contact networks	1. Lifting the wire on the support of overhead power lines	
		2. Conducting cutting and cutting of wires and cables	
		3. Manufacturing of descents, jumpers, loop and semi-loop of wires and cables	
		4. Execution of unwinding and installation of link and plastic strings on a carrying cable from the ground, dischargers	
		5. Installation of protection for transitions, reinforcement on consoles and flexible crossbars, load limiters of compensated anchoring, fixing and feeder brackets on supports	
	LO 5. To make installation and dismantle of wires and networks	1. Installation of the middle anchoring on the ground, suspension of the suspension cable from the	

		ground to the supports, insert insulators into wires and cables on the ground	
		2. Installation of inter-rail connections, wires on overhead power lines	
		3. Fabrication and connection of cable delays to the supports, complete set of rigid crossbars	
		4. Carrying out the dismantling of wires and cables of overhead power lines	
		5. Installation of air line inputs to buildings and fixing wires on pin insulators	
		6. The implementation of the tension and adjustment of wires and cables on overhead power lines	
		7. The choice of materials based on their properties for use in the installation of high-voltage overhead power lines and contact networks	
PM 3. Performing work on diagnostic testing and	LO 1. To perform preparatory work for the performance of	1. Familiarization with the order of work and the	Electrical equipment of power plants

measurement of parameters of contact network devices and overhead power lines	diagnostic tests and measurements of parameters of the contact network devices and overhead power lines	peculiarities of the technological operations for diagnostic testing and measuring the parameters of the contact network devices and overhead power lines	and substations Operation of electrical equipment of power plants and substations
		2. Selection of instruments, tools, protection and installation tools for the production of diagnostic tests and measurements of parameters of the contact network and overhead power lines based on the task	
		3. Testing the operability of protective and installation tools, diagnostic devices and tools	
		4. Preparation and commissioning of instruments for performing diagnostic tests and measurements of parameters of a contact network device and overhead power lines	
		5. Preparation of the workplace by de-energizing and fencing signals	

	<p>LO 2. To perform work on inspection and diagnosis of contact network devices and overhead power lines</p>	<p>1. Assessment of the condition of the serviced equipment during the inspection and diagnostics of the contact network devices and overhead power lines</p>	
		<p>2. Inspection of the contact network devices, overhead power lines, transitions of power lines through the contact network</p>	
		<p>3. Carrying out diagnostics of the contact network devices and overhead power lines on the supports of the contact network from the railcar</p>	
		<p>4. Identifying the causes of malfunction of power supply devices</p>	
		<p>5. Determination of the volume of repair work on the results of the audit, detours and detours with inspections of the contact network and overhead power lines</p>	

		6. Examination and diagnostics of the contact network devices and overhead power lines, including the use of automated systems installed at the workplace	
	LO 3.To perform work on testing and measuring devices of the contact network using portable and stationary diagnostic equipment	1. Assessment of the condition of the serviced equipment of the contact network and other power supply devices	
		2. Testing and measuring the parameters and dimensions of the contact network and other power supply devices	
		3. Analysis of the measurements made during the work on testing and measuring devices of the contact network	
		4. Identification of the volume of repair work on the results of tests and measurements of the contact network and other power supply devices	
		5. Maintenance of technical documentation on the results of tests and measurements of the contact	

		network and other power supply devices, including using automated systems installed at the workplace	
PM 4 Carrying out maintenance of equipment of stations, distribution networks and systems	LO 1. To carry out maintenance of electrical equipment	1. Characteristics and principle of operation of electrical equipment	Electrical equipment of power stations and substations
		2. Determination of equipment performance	Operation of electrical equipment of power plants and substations
		3. Determination of damage and assessment of the technical condition of electrical equipment	
		4. Ensuring uninterrupted work of electrical equipment of stations, networks	
		5. Perform switching	
	LO 2. To carry out preventive inspections of electrical equipment	1. Possession of safe methods of work on electrical equipment	
		2. Determination of the technical condition of electrical equipment	
		3. Inspection, determination and elimination of defects and damage to electrical equipment	
		4. Registration of technical	

		documentation in the process of maintenance of electrical equipment	
	LO 3. To perform adjustment and testing of electrical equipment	1. Compliance with the timing of the test of protective equipment and devices	
		2. Testing and commissioning of electrical equipment	
		3. Restoration of power supply to consumers	
		4. Preparation of technical reports on the maintenance of electrical equipment	
PM 5 Repair of station equipment, distribution networks and systems	LO 1. To perform repair of stations, distribution networks and systems	1. Monitoring of compliance with safety measures and quality of repair work	Organization of installation, repair and adjustment of high-voltage equipment Electric devices
		2. Determination of the health and maintainability of equipment withdrawn from work	
		3. Identification of the causes of occurrence and methods of eliminating the danger to personnel performing repair work	
		4. Drawing up an application for equipment and	

		spare parts and preparing technical documentation for repairs	
		5. Execution of repair work	
	LO 2. To rent and take electrical equipment from repair	1. Testing of repaired electrical equipment	
		2. Use of devices, tools, equipment and measuring instruments	
		3. Analysis of the causes of contactors wear and ways to combat this phenomenon.	
		4. Execution of commissioning works.	
		5. Calculation of parameters of electrical apparatus and drawing up design documentation	
		6. Acceptance of electrical equipment after repair	
PM 6 Commissioning of electrical equipment of medium and high voltage	LO 1. To apply the basic methods and means of measuring electrical and electrical quantities, choose measuring equipment	1. Drawing up measuring circuits	Electrical measurements Information and measuring equipment Electromagnetic Transients
		2. The choice of measuring instruments	
		3. Measurement with a given accuracy various electrical values	
		4. Determination of the value of the measured value and measurement	

		accuracy	
		5. The use of computer technology for processing and analyzing measurement results	
	LO 2. To analyze electromagnetic transients in electric power systems	1. Application of methods for calculating transient and steady-state processes in linear and nonlinear electrical circuits	
		2. Analysis of operating modes of electric power and electrical equipment and systems	
		3. Calculation of parameters of electric power and electrical devices, electrical installations, electric power networks and systems, power supply systems	
		4. The use of applied programs and computer-aided design tools when solving engineering problems	
PM 7 Implementation of the commissioning of automatic devices	LO 1. To carry out the development and evaluation of algorithms for the operation and interaction of	1. Knowledge of the principles of relay protection and automatic control systems in the power industry	Automatic control in power engineering Relay

	various automation devices for electric power devices	2. Characteristics of methods for adjusting the parameters of the mode of electric power systems	Protection and Automation Network management
		3. Selection of types of relays and methods for regulating the parameters of relay protection and automation	
		4. Application of automatic reclosing and automatic switching on reserve	
	LO 2. To perform protection and adjustment of various automation devices of electric power devices.	1. Reading relay protection and automation schemes for electric power devices	
		2. Analysis of relay protection circuits of power lines, transformers, compensators, electric motors, busbars, blocks	
		3. Perform adjustment of emergency protection automation	
	LO 3. To analyze the structures and processes that accompany the operation of high-voltage installations	1. Characteristics of the main causes of emergency conditions caused by exposure to strong electric fields and electric discharge processes	

		2. Understanding of electrophysical processes in dielectric media	
		3. Isolation classification of high-voltage equipment	
		4. Proficiency in measuring high voltages	
		5. The use of surge protection	
PM 8 Planning, organization and automation of production	LO 1. To understand the essence of market reforms	1. Awareness of the management structure of enterprises	Energy Economics Labor protection and electrical safety safety
		2. Knowledge of the basics of planning	
		3. Understanding the development of the economy of the Republic of Kazakhstan	
	RO 2. To apply the results of economic analysis of industry and energy organizations	1. Analysis of the effectiveness of planning	
		2. Calculation of investment in capital construction	
		3. Performing calculations of technical and economic indicators	
4. Implementation of design and settlement work			
PM 9 Performing work to ensure the safe operation of high-voltage equipment	LO 1. To comply with the requirements of safety and labor protection when	1. Application of the main tasks and legal bases of protection, rules of fire safety and	Labor protection and electrical safety

	servicing electrical installations	industrial sanitation of labor	
		2. Compliance with safety regulations when servicing electrical installations	
		3. The choice of a safe working method and means of protection when inspecting electrical equipment	
		4. Analysis of the results of the inspection and the question of the health of electrical equipment on external signs	
	LO 2. To carry out organizational measures to ensure the safe operation of high-voltage equipment	1. Registration of work in order, order or list of works performed in the order of current operation	
		2. Issuance of permits for the preparation of the workplace and for admission to work with the requirements	
		3. Registration of the admission to work and performance of supervision in operating time	
		4. Making a break in work, transfer to another place, end of work	

	LO 3. To carry out technical measures to ensure the safe operation of high-voltage equipment	1. Conducting power off 2. The adoption of measures that prevent the erroneous or spontaneous switching on of switching equipment 3. Perform a no-voltage test, overlay ground connections.	
Basic Modules			
BM 1 Application of professional vocabulary, the preparation of business papers in the field of professional activity	LO1. To know the grammar and terminology of the Kazakh (Russian) and foreign languages for communication in the sphere of their professional activities	1. Possession of lexical and grammatical material in the specialty necessary for professional communication.	Professional Kazakh (Russian) language Professionally-oriented foreign language
		2. Understanding the value of written and oral communication in Kazakh (Russian) and foreign languages.	
		3. The use of communication skills to establish and develop relations of cooperation and partnership.	
		4. Writing texts using various presentation forms.	
	LO2. To master the translation technique (with a dictionary) of professional-oriented texts	1. Reading and translation (with a dictionary) of professional texts	
		2. Independent	

		preparation of coherent, logical reasoned statements in accordance with the proposed topic.	
		3. Understanding of the discussion topics and participation in its discussion.	
	LO3. To work with organizational, administrative, information and reference documents using computer technologies	1. Drawing up in Kazakh (Russian) and foreign languages a summary, autobiography, description, statement, complaint, power of attorney, receipt	
		2. Compliance with the basic requirements for the text of the document	
		3. Creation on the computer of documents that meet modern requirements and established regulations	
BM 2. Application of the foundations of philosophical knowledge, social sciences for socialization and adaptation in society and the workforce.	LO1. To determine the ratio in the life of a person of such philosophical categories as freedom and responsibility, material and spiritual values.	1. Understanding the essence of social and ethical problems associated with the development and use of science, technology and technology Understanding the essence of social	Fundamentals of Philosophy, Fundamentals of Sociology and Political Science

		and ethical problems associated with the development and use of science, technology and technology.	
		2. Understanding the essence of the process of knowledge and different points of view on the process of knowledge in the history of philosophy	
		3. Application of skills for analyzing the main world outlook and methodological problems arising in science at the present stage of its development	
	LO 2. To understand international political processes, geopolitical situation	1. The use of political science knowledge in everyday life and in their professional activities	
		2. Participation in discussions on current issues, problems and prospects for development, etc.	
		3. The use of social, moral and legal norms governing the attitude of a person towards a person, society,	

		environment	
	LO 3. To understand the moral values and norms that form tolerance and an active personal position.	1. Understanding the role and place of culture of the peoples of the Republic of Kazakhstan in the world civilization	
		2. The use of approaches and methods of critical analysis in relation to various cultural forms and processes of modern society	
		3. Application of national traditions and customs of various countries in professional activities	
BM 3. Understanding the history, role and place of Kazakhstan in the world community, respectful and caring attitude to historical heritage and cultural traditions	LO 1. To understand the role and place of culture of the peoples of the Republic of Kazakhstan in world civilization	1. Knowledge of the foundations of the history of national culture, the values of traditional Kazakh culture	History of Kazakhstan Culturology
		2. Understanding the role and place of culture of the peoples of the Republic of Kazakhstan in world civilization	
	LO 2. To understand the moral values and	1. Characteristics of the forms, types	

	<p>norms that form tolerance and an active personal position.</p>	<p>and history of different cultures and civilizations</p>	
	<p>LO 3. To understand the main historical events</p>	<p>2. Understanding the current state of the world and traditional religions</p>	
		<p>3. Tolerant perception of social, ethnic, confessional and cultural differences.</p>	
		<p>1. Understanding the essence of historical events that occurred from antiquity to the present.</p>	
		<p>2. Disclosure of the role and place of the Kazakh people in the common Turkic community, in the system of nomadic civilization, in the development of the historical and cultural community of the peoples of the Eurasian world</p>	
		<p>3. Understanding the nature and purpose of the political and social changes taking place in the Republic of Kazakhstan after independence</p>	
		<p>4. Characteristics of the achievement of an independent</p>	

		Kazakhstan	
	LO 4. To define causal relationships of historical events.	1. Defining of the main facts, processes and phenomena, reflecting and characterizing the integrity and consistency of the history of Kazakhstan	
		2. Establishing the connection between historical events	
		3. Using historical sources	
BM 4. Application of basic knowledge of the economy and knowledge of labor laws and regulations to protect their rights in their professional activities	LO1. To define the forms and types of ownership, types of plans, basic economic indicators of the enterprise	1. Performance of the necessary economic calculations using mathematical methods	Fundamentals of Economics Law basics
		2. Discussion of the main economic indicators of the enterprise	
		3. Conducting measurements of the cost of working time to perform a certain work	
		4. Defining methods to reduce costs and increase profitability	
	LO 2. To understand the development trends of the world economy, the main objectives of the state's transition to a green economy	1. Understanding the main objectives of the state's transition to a green economy	
		2. Application of the basic methods of calculating gross domestic product	

		and gross national product	
		3. Identification of global economic problems, ways to overcome them	
	LO 3. To protect rights in accordance with labor laws	1. Understanding the legal status in the formation of the identity of a citizen in accordance with the provisions of the Constitution of the Republic of Kazakhstan	
		2. The use of evidence-based argumentation of their own position in specific legal situations using regulations	
		3. Understanding of responsibility for administrative and corruption offenses	
	LO 4. To know the basic concepts of law and state-legal phenomena	1. Knowledge of concepts and observance of the principles of law and order	
		2. Application of evidence-based argumentation of one's own position in specific legal situations using normative acts.	
		3. Understanding of responsibility for administrative and corruption offenses	

BM 5. Development and improvement of physical qualities	LO 1. To strengthen health and abide by the principles of a healthy lifestyle.	1. Understanding the importance of physical culture for health promotion, the role of physical culture and sports in the development of the country	Physical Culture
		2. Performing a set of exercises for general physical training.	
		3. Application of the rule of a healthy lifestyle in everyday life	
	LO 2. To improve physical qualities and psycho-physiological abilities	1. Knowledge of the exercise technique	
		2. Compliance with the rules of team sports	
		3. Application of the studied methods of games and individual tactical tasks in an educational game	
		4. Implementation of control standards and tests provided by the program	
	LO 3. To provide first aid for injuries and accidents.	1. Understanding the causes of injuries during exercise, methods of injury prevention	
		2. Provision of first aid for injuries.	
		3. Estimation of the difficulty and risk arising during the execution of	

		various physical activities, own and others physical abilities	
BM 6. Execution, execution, reading of design and technological documentation using application programs	LO1. To follow the rules of design documentation	1. Understanding the rules of design documentation	Engineering graphics. Computer design
		2. Design drawings according to the rules of a single system of design documentation.	
		3. Identification of the purpose and scale of the drawing technical details.	
		4. Compliance with the requirements of the unified system of design documentation (USDD).	
	LO2. To have the skills of projecting on the plane	1. Execution and design of the necessary cuts in the drawings.	
		2. Perform axonometric projection.	
		3. Execution of drawings of schemes according to symbols according to a single system of design documentation.	
		4. Application of computer graphics methods	
	LO3. To develop and design schemes for the specialty with	1. Execution of schemes in the specialty, using the	

	the help of the application package.	means of technical drawing.	
		2. Using modern software applications.	
		3. Knowledge computer graphics, using 3D graphics.	

Specification of the basic module 1
«Application of professional vocabulary,
drafting of business papers in the sphere of professional activity»

Scope of competence	Drawing up and design of business documents in the field of activity, knowledge of professionally-oriented languages
Module name and code	Application of professional vocabulary, the preparation of business papers in the field of professional activity
Purpose of the module	Formation and development of communicative speech competence of students, improving the speech culture of future specialists and promptly carry out tasks and competently issue official business papers.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To know grammar and terminology of Kazakh (Russian) and foreign languages for communication in the sphere of their professional activities 2. To master the translation technique (with a dictionary) of professional-oriented texts 3. To work with organizational, administrative, information and reference documents using computer technologies.
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Basics of business Kazakh (Russian) and foreign language and professional vocabulary 2. Rules of speech etiquette 3. Participation in a professional conversation 4. Basics of office work 5. Methods of creation and functions, classification, carriers, purpose, components, component parts, rules for processing documents 6. To possess the lexical and grammatical minimum of the Kazakh (Russian) and foreign language, necessary for reading and translating

	(with a dictionary) texts of professional orientation 7. Knowledge of national culture, business culture of the country 8. Draw up official documents necessary in professional activities with the use of computer technology.
Prerequisites	Knowledge of the school course of Kazakh, Russian, foreign language; Introduction to the specialty
Disciplines forming the module	Professional Kazakh (Russian) language Professional foreign language, Professionally-oriented foreign language Office work in the state language
Module type (mandatory, optional)	Mandatory
Labor intensity (credits / academic hours)	6 credits / 180 hours
Duration of the module	3-5
Form of training	Full-time
Teaching methods	Verbal (conversation, lecture); visual practical; problem search; reproductive; inductive; case method.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	PM 1 - PM 9 Professional modules

Specification of the basic module 2
«Application of the basics of philosophical knowledge, social sciences for socialization and adaptation in society and the work collective»

Bailiwick	Fundamentals of philosophy, awareness of oneself and one's place in society, the tolerant perception of social, political differences
Module name and code	Application of the basics of philosophical knowledge, social sciences for socialization and adaptation in society and the workforce
Purpose of the module	Formation of students' system of knowledge about the political, legal and socio-spiritual foundations of the functioning and development of society and main concepts - philosophy as a special form of natural science, about its connection with the methods of future professional activity
Level of professional qualification	4
Learning outcomes by module	1. To determine the ratio in the life of a person of such philosophical categories as freedom and responsibility, material and spiritual values. 2. To understand international political processes, geopolitical situation 3. To understand the moral values and norms that form tolerance and an active personal position.
Summary of content (sections, topics)	1. Basics of the philosophical picture of the world 2. Understanding patterns and prospects for the development of society 3. Trends in the development of socio-political processes of the modern world 4. Basic concepts and patterns of philosophy 5. Functioning of the system of relations between citizens and other political actors in society 6. Operation by the basic philosophical

	<p>concepts</p> <p>7. Basic questions of philosophy and laws of dialectics</p> <p>8. Systems of social and political relations taking shape in the course of social interaction.</p>
Prerequisites	School Program: History, Man and Society, Literature, Geography
Disciplines forming the module	Fundamentals of philosophy Fundamentals of Sociology and Political Science
Module type (mandatory, optional)	Mandatory
Labor intensity (credits / academic hours)	6 credits / 180 hours
Duration of the module	3-5
Form of training	Full-time
Teaching methods	Verbal (conversation, lecture); visual practical; problem search; reproductive; inductive; case method.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	Modern history of Kazakhstan, Cultural Studies, Fundamentals of Economics

Specification of the basic module 3
«Understanding of the history, role, and place of Kazakhstan in the world community, respectful and careful attitude to historical heritage and cultural traditions»

Scope of competence	The history, role and place of Kazakhstan in the world community
Module name and code	Understanding of the history, role and place of Kazakhstan in the world community, respectful and caring attitude to historical heritage and cultural traditions
Purpose of the module	Show scientifically - proven facts, continuity and consistency of historical and cultural development from ancient times to the present day
Level of professional qualifications	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To understand the role and place of culture of the peoples of the Republic of Kazakhstan in world civilization 2. To understand the moral values and norms that form tolerance and active personal position 3. To understand the main historical events 4. To determine the causal relationships of historical events.
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. The essence and purpose of culture 2. The essence and patterns of historical events that occurred from antiquity to the present 3. Basic concepts and laws of culture, religion and civilization 4. Chronological borders and essence of the main historical periods of Kazakhstan 5. The role and place of culture of the peoples of the Republic of Kazakhstan in world civilization 6. Fundamentals of universal moral values and humanistic worldview
Prerequisites	School Program: History, Man, and Society, Fundamentals of Law
Disciplines forming the module	The modern history of Kazakhstan,

	Culturology
Module type (mandatory, optional)	Mandatory
Labor intensity (credits / academic hours)	4 credit / 120 hours
Duration of the module	3-5
Form of training	Full-time
Teaching methods	Verbal (conversation, lecture); visual practical; problem search; reproductive; inductive; case method.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	Fundamentals of Philosophy, Fundamentals of Sociology and Political Science

Specification of the basic module 4
«Applying basic knowledge of the economy and knowledge of labor laws and regulations to protect their rights in professional activities»

Scope of competence	Modern economic system
Module name and code	Application of basic knowledge of economics and knowledge of labor laws and regulations to protect their rights in their professional activities
Purpose of the module	To acquaint with the basic theoretical positions of the economic activity of an enterprise in a market economy, the main economic categories and concepts, the existing system of economic indicators and methods for calculating them
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To determine the forms and types of property, types of plans, basic economic indicators of the enterprise 2. To understand the development trends of the world economy, the main objectives of the transition to a green economy 3. To protect your rights in accordance with labor laws 4. To know basic concepts of law and state-legal phenomena
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Fundamentals of economic theory 2. General bases of economic systems 3. Basics of Macroeconomics 4. Actual problems of the economy 5. Main objectives of the Green Economy 6. The system of state-legal relations and phenomena the functioning of the system of relations between citizens and other political actors in society 7. Conceptual concepts of the theory of economics and business fundamentals 8. Priority directions of the socio-economic development of the country
Prerequisites	School Program: Man and Society, Fundamentals of Law, Geography
Disciplines forming the module	Fundamentals of Economics Law basics
Module type (mandatory, optional)	Mandatory

Labor intensity (credits / academic hours)	4 credit / 120 hours
Duration of the module	3-4
Form of training	Full-time
Teaching methods	Verbal (conversation, lecture); visual practical; problem search; reproductive; inductive; case method.
Forms of control	Pass fail exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	Principles of Philosophy, Labor Law of the Republic of Kazakhstan, Family Law of the Republic of Kazakhstan

Specification of the basic module 5
«Development and improvement of physical qualities»

Scope of competence	Physical Culture and Sport
Module name and code	Development and improvement of physical qualities
Purpose of the module	Formation of physical culture of pupils and abilities to realize it in social-professional, physical culture and sports activity
Level of professional qualifications	4
Learning outcomes by module	1. To promote health and abide by the principles of a healthy lifestyle 2. To improve physical qualities and psycho-physiological abilities 3. To provide first aid for injuries and accidents.
Summary of content (sections, topics)	1. Socio-biological and psycho-physiological bases of physical culture 2. Basics of physical and sports self-improvement 3. Basics of a healthy lifestyle
Prerequisites	Knowledge of the school course physical culture
Disciplines forming the module	Physical Culture
Module type (mandatory, optional)	Mandatory
Labor intensity (credits RK / academic hours)	6 credits / 180 hours
Duration of the module	3-8
Form of training	Full-time
Teaching methods	Practical work
Forms of control	Pass fail exam
Required resources	Gymnasium and sports equipment
Language of instruction	Kazakh, Russian
Post-requisitioning	Sports Groups for Improvement

Specification of the basic module 6
“Performance, design, reading of design and technological documentation
using application programs”

Scope of competences	-
Module name and code	Performance, design, reading of design and technological documentation using application programs
Purpose of the module	After studying this module, the student will be able to perform, design, read design and technological documentation using application programs.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To follow the rules of design documentation. 2. To have the skills of projecting on the plane. 3. To develop and design schemes for the specialty with the help of the application package.
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Understanding the rules for design documentation. 2. Design drawings according to the rules of a single system of design documentation. 3. Definition of the purpose and scale of the drawing technical details. 4. Compliance with the requirements of the unified system of design documentation (USDD). 5. Execution and registration of the necessary cuts on the drawings. 6. Performance of axonometric projection. 7. Drawings of schemes according to symbols according to a single system of design documentation. 8. Application of computer graphics techniques. 9. Designing schemes in the specialty, using the means of technical drawing. 10. Application of modern software applications. 11. Knowledge of computer graphics, the use of 3D-graphics.
Prerequisites	Mathematics, geometry and stereometry of

	the school program; Computer science; Object Oriented Programming.
Disciplines forming the module	- Engineering graphics; - Computer design.
Module type (mandatory, optional)	Mandatory / Optional
Labor intensity (credits / academic hours)	4 credit / 120 hours
Duration of the module	1 semester
Form of training	Full-time
Teaching methods	Verbal (conversation, lecture); visual practical; problem search; reproductive; inductive; case method
Forms of control	Pass fail exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Russian, Kazakh
Post-requisitioning	Basics of computer simulation.

Specification of the professional module 1
«Installation of supports of overhead power lines, contact networks and
structures of open distribution devices»

Scope of competence	Electric installation work
Module name and code	Installation of support for overhead power lines, contact networks and open switchgear structures
Purpose of the module	To teach students to carry out electrical work on the overhead lines
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1 To perform preparation of overhead power line supports and open switchgear structures for assembly and installation 2. To assemble the supports of overhead power lines and structures of open switchgears 3. To perform the installation of overhead power line supports and open switchgear structures 4. To read the drawings and diagrams
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Characteristics of power systems and power grids 2. Classification of power plants and types of installation work 3. Characteristics of the device overhead power lines and the appointment of structural elements 4. Methods of construction of overhead power lines 5. Purpose and content of technical documentation, requirements for its execution 6. Basic rules for the development, design and reading of design and technological documentation 7. Basic techniques of drawing, rules for the implementation of drawings 8. Requirements of the unified system of design documentation (USDD)
Prerequisites	<ol style="list-style-type: none"> 1. Fundamentals of the specialty 2. General energy
Disciplines forming the module	Drawing Fundamentals of technical mechanics

	<p>Theoretical foundations of electrical engineering</p> <p>Electric cars and transformer tori</p> <p>Electrical measurements</p> <p>Electrotechnical materials</p> <p>Basics of industrial electronics</p> <p>Computer Technology Basics</p> <p>Electrical equipment of power stations and substations</p> <p>Occupational Safety and Health</p> <p>Theoretical bases of installation and dismantling of wires and cables</p> <p>Theoretical bases of mounting supports and structures</p> <p>Mechanic-mechanical practice</p> <p>Electrical practice</p>
Module type (mandatory, optional)	Mandatory
Labor intensity (credits / academic hours)	14 credits / 420 hours
Duration of the module	3-8 semester
Form of training	Full-time
Teaching methods	Traditional teaching methods are lectures, practical and laboratory classes, problem teaching methods, interactive teaching methods.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	Electrical equipment of power stations and substations Operation of electrical equipment of power stations and substations

Specification of the professional module 2
«Installation and dismantling of wires, lightning protection and tension
cables of overhead transmission lines and contact networks»

Scope of competence	Electric installation work
Module name and code	Installation and dismantling of wires, ground and tension cables of overhead power lines and contact networks
Purpose of the module	Teach students to carry out the installation and dismantling of wires, ground and tension cables
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1 To roll and wind steel ropes, cables and wires on drums 2. To assemble insulators and fittings in insulating suspension 3. To carry out grounding and zeroing of ground protection and tension cables of overhead power lines and contact networks 4. To tension and dismantle the cables on the supports of overhead power lines and contact 5. To make installation and dismantle of wires and networks
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Rolling of steel ropes, wires and cables with the installation of drums 2. Winding reels on wires and cables 3. Safety when performing electrical work 4. Build insulators in insulating suspension 5. Assembly of reinforcement in insulating suspension 6. Installation of the middle anchoring on the ground, suspension of the suspension cable from the ground to the supports, insert insulators into wires and cables on the ground 7. Installation of air line inputs to buildings and fixing wires on pin insulators 8. Tension and adjustment of wires and cables on overhead power lines 9. Selection of materials based on their properties for use in the installation of high-voltage overhead power lines and contact networks
Prerequisites	Installation of overhead power line supports, contact networks and open switchgear

	structures
Disciplines forming the module	Drawing Fundamentals of technical mechanics Theoretical foundations of electrical engineering Electric cars and transformer tori Electrical measurements Electrotechnical materials Basics of industrial electronics Computer Technology Basics Electrical equipment of power stations and substations Occupational Safety and Health Theoretical bases of installation and dismantling of wires and cables Theoretical bases of mounting supports and structures Mechanic-mechanical practice Electrical practice
Module type (mandatory, optional)	Mandatory
Labor intensity (credits / academic hours)	12 credits / 360 hours
Duration of the module	3-8 semester
Form of training	Full-time
Teaching methods	Traditional teaching methods are lectures, practical and laboratory classes, problem teaching methods, interactive teaching methods.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	Electrical equipment of power stations and substations Operation of electrical equipment of power stations and substations Organization of installation, repair and commissioning of high-voltage equipment Electrical apparatus Industrial training

Specification of the professional module 3
«Performance of works on diagnostic tests and measurements of parameters
of devices of the contact network and overhead power lines»

Scope of competence	Electric installation work
Module name and code	Performing diagnostic tests and measurements of parameters of contact network devices and overhead power lines
Purpose of the module	To teach students to work on diagnostic tests and measurements
Level of professional qualifications	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To perform preparatory work for the performance of diagnostic tests and measurements of parameters of the contact network devices and overhead power lines 2. To perform work on the inspection and diagnosis of contact network devices and overhead power lines 3. To perform work on testing and measuring devices of the contact network with the help of portable and stationary diagnostic equipment
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. The order of work and features of the technological operations for diagnostic testing and measurement of parameters of the contact network and overhead power lines 2. Instruments, tools, protective and installation means for the production of diagnostic tests and measurements of parameters of the contact network devices and overhead power lines 3. Protective and installation tools, diagnostic devices and tools 4. Adjustment of instruments for diagnostic testing and measurement of parameters of the contact network devices and overhead power lines
Prerequisites	Installation and disassembly of wires, grounding and tension cables of overhead power lines and contact networks
Disciplines forming the module	<p>Drawing</p> <p>Fundamentals of technical mechanics</p> <p>Theoretical foundations of electrical</p>

	<p>engineering Electric cars and transformer tori Electrical measurements Electrotechnical materials Basics of industrial electronics Computer Technology Basics Electrical equipment of power stations and substations Occupational Safety and Health Theoretical bases of installation and dismantling of wires and cables Theoretical bases of mounting supports and structures Mechanic-mechanical practice Electrical practice</p>
Module type (mandatory, optional)	Mandatory
Labor intensity (credits / academic hours)	8 credits / 240 hours
Duration of the module	3-8 semester
Form of training	Full-time
Teaching methods	Traditional teaching methods are lectures, practical and laboratory classes, problem teaching methods, interactive teaching methods.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	Electrical equipment of power stations and substations Operation of electrical equipment of power stations and substations Organization of installation, repair and commissioning of high-voltage equipment Electrical apparatus Industrial training

Specification of the professional module 4
«Maintenance of equipment of stations, distribution networks, and systems»

Scope of competence	Maintenance and repair of high-voltage equipment
Module name and code	Maintenance of equipment of stations, distribution networks and systems
Purpose of the module	To teach students to perform maintenance work on high-voltage equipment.
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To carry out maintenance of electrical equipment 2. To conduct routine inspections of electrical equipment 3. To set up and test electrical equipment
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Characteristics and principle of operation of electrical equipment 2. Signs of equipment performance 3. Evaluation of the technical condition of electrical equipment 4. Uninterrupted operation of electrical stations, networks 5. Technical condition of electrical equipment 6. Defects and damage to electrical equipment 7. Terms of testing protective equipment and devices 8. Testing and adjustment of electrical equipment 9. Power supply of consumers
Prerequisites	Drawing Fundamentals of technical mechanics Theoretical foundations of electrical engineering Electrical machines and transformers Electrical measurements Electrotechnical materials Basics of industrial electronics Computer Technology Basics Electrical equipment of power stations and substations Occupational Safety and Health

	<p>Theoretical bases of installation and dismantling of wires and cables</p> <p>Theoretical bases of mounting supports and structures</p> <p>Mechanic-mechanical practice</p> <p>Electrical practice</p>
Disciplines forming the module	<p>Electrical equipment of power stations and substations</p> <p>Organization of installation, repair and adjustment of high-voltage equipment</p> <p>Operation of electrical equipment of power plants and substations</p> <p>Electric Appliances</p> <p>Industrial training</p>
Module type (mandatory, optional)	Optional
Labor intensity (credits / academic hours)	9 credits / 270 hours
Duration of the module	3-8 semester
Form of training	Full-time
Teaching methods	Traditional teaching methods are lectures, practical and laboratory classes, problem teaching methods, interactive teaching methods.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	<p>Electrical measurements</p> <p>Information and measuring equipment</p> <p>Electromagnetic Transients</p> <p>Relay Protection and Automation</p> <p>Network management</p> <p>Automatic control in power engineering</p>

Specification of the professional module 5
«Repair of equipment of stations, distribution networks and systems»

Scope of competence	Maintenance and repair of high-voltage equipment
Module name and code	Repair of station equipment, distribution networks and systems
Purpose of the module	To teach students to perform work on the repair of high-voltage equipment
Level of professional qualification	5
Learning outcomes by module	<ol style="list-style-type: none"> 1. To perform work on repair of stations, distribution networks and systems 2. To hand over and accept electrical equipment from repair
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Security measures and quality control of repair work 2. The performance and maintainability of equipment 3. Causes and methods of eliminating hazards for personnel performing repairs 4. Types of repair work 5. Procedure for testing electrical equipment. 6. Devices, instruments, equipment and measuring instruments 7. Causes of contactors wear and control methods 8. Procedure and rules for the commissioning 9. Calculation of the parameters of electrical devices and the preparation of design documentation 10. Acceptance of electrical equipment after repair
Prerequisites	Drawing Fundamentals of technical mechanics Theoretical foundations of electrical engineering Electric cars and transformer tori Electrical measurements Electrotechnical materials Basics of industrial electronics Computer Technology Basics Electrical equipment of power stations and substations

	Occupational Safety and Health Theoretical bases of installation and dismantling of wires and cables Theoretical bases of mounting supports and structures Mechanic-mechanical practice Electrical practice
Disciplines forming the module	Electrical equipment of power stations and substations Organization of installation, repair and adjustment of high-voltage equipment Operation of electrical equipment of power plants and substations Electric Appliances Industrial training
Module type (mandatory, optional)	Optional
Labor intensity (credits / academic hours)	13 credits / 390 hours
Duration of the module	3-8 semester
Form of training	Full-time
Teaching methods	Traditional teaching methods are lectures, practical and laboratory classes, problem teaching methods, interactive teaching methods.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	Information and measuring equipment Electromagnetic Transients Automatic control in power engineering Fundamentals of relay protection technology High voltage technique Technological practice

Specification of the professional module 6
«Implementation of commissioning of medium and high voltage electrical equipment»

Scope of competence	Operation and control of work of high-voltage equipment of electric power systems
Module name and code	Implementation of the commissioning of electrical equipment of medium and high voltage
Purpose of the module	To teach students to carry out the commissioning of medium and high voltage equipment
Level of professional qualifications	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To apply basic methods and measurement tools of electrical and electrical – technical quantities, choose the measuring technique 2. To analyze electromagnetic transients in electric power systems
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Measuring circuits 2. Measuring instruments 3. Computing facilities for processing and analyzing measurement results 4. Methods for calculating transient and steady-state processes in linear and nonlinear electrical circuits 5. Modes of operation of electric power and electrical equipment and systems 6. Calculation of parameters of electrical power and electrical devices, electrical installations, electrical power networks and systems, power supply systems 7. Application programs and computer-aided design tools for solving engineering problems
Prerequisites	<p>Electrical equipment of power stations and substations</p> <p>Organization of installation, repair and adjustment of high-voltage equipment</p> <p>Operation of electrical equipment of power plants and substations</p> <p>Electric Appliances</p> <p>Industrial training</p>
Disciplines forming the module	<p>Information and measuring equipment</p> <p>Electromagnetic Transients</p>

	Automatic control in power engineering Fundamentals of relay protection technology High voltage technique Technological practice
Module type (mandatory, optional)	Optional
Labor intensity (credits / academic hours)	9 credits / 270 hours
Duration of the module	3-8 semester
Form of training	Full-time
Teaching methods	Traditional teaching methods are lectures, practical and laboratory classes, problem teaching methods, interactive teaching methods.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	Labor protection and electrical safety Energy economics

Specification of the professional module 7
«Commissioning of automatic devices»

Scope of competence	Operation and control of work of high-voltage equipment of electric power systems
Module name and code	Implementation of the commissioning of automatic devices
Purpose of the module	To teach students to carry out the commissioning of automatic devices
Level of professional qualification	5
Learning outcomes by module	<ol style="list-style-type: none"> 1. To carry out the development and evaluation of the algorithms of operation and interaction of various automation devices for electric power devices 2. To perform protection and adjustment of various devices of automatic equipment of electric power devices. 3. To analyze the structures and processes that accompany the work of high-voltage installations
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Principles of relay protection and automatic control systems in power industry 2. Ways to adjust the parameters of the mode of power systems 3 Types of relays and methods for controlling parameters of relay protection and automation 4. Schemes of automatic reclosing and automatic switching on of reserve 5. Schemes of relay protection and automation of electric power devices 6. Schemes of relay protection of power lines, transformers, compensators, electric motors, busbars, blocks 7. Emergency automation 8. Causes of emergency conditions 9. Electrophysical processes in dielectric media 10. Classification of insulation of high voltage equipment. 11. Methods for measuring high voltages 12. Surge Protection
Prerequisites	Electrical equipment of power stations and substations Organization of installation, repair and

	adjustment of high-voltage equipment Operation of electrical equipment of power plants and substations Electric Appliances Industrial training
Disciplines forming the module	Information and measuring equipment Electromagnetic Transients Automatic control in power engineering Fundamentals of relay protection technology High voltage technique Technological practice
Module type (mandatory, optional)	Optional
Labor intensity (credits / academic hours)	5 credits / 150 hours
Duration of the module	3-8 semester
Form of training	Full-time
Teaching methods	Traditional teaching methods are lectures, practical and laboratory classes, problem teaching methods, interactive teaching methods.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	Labor protection and electrical safety; Energy economics

Specification of the professional module 8
«Performance of works on planning, organization, and automation of production»

Scope of competence	Production planning and ensuring safe operation
Module name and code	Performance of work on planning, organization and automation of production
Purpose of the module	To teach students the principles of organization and production planning
Level of professional qualification	4
Learning outcomes by module	1. To understand the essence of market reforms 2. To apply the results of the economic analysis of the activities of industrial and energy organizations
Summary of content (sections, topics)	1. Management structure of enterprises 2. Basics of planning 3. Analysis of the effectiveness of planning 4. Calculation of investment in capital construction
Prerequisites	Information and measuring equipment Electromagnetic Transients Automatic control in power engineering Fundamentals of relay protection technology High voltage technique Technological practice
Disciplines forming the module	Energy Economics Labor protection and electrical safety
Module type (mandatory, optional)	Optional
Labor intensity (credits / academic hours)	6 credits / 180 hours
Duration of the module	3-8 semester
Form of training	Full-time
Teaching methods	Traditional teaching methods are lectures, practical and laboratory classes, problem teaching methods, interactive teaching methods.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian

Post-requisitioning	Basics of computer-aided design (AUTOCAD and CREDO) Electrical networks and systems Undergraduate practice Graduation Design
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Specification of the professional module 9
«Performing work to ensure the safe operation of high-voltage equipment»

Scope of competence	Management and design of electrical networks with the use of modern software and hardware
Module name and code	Performing work to ensure the safe operation of high-voltage equipment
Purpose of the module	To teach students how to work to ensure the safe operation of high-voltage equipment
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. To comply with the requirements of technology safety and labor protection when servicing electrical installations 2. To carry out organizational measures to ensure the safe operation of high-voltage equipment 3. To carry out technical measures to ensure the safe operation of high-voltage equipment
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Fundamentals of protection, fire safety rules and occupational health and safety 2. Safety regulations when servicing electrical installations 3. Safe working methods and means of protection when inspecting electrical equipment 4. The order of registration order, order or list of works performed in the order of current operation 5. Requirements for registration of admission to work and the implementation of supervision during work 6. Making a break in work, transfer to another place, end of work 7. Erroneous or spontaneous switching equipment switching. 8. Check for voltage absence, grounding
Prerequisites	Information and measuring equipment Electromagnetic Transients Automatic control in power engineering Fundamentals of relay protection technology High voltage technique Technological practice

Disciplines forming the module	Energy Economics Labor protection and electrical safety
Module type (mandatory, optional)	Optional
Labor intensity (credits / academic hours)	7 credits / 210 hours
Duration of the module	3-8 semester
Form of training	Full-time
Teaching methods	Traditional teaching methods are lectures, practical and laboratory classes, problem teaching methods, interactive teaching methods.
Forms of control	Pass fail exam, exam
Required resources	Personal Computer; software; presentations; electronic resources; support cards; handouts.
Language of instruction	Kazakh, Russian
Post-requisitioning	Pre-diploma practice

PLAN OF THE EDUCATIONAL PROCESS

Code and profile of education: 0900000 - Power Engineering
 Specialty: 0919000 - High Voltage Networks
 Qualification: 091901 3 - "Electrician technician"

Form of training: full-time
 Normative training period 3 years 10 months
 on the basis of general secondary education

Module code	The name of cycles, disciplines/modules, practices	Credit RK	ECTS credit	Exam	Amount of study time (hours)				Distribution by semesters	
					TOTAL	Them:				
						Theoretical training	Practical training **	Production training		Individual training
GED	General educational disciplines	48			1448	1448			1-4	
BM	Basic modules	30			900	480	-	360	60	3-8
BM 1	Application of professional vocabulary, the preparation of business papers in the field of professional activity	6	+		180	90		60	30	3-8
BM 2	Application of the basics of philosophical knowledge, social sciences for socialization and adaptation in society and the workforce	6	+		180	180	-	-	-	3-8
BM 3	Understanding of the history, role and place of Kazakhstan in the world community, respectful and caring attitude to historical heritage and cultural	4		+	120	120	-	-	-	3-8

	traditions									
BM 4	Application of basic knowledge of economics and knowledge of labor laws and regulations to protect their rights in their professional activities	4	+		120	60	-	60		3-8
BM 5	Development and improvement of physical qualities	6		+	180	-	-	180	-	3-8
BM 6	Performance, design, reading of design and technological documentation using application programs	4	+		120	30		60	30	3-8
PM	Professional modules on working qualifications (including industrial training and professional practice)	48	+	+	1440	360	720	270	90	3-8
PM 1	Installation of support for overhead power lines, contact networks and open switchgear structures	14	+	+	420	120	180	90	30	3-8
PM 2	Installation and dismantling of wires, ground and tension cables of overhead power lines and contact networks	12	+	+	360	90	180	60	30	3-8
PM 3	Maintenance of equipment of stations, distribution networks and systems	9	+	+	270	60	180	30	-	3-8
PM 4	Repair of station equipment, distribution networks and systems	13	+	+	390	90	180	90	30	3-8
PM	Professional modules for mid-level specialist qualifications (including in-service training and professional practice)	35			1050	330	420	210	90	3-8
PM 5	Performing diagnostic tests and measurements of parameters of contact network devices and overhead power lines	8	+	+	240	60	90	60	30	3-8
PM 6	Implementation of the commissioning of electrical equipment of medium and high voltage	9	+	+	270	90	120	60	-	3-8

PM 7	Implementation of the commissioning of automatic devices	5	+	+	150	60	60	30	-	3-8
PM 8	Performance of work on planning, organization and automation of production	6	+	+	180	60	60	30	30	3-8
PM 9	Perform work to ensure the safe operation of high-voltage equipment	7	+	+	210	60	90	30	30	3-8
	Total:	161			4838	2618	1140	840	240	
PP	Prediploma practice	10			300		300			8
DP 01	Diploma project	9			270	180			90	8
IC	Intermediate certification	10			300	300				1-8
FE	Final examination	2			60	60				8
	Total for compulsory education				5768	3158	1440	840	330	
C	Consultations	13			400	400				1-8
O	Optional lessons	14			420	420				1-8
	Total:	219			6588	3978	1440	840	330	

Note:

* Forms of control (the number of course works, examinations), the order of studying the disciplines (distribution by semester) are exemplary and can vary depending on the forms of study, the specifics of specialties, local and other conditions (circumstances), including, in accordance with the needs of employers.

** In accordance with the State Educational Establishment of Teachers' Educational Institutions, educational institutions can change up to 50% of the amount of study time allocated for the development of educational material for modules, up to 50% for each module and up to 60% (up to 80% for dual training) of vocational training and professional practice with keeping the total number of hours for compulsory education.