

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

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

EDUCATIONAL PROGRAM

1401000- Construction and Maintenance of Buildings and Structures
(code and name of the specialty)

Level of professional qualification : mid-level specialist

Duration of training: 3 years 10 months.

Astana, 2018

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

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TABLE OF CONTENT

	Introduction	4
1	List of designations and abbreviations	5
2	Passport of the working education program	6
3	Competency profile	7
4	List of modules and training outcomes	10
4.1	Specification of Basic Module 1 “Application of professional vocabulary, the preparation of business papers in the field of professional activity”	23
4.2	Specification of Basic Module 2 “Development and improvement of physical qualities”	25
4.3	Specification of Basic Module 3. Application of basic knowledge of economics in professional activities	27
4.4	Specification of Basic Module 4. Understanding the history, role, and place of Kazakhstan in the world community	29
4.5	Specification of Basic Module 5. Application of Basics of Philosophy, social sciences for socialization and adaptation in society and the work collective	31
4.6	Specification of Basic Module 6. Occupational safety and prevention of accidents	33
4.7	Specification of Basic Module 7. Application of the laws of physics and the use of information technology in professional activities	35
4.8	Specification of Professional Module 1. Development of design and technological documentation	37
4.9	Specification of Professional Module 2 Implementation of the core mechanical and metalwork-Assembly works	39
4.10	Specification of Professional Module 3 Welding and bonding of pipes with various plastic shaped parts	41
4.11	Specification of Professional Module 4 Installation, maintenance and repair of building engineering systems, including communication "Smart Houses"	44
4.12	Specification of Professional Module 5 Installation, maintenance and repair of power and low-voltage systems, including communication "Smart Houses"	47
4.13	Specification of Professional Module 6. Maintenance of intellectual control system of the building, including communication "Smart Houses"	50
5	Education Process plan	53

INTRODUCTION

The President of the country N.A.Nazarbayev in a message to the people of Kazakhstan 2018: “New opportunities for development in the context of the fourth industrial revolution” marked the need to develop modern educational standards in all major trades. In new standards employers and businessmen clearly consolidate what knowledge, skills and competences should have the employees”.

This educational program is developed based on the current Legislation of the Republic of Kazakhstan “On education”, normative documents, decrees of the Government of the Republic of Kazakhstan in education and architecture-construction activity defining the training content by specialty 1401000 – “Construction and maintenance of buildings and structures” on qualification “140133 3- Technician for maintenance of intellectual management system of buildings”

Intelligent building management systems is a product of the modern development of existing automation systems: an integrated optimization of resources, increasing the flexibility of configuration and reduced overall costs for energy consumption, integration with a wide range of technology and telecommunications equipment, simplifying user interaction, security.

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

The use of modular competence-based approach, based on developing and evaluating students’ competence of the educational institutions in the form of basic educational results, use of a unit of training.

In accordance with this educational program, training process in organizations of technical and vocational education is based on both the modular system and the credit system of training.

Domestic and foreign scientific and methodical works on the introduction of automatic control systems of buildings are used at developing of provided modular training programs.

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

LIST OF SYMBOLS AND ABBREVIATIONS

BC	Basic competence
BM	Basic module
SCES	The State compulsory education standard
FC	Final certification
C	Consultation
NQF	National Qualifications framework
GCEA	General classifier of types of economic activity
GED	General Education Discipline
EP	Educational program
PS	Professional standard
GE	Graduate education
PC	Professional competence
PM	Professional module
IT	Industrial training
PP	Professional practice
WG	Working Group
RoK	The Republic of Kazakhstan
LO	Learning outcomes
TVE	Technical and vocational education
O	Elective classes

PASSPORT OF THE WORKING EDUCATION PROGRAM

Name (*specialty code and name*): 1401000 - Construction and maintenance of buildings and structures”

Name and code: 140133 3- Technician for maintenance of intellectual management system of buildings

The purpose of the education program: preparation of highly qualified specialists for maintenance of intellectual management system including communication of “Smart Houses”.

Level of education: technical and professional.

Professional qualification: middle-level Specialist.

Skill levels on NQF/SQF: 4

Professional activity Area*: Construction and utilities; service economy and management; Energy.

Type (s) of employment:**

1. Maintenance of water supply systems, sewerage, heating of buildings and structures, including communication of “Smart Houses”;

2. Maintenance of power and low-voltage systems, illumination and lighting networks of buildings and structures, including communication of “Smart Houses”;

3. Operating of intellectual control system of buildings and structures.

Object(s) of professional activity*:** intellectual building management systems, Smart House, sensors, actuators, controllers, actuating mechanisms, automated system for engineering networks management.

Program Features**:** The possibility to use dual forms for vocational training/credit technology.

Form of study: full-time.

Training terms: 3 years 10 months.

Language of training: State (Kazakh) and Russian.

The volume of credits/hours: 219/ 6588 h.

Requirements for students***:** persons with basic secondary / general secondary / technical and vocational education.

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

** Specifies according to PS (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>The purpose of the training : work performance on maintenance of intellectual management system including communication “Smart Houses” and engineering systems</p>	<p>After the successful completion of the program, the trainee will be able to perform maintenance work on the intellectual management system including communication “Smart Houses”</p>	
<p>The name of the section, section, group, class and subclass according to GCEA * (<i>professional standard</i>)</p>	<p>GCEA code: 43298 Section: [F] CONSTRUCTION Section: [43] specialized construction works Group: [432] electrical, fitting and other construction installation activities Class: [4329] other construction installation activities GCEA code: 43210 Section: [F] CONSTRUCTION Section: [43] specialized construction works Group: [432] electrical, fitting and other construction installation activities Class: [4321] Electrical and installation works</p>	
<p>The scope of competencies (<i>core labor standard or professional functions analysis profession</i>) **</p>	<ol style="list-style-type: none"> 1. Maintenance of water supply systems, sewerage, heating of buildings and constructions, including communication "Smart Houses"; 2. Maintenance of power and low-voltage systems, illumination and lighting networks of buildings and constructions, including communication "Smart Houses"; 3. Maintenance of intellectual control system of buildings and structures. 	
<p>Basic Competence</p>		
<p>Competence Code</p>	<p>Competence (in line with labor functions and skill levels)</p>	<p>Modules</p>
<p>BC 1</p>	<p>Use professional vocabulary in the field of professional activity and prepare business papers in the state language</p>	<p>BM 1. Application of professional vocabulary and design of business papers in the field of professional activity</p>
<p>BC 2</p>	<p>Develop and improve the physical quality</p>	<p>BM 2. Development and improvement of physical qualities</p>

BC 3	Apply basic knowledge of the economy in professional activities	BM 3. Application of basic knowledge of economics in professional activities
BC 4	Understand the history, role, and place of Kazakhstan in the world community	BM 4. Understanding the history, role, and place of Kazakhstan in the world community
BC 5	Apply Basics of Philosophy, social sciences for socialization and adaptation in society and the work collective	BM 5. Application of Basics of Philosophy, social sciences for socialization and adaptation in society and the work collective
BC 6	Follow the rules of labor protection and safety	BM 6. Occupational safety and prevention of accidents
BC 7	Use the laws of physics and apply information technology in professional activities	BM 7. Application of the laws of physics and the use of information technology in professional activities

Professional competence

Competency code	Competence (in line with labor functions and skill levels)	Modules
PC 1	Develop design and technological documentation	PM 1. Development of design and technological documentation
PC 2	Perform basic fitting and metalwork-assembly work	PM 2 Implementation of the core mechanical and metalwork-Assembly works
PC 3	Produce welding and joining of pipes with various plastic shaped parts	PM 3 Welding and bonding of pipes with various plastic shaped parts
PC 4	Carry out installation, maintenance and repair of building engineering systems, including communication "Smart Houses"	PM 4 Installation, maintenance and repair of building engineering systems, including communication "Smart Houses"
PC 5	Carry out installation, maintenance and repair of power and low-voltage systems, including communication "Smart Houses"	PM 5 Installation, maintenance and repair of power and low-voltage systems, including communication "Smart Houses"

PC 6	Maintenance of intellectual control system of the building, including communication "Smart Houses"	PM 6. Maintenance of intellectual control system of the building, including communication "Smart Houses"
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THE LIST OF MODULES AND TRAINING OUTCOMES

Basic Competence			
The module name	Learning outcomes	Assessment Criteria for the training outcomes	Module forming Disciplines
BM 1. Application of professional vocabulary, the preparation of business papers in the field of professional activity	LO 1. Know the grammar and terminology of the Kazakh (Russian) and foreign languages for communication in the sphere of their professional activities	CR 1.1. Knowing of Lexico-grammatical material, necessary for professional communication CR 1.2. . Knowing the grammatical material in the specialty CR 1.3. The use of terminology in the specialty.	Professional Kazakh (Russian) language Professional foreign language Culture of business communication
	LO 2. To master the translation technique (with a dictionary) of professional-oriented texts	CR 2.1. Reading professional texts CR 2.2. Translation (with a dictionary) of professional texts CR 2.3. Development of a special vocabulary of foreign language vocabulary of professional orientation	
	LO 3. To work with organizational, administrative and informational documents using computer technology	CR 3.1. Drawing up in Kazakh (Russian) and foreign languages a resume, autobiography, description, statement, complaint, power of attorney, receipt CR 3.2. Compliance with textual requirements CR 3.3. Creation of documents on the computer that meet	

		modern requirements and established regulations	
BM 2. Development and improvement of physical qualities	LO 1. Strengthen health and healthy lifestyle	CR 1.1. Understanding and adhering to the fundamentals and culture of a healthy lifestyle CR 1.2. Characteristics of the physiological basis of the respiratory, circulatory and energy supply systems under muscle loads CR 1.3. Performing a set of exercises for general physical training	Physical education
	LO 2. To improve physical qualities and psycho-physiological abilities	CR 1. Characteristics of the foundations of physical activity and methods of its regulation CR 2. Selection and application of methods and means of physical culture to improve the basic physical qualities CR 3. Implementation of control standards and tests provided by the program	
	LO 3. Provide first aid for injuries and accidents	CR 1. Understanding the causes of injury during exercise CR 2. Using injury prevention methods CR3. Providing medical care for injuries	
BM 3. Application of basic knowledge of economics in	LO 1. To determine the forms and types of property,	CR 1.1. Understanding of the laws and principles of a market economy, tax policy,	Basics of economics

professional activities	types of plans, basic economic indicators of an enterprise	sources of inflation, the main stages and content of planning CR 1.2. Performing of the necessary economic calculations using mathematical methods to determine the main economic indicators of the enterprise CR 1.3. Determination of the main economic indicators of the enterprise	
	LO 2. Understand the development trends of the world economy, the main objectives of the state's transition to a green economy	CR 2.1. Characteristics of the trends of the world economy CR 2.2. Understanding the main objectives of the state transition to a "green" economy CR 2.3. Applying the basic methods of calculating gross domestic product and gross national product for the state's transition to a green economy	
	LO 3. To determine the possibility of success and the risk of entrepreneurship	CR 3.1. Characteristics of goals, factors, conditions, organizational and legal forms of entrepreneurial activity CR 3.2. Understanding the factors that determine entrepreneurial success CR 3.3. Drawing up a business plan	
BM 4. Understanding the history, role and place of	LO 1. Understand major historical events	CR 1.1. Understanding of chronology and understanding of the essence of historical	History of Kazakhstan

<p>Kazakhstan in the world community</p>		<p>events from antiquity to the present CR 1.2. Understanding the nature and purpose of political and social changes taking place in the Republic of Kazakhstan after independence CR 1.3. Characteristics of the achievements of independent Kazakhstan</p>	
	<p>LO 2. Identify cause-effect relationships of historical events.</p>	<p>CR2.1. Determination of the main facts, processes and phenomena that reflect and characterize the integrity and consistency of the history of Kazakhstan CR 2.2. Linking historical events CR 2.3. Ability to work with historical sources</p>	
	<p>LO 3. Own knowledge to develop national identity</p>	<p>CR 3.1. 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 CR 3.2. Demonstration of spatial thinking, the ability to analyze historical material CR 3.3. Characteristics of Kazakhstan in the system of foreign</p>	

		political relations of the modern world	
BM 5. Application of Basics of Philosophy, social sciences for socialization and adaptation in society and the work collective	LO 1. Master the basic concepts and information of philosophy, political science, cultural studies and sociology	CR 1.1 Understanding the essence of the concepts, categories and information of philosophy, political science, cultural studies and sociology CR 1.2. Identification of problems and interrelations of the main categories and concepts of philosophy, political science, cultural studies and sociology CR 1.3. Analysis of various points of view	Basic Philosophy Cultural Studies Law basics Fundamentals of sociology and political science
	LO 2. Understand international political processes, geopolitical situation and moral values, and norms that form tolerance and an active personal attitude	CR 2.1 Characteristics of the structure of the political system, history and the current state of the world and traditional religions CR 2.2 Determining differences in extremist, radical and terrorist ideologies CR 2.3 Tolerant perception of social, ethnic, religious and cultural differences	
	LO 3. Master the basic concepts and information about the main branches of law	CR 3.1 Possession of the basic provisions of criminal, civil and family law and information about taxes CR 3.2 Understanding of responsibility for administrative and corruption offenses and respect for the	

		principles of law and order CR 3.3 Protection of rights in accordance with the law of labor	
BM 6. Occupational safety and prevention of accidents	LO 1. Follow safety rules and labor protection	CR 1. Normative technical acts on labor protection CR 1.2 Understanding the organization of labor protection in the enterprise CR 1.3 Abidance of primary safety instructions	History of Kazakhstan
	LO 2. Ensure compliance with process safety	CR 2.1 The management of sanitary and hygienic and sanitary-technical norms of the Republic of Kazakhstan in the organization of work CR 2.2 Comply with the rules for the use of technological equipment, devices and tools, methods and techniques for safe work CR 2.3 The application of the rules of first aid in case of accidents and other damages	
	LO 3. Develop safety and labor protection measures	CR 3.1 General sanitary and hygienic requirements for production premises and workplaces CR 3.2 Organization of service monitoring and supervision of labor protection in the organization.	

		CR 3.3 Analysis of the organization's activities in order to identify risks in the field of occupational safety and health safety of personnel	
BM 7. Using the laws of physics and the use of information technology in professional activities	LO 1. Apply the basic laws of physics	CR 1.1. Characteristics of physical phenomena and processes, principles of operation of devices and mechanisms using the conceptual apparatus of the school physics course (values, laws, models, concepts) CR 1.2. Understanding the essence of methods of working with information of physical content CR 1.3. Understanding the basic laws of building physics	Physics, Maths, Information and communication technology
	LO 2. Solve problems in the field of professional activity	CR 2.1. Characteristic of mathematical material CR 2.2. Generalization of Mathematical Material CR 2.3. Understanding of Mathematical Thinking	
	LO 3. Apply information technology in professional activities	CR 3.1. Understanding methods of automated information processing, network technologies for processing and transmitting information CR 3.2. Understanding interpolation: the	

		<p>process of collecting, transmitting, processing and replenishing information; programming language; programming technology; computer graphics</p> <p>CR 3.3. Formation of resource information base for solving professional tasks</p>	
Professional modules			
Module name	Training outcomes	Criteria for the assessment of training outcomes	Module forming Disciplines
PM 1. Development of design and technological documentation	LO 1. Perform drawing of simple and medium complexity	<p>1. Following the rules of design drawings overall appearance and assembly drawings</p> <p>2. Execution of solids projections, sections and sections and their and isometric views</p> <p>3. Assembly drawings sketches of Decoration</p>	Drawing Computer graphics
	LO 2. Create, edit and execute drawings by using computer technology	<p>1. Basic concepts of computer graphics hardware</p> <p>2. Execution drawings and diagrams, using technically e means computer graphics</p> <p>3. Creating and editing drawings of various professional orientation</p>	
	LO 3. The use of computer technology in practice	<p>1. Application of modern information technology</p> <p>2. The use of graphical editors in solving</p>	

		specific business problems 3. Creating a database and developing forms for entering and viewing data	
PM 2. Performance of basic metalwork and fitting and assembly work	LO 1. Define properties and classify the materials used in the production of	1. Knowledge of types, properties and applications of the basic materials used in manufacture 2. Defining properties and field of application of the basic materials used in manufacture 3. Classification of materials according to their use, properties, and applications	Materials science Technology of metal and metalwork-assembly works
	LO 2 Main technical measurement. conduct	1. Use of different methods and tools for measuring 2. Installation of various types of layouts 3. Perform technically measurements on the drawings	
	LO 3 . Perform different types of connection parts and solder the wires to the motherboard	1. Use of markup methods of felling, cutting, bending and straightening metal. 2. Various types of connections (threaded, welded, bonded, crimp, flanged) details. 3. Application of the basic mechanic of equipment and technology of mechanical works	
PM 3.	LO 1. Prepare the plastic pipes	1. The execution of preparatory works for	Occupational health and safety

Welding and bonding pipes with various plastic shaped parts	and fittings for welding works	welding of pipelines, chamfering, cleaning the pipe ends 2. Selection of plastic pipes and shaped parts for welding works 3. Classification and determination of the properties of plastic pipes and shaped parts for their purpose	Welding and bonding of plastics Special technology
	LO 2. Produce welding and joining of pipes with various plastic shaped parts	1. Detection of defects in welded seams and glued (cracks, sink). 2. Cutting and fitting parts in junctions. 3. Detection of defects and their removal	
	LO 3. Perform basic types of welding	1. Preliminary and accompanying heating when welding parts with observance of the specified temperature 2. Hand cutting and preparation of plastics 3. Welding easy and medium difficulty of parts of constructions, pipelines of various plastics in all positions of the weld	
PM 4. Installation, maintenance and repair of engineering systems of buildings, including communications of Smart Houses	LO 1. Mount the water supply, sewerage, heating and ventilation	1. Layout places laying pipes, drills holes and breaking through and installation of fastenings 2. Selection of pipes, connections, laying of pipes and pipelines 3. Installation of water supply, sewerage, heating and ventilation	Technical mechanics Technology equipment operation of water supply systems, sewerage and heating systems The device of modern sanitation systems and

	<p>LO 2. Maintain water supply systems, sewerage, heating and ventilation of buildings in working condition in accordance with the requirements</p>	<p>1. Implementation of maintenance works in the sewage system, internal drains, sanitary-engineering devices 2. Monitoring of technical condition of the equipment control system of water supply, sewerage, heating and ventilation of buildings 3. Compliance with occupational safety and health, and environmental protection Wednesday when you typical malfunctions and maintenance of sanitation systems</p>	<p>equipment in residential and public buildings, industrial enterprises</p>
	<p>LO 3. To repair water supply systems, sewerage, heating and ventilation of buildings in working condition in accordance with the requirements</p>	<p>1. Repair of heating equipment, acquisition of materials, equipment and products for sanitary systems devices 2. Adjusting faucets, toilet tanks 3. Repair of water supply and sewerage system of polymer pipes bolted, welded, glued, or up connections</p>	
<p>PM 5. Installation, maintenance and repair of power and low-current systems, including</p>	<p>LO 1. Assess current state of electro - equipment</p>	<p>1. Use of electrical defects 2. Use of methods for detection of defects in mechanical parts, magnetic wires, pin joints, insulation, connection diagrams</p>	<p>Electrical and electromechanical equipment industry Installation and maintenance of electrical equipment</p>

communications of Smart Houses		3. Assessment of the status of electrical measurement and audit tests.
	LO 2. Understand the fundamentals of installation and repair of internal electric networks	1. Compliance with safety regulations when installing internal electric networks. 2. Application of conditionally pictograms schema elements, marking wires and cables 3. Following the technology of laying of cables when connecting through various methods and termination lived cables and wires, laying and fastening of the wiring
	LO 3. Maintenance of power and low-voltage systems	1. Compliance with occupational safety and health, and environmental protection Wednesday when you typical malfunctions and maintenance operations objects of power and low-voltage systems, lighting systems and lighting networks. 2. Monitoring of technical condition of the equipment control system of power and low-voltage systems, lighting systems and lighting networks of buildings.

		3. Performing maintenance equipment power and low-voltage systems of buildings	
PM 6. Maintenance of the intelligent building management system, including “Smart House” communications	LO 1. Diagnosis of intellectual building management systems	1.Diagnosis of electrical system, ventilation, heating, water supply and ventilation. 2.Diagnosis of system security, 3.Diagnosis of all life-support systems on Terminal intellectual building management systems	Theoretical bases of electrical engineering Equipment and technology for repair of domestic machines and devices Theory of automatic control
	LO 2. Maintenance skills for electrical and electronic equipment of intellectual building management systems	1.Accounting requirements for the installation of electrical and electronic equipment. 2.Check battery charge and replace batteries in smoke detectors, carbon monoxide and other autonomous sensors 3. Checking the operation of the equipment, sensors, lamps, actuators	
	LO 3. Skills maintenance other equipment of intellectual building management systems	1.Cleaning of air conditioners, testing their work in different modes 2.replacement filters for water purification, air 3. Replacement of defective lamps, filters, sensors, timers, actuators, controllers and control panels	

4.1 Specification of the basic module 1 “Application of professional vocabulary and business writing in the state language”

Sphere of competence	-
Name of module	Application of professional vocabulary in the field of professional activity, preparation of business papers in the state language
Purpose of module	After studying this module, the student will be able to apply professional vocabulary, make business papers in the state language
Level of professional qualification	5
Learning outcomes by module	<ol style="list-style-type: none"> 1. To know the grammar and terminology of the 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 and informational documents with the use of computer technology.
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Knowing of lexical material in the specialty; 2. Knowing of grammatical material in the specialty; 3. The use of terminology in the specialty; 4. Reading professional texts; 5. Translation (with a dictionary) of professional texts; 6. Development of a special vocabulary of foreign language vocabulary of professional orientation 7. Drawing up in Kazakh (Russian) and foreign languages a summary, autobiography, description, statement, complaint, power of attorney, receipt; 8. Compliance with the requirements for the text of the document; 9. Creation of documents on the computer that meet modern requirements and established regulations.
Prerequisites	<p>Knowledge of the school course of Kazakh, Russian, foreign language;</p> <p>Introduction to the specialty.</p>
Forming disciplines modules	<p>Professional Kazakh (Russian)</p> <p>Professional foreign language</p> <p>Culture of business communication</p> <p>Office work in state language</p>
Type of module (compulsory, optional)	Compulsory

Labor intensity (RK/ credits academic hours)	6 credits /180 hours
Length of module	3 semesters
Form of education	full time
Technology of education	module
Forms of educational process organization	Lecture, Student's Individual Work, Practical trainings, laboratory trainings, practices
Methods of education	Oral interaction, test, report, reference paper, creative task
Forms of control	Examination, test, course project
Necessary resources	<p>Personal computer, educational-methodical literature on the disciplines: Professional Kazakh (Russian) language, Professional foreign language, Culture of business communication.</p> <p>Murzalina B., Nurkeyeva S., Nurgazina G., Sagyndykova M., Baitassova S. Textbook for intensive training in the Kazakh language, 2009;</p> <p>V.A. Radovel English for technical universities. Textbook, 2016</p> <p>Жахина Б., Құрманова А.Қ., Қайырбекова И.С. Мемлекеттік тілде іс қағаздарын жүргізу курсы. - Көкшетау, 2003. – 120 б.</p> <p>А.Баймуханова. Мемлекеттік тілде іс қағаздарын жүргізу. Алматы, 2010</p> <p>Н. Егіншебаева. Мемлекеттік тілде іс қағаздарын жүргізу. Алматы, 2012</p> <p>Б.Айтбаева, Г.Абдрахманова. Қазақ тілі (B2 деңгейі). Қарағанды, 2012</p>
Language of education	Russian, Kazakh
Postrequisites	PM 1- PM 6

4.2 Specification of the basic module 2
“Development and improvement of physical qualities”

Sphere of competence	-
Module Name	Development and improvement of physical qualities
Module purpose	By the end of this module, the student will be able to develop and improve physical qualities.
Proficiency Level	4
Learning outcomes	LO 1. To strengthen health and abide by the principles of a healthy lifestyle; LO 2. To improve physical qualities and psycho-physiological abilities; LO 3. To provide first aid for injuries and accidents.
Summary of content (sections, topics)	1. Understanding and adhering to the fundamentals and culture of a healthy lifestyle; 2. Characteristics of the physiological bases of the activity of the respiratory, circulatory and energy supply systems under muscle loads; 3. Performing a set of exercises for general physical training; 4. Characteristics of the basics of physical activity and methods of its regulation; 5. Selection and application of methods and means of physical culture to improve basic physical qualities; 6. Implementation of control standards and tests provided by the program; 7. Understanding the causes of injury during exercise; 8. The use of methods of injury prevention; 9. Providing first medical care for injuries.
Prerequisites	Valeology Psychology Biology
Disciplines forming the module	Physical education
Module type (compulsory, optional)	Compulsory
Workload (credits RoK / academic hours)	6 credits / 180 hours
The duration of the module	3 semesters

Form of study	intramural
Education technology	Modular
Forms of educational process organization	Lecture, independent work, practical session, laboratory classes, practices.
Teaching methods	Oral activities (conversation, lecture); visual, competitive; practical exercises.
Form of control	Exam, test
Necessary resources	Gym equipped with equipment: Volleyball net; Basketball backboard; Multifunctional simulator; Simulator hyperextension; Bench for bench press; Simulator bench scott; Simulator t-neck; Table tennis; Gymnastic bench; Gymnastics mat; Gymnastic goat; Gymnastic bridge universal; The volleyball ball is massive; Basketball ball; Multimedia equipment, Internet resources and posters on occupational safety and health, fire safety and environmental protection, educational and methodical literature. Yu.I. Evseev. Physical education for university students. - Rostov-on-Don. -2003.
Language of instruction	Russian, Kazakh
Post requisites	PM 1 – PM 6

4.3 Specification of the basic module 3

"Application of basic knowledge of the economy in professional activities"

Sphere of competence	-
Module Name	Application of basic knowledge of economics in professional activities
Module purpose	By the end of this module, the student will be able to apply the basic knowledge of the economy in their professional activities.
Proficiency Level	4
Learning outcomes	LO 1. To determine the forms and types of property, types of plans, the main economic indicators of the enterprise; LO 2. To understand the development trends of the world economy, the main objectives of the state transition to a green economy; LO 3. To determine the possibility of success and risk business.
Summary of content (sections, topics)	1. Understanding the laws and principles of a market economy, tax policy, sources of inflation, the main stages and content of planning 2. Perform the necessary economic calculations using mathematical methods to determine the main economic indicators of the enterprise 3. The definition of the main economic indicators of the enterprise 4. Characteristics of the trends of the world economy 5. Understanding the main objectives of the state's transition to a green economy 6. Application of basic methods for calculating gross domestic product and gross national product for the state's transition to a green economy 7. Characteristics of goals, factors, conditions, organizational and legal forms of entrepreneurial activity 8. Understanding the factors that determine business success 9. Drawing up a business plan
Prerequisites	Basics of state and law
Disciplines forming the module	Fundamentals of economics
Module type (compulsory, optional)	Compulsory

Workload (credits RoK / academic hours)	3 credits /90 hours
The duration of the module	1 semester
Form of study	intramural
Education technology	Modular
Forms of educational process organization	Lecture, office hours, practical session, laboratory classes, practices.
Teaching methods	Oral interaction, testing, report, abstract, creative task
Form of control	Exam, testing, course project
Necessary resources	Personal computer, Internet resources, educational and methodical literature in the disciplines: Fundamentals of Economics. Sakhariev, S.S. Modern course of economic theory [Electronic resource]: textbook / S.S. Saccharides; A.S. Sakhariev. - Almaty: Jurid. Lit. 2009
Language of instruction	Russian, Kazakh
Post requisites	PM 1 –PM 6

4.4. Specification of the basic module 4
"Understanding the history, role and place of Kazakhstan in the world community"

Sphere of competence	-
Module Name	Understanding the history, role and place of Kazakhstan in the world community
Module purpose	By the end of this module, the student will understand the history, role and place of Kazakhstan in the world community.
Proficiency Level	4
Learning outcomes	<ol style="list-style-type: none"> 1. To understand major historical events 2. To determine the causal relationships of historical events. 3. To own knowledge for the development of national identity
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Understanding the essence of historical events that took place from antiquity to the present 2. Understanding the nature and purpose of the political and social changes taking place in the Republic of Kazakhstan after independence. 3. Characteristics of the achievements of independent Kazakhstan 4. Determination of the main facts, processes and phenomena that reflect and characterize the integrity and consistency of the history of Kazakhstan 5. Establishing links between historical events 6. Ability to work with historical sources 7. 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 8. Demonstration of spatial thinking, the ability to analyze historical material 9. Characteristics of Kazakhstan in the system of foreign political relations of the modern world
Prerequisites	History of Kazakhstan (initial course)
Disciplines forming the module	History of Kazakhstan

Module type (compulsory, optional)	Compulsory
Workload (credits RoK / academic hours)	3 credits / 90 hours
The duration of the module	1 semester
Form of study	intramural
Education technology	Modular
Forms of educational process organization Teaching methods	Lecture, office hours, practical session, laboratory classes, practices. Oral interaction, testing, report, abstract, creative task
Form of control	Exam, test, course project
Necessary resources	Personal computer, educational and methodical literature on the discipline of the history of Kazakhstan. Abdakimov A. History of Kazakhstan. - Almaty, 2002 Abylhozhin ZH.B. Essays on the socio-economic history of Kazakhstan XX century. - Almaty, 1997. Razdykov S.Z. History of Kazakhstan. Study guide for colleges. - Pavlodar, 2005. 165 p.
Language of instruction	Russian, Kazakh
Post requisites	PM 1-PM 6

4.5 Specification of the basic module 5

"Applying of the basics of philosophical knowledge, social sciences for socialization and adaptation in society and the work places"

Sphere of competence	-
Module Name	Application of the basics of philosophical knowledge, social sciences for socialization and adaptation in society and the workforce
Module purpose	By the end of this module, the student will be able to apply the basics of philosophical knowledge, social sciences for socialization and adaptation in society and the workforce.
Proficiency Level	4
Learning outcomes	<ol style="list-style-type: none"> 1. To know basic concepts and information of philosophy, political science, cultural studies and sociology; 2. To understand the international political processes, the geopolitical situation and moral values, and the norms that form tolerance and an active personal position; 3. To know basic concepts and information about the main branches of law.
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Understanding the essence and essence of the concepts, categories and information of philosophy, political science, cultural studies and sociology 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 4. Characteristics of the structure of the political system, history and current state of the world and traditional religions 5. Definition of differences of extremist, radical and terrorist ideologies 6. Tolerant perception of social, ethnic, religious and cultural differences. 7. Possession of the basic provisions of criminal, civil and family law and information about taxes 8. Understanding of responsibility for administrative and corruption offenses and the observance of the principles of law and order 9. Protecting rights in accordance with labor laws

Prerequisites	World history History of Kazakhstan
Disciplines forming the module	Basic philosophy Culturology Law basics Fundamentals of sociology and political science
Module type (compulsory, optional)	Compulsory
Workload (credits RoK / academic hours)	6 credits / 180 hours
The duration of the module	3 semesters
Form of study	intramural
Education technology	Modular
Forms of educational process organization	Lecture, office hours, practical session, laboratory classes, practices.
Teaching methods	Oral interaction, testing, report, abstract, creative task
Form of control	Oral questioning, testing, presentation, report, abstract, interview, creative task, colloquium.
Necessary resources	Personal computer, software, Internet resources, educational and methodical literature in the following disciplines: Fundamentals of Philosophy, Fundamentals of Law, Fundamentals of Sociology and Political Science, Cultural Studies. Bagdasaryan N. G. Culturology: Textbook. for stud. tech. universities / Coll. auth .; Ed. N. G. Bagdasaryan. - 3rd ed., Corr. and add. - M .: Higher. school., 2001.-511 p. Razdykov S.Z. Basics of political science. Textbook. - Astana, "Foliant", 2008. 312 p. Zelenkov A. I. Philosophy: an educational and methodical complex. - 2003. Mkrtychyan E.R. Basics of Sociology, Textbook, Volgograd, 2017 KS Birzhanov, K. B. Ibraeva. Basics of Law of the Republic of Kazakhstan, 2013
Language of instruction	Russian, Kazakh
Post requisites	PM 1 – PM 6

4.6 Specification of the basic module 6 "Labor protection and safety engineering"

Sphere of competence	-
Module Name	Labor protection and safety engineering
Module purpose	By the end of this module, the student will be able to apply the necessary knowledge, skills of safe labor in industrial and domestic conditions, injury prevention and skills of providing a favorable business environment
Proficiency Level	4
Learning outcomes	<ol style="list-style-type: none"> 1. Follow safety rules and labor protection 2. Ensure compliance with the safety of technological processes. 3. Develop safety and labor protection measures
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Normative technical acts on labor protection 2. Understanding the organization of labor protection in the enterprise 3. Compliance with the initial safety instructions 4. Management of sanitary and hygienic and sanitary-technical norms of the Republic of Kazakhstan in the organization of work 5. Comply with the rules for the use of technological equipment, devices and tools, methods and techniques for safe work 6. The application of the rules of first aid in case of accidents and other damages. 7. General sanitary and hygienic requirements for production facilities and workplaces 8. Organization of service monitoring and supervision of labor protection in the organization. 9. Analysis of the organization's activities in order to identify risks in the field of occupational safety and health, personnel health
Prerequisites	Physical education
Disciplines forming the module	Labor protection and safety engineering
Module type (compulsory, optional)	Compulsory
Workload (credits RoK / academic hours)	4 credits / 120 hours

The duration of the module	2 semesters
Form of study	intramural
Education technology	Modular
Forms of educational process organization Teaching methods	Lecture, independent work, practical session, laboratory classes, practices. Oral interaction, testing, report, abstract, creative task
Form of control	Exam, tests, course project
Necessary resources	Personal computer, educational and methodical literature on the subject of labor protection and safety. Amanzholov J. Occupational safety and health: a training manual. 3rd ed. - Astana: Foliant, 2014. 272 p.
Language of instruction	Russian, Kazakh
Post requisites	PM 1- PM 6

4.7. Specification of the basic module 7
"Applying of the laws of physics and the use of information technology in professional activities "

Sphere of competence	-
Module Name	Application of the laws of physics and the use of information technology in professional activities
Module purpose	By the end of this module, the student will be able to use the laws of physics and apply information technologies in their professional activities.
Proficiency Level	4
Learning outcomes	<ol style="list-style-type: none"> 1. To apply the basic laws of physics; 2. To solve problems in the field of professional activity; 3. To apply information technology in professional activities.
Summary of content (sections, topics)	<ol style="list-style-type: none"> 1. Characteristics of physical phenomena and processes, principles of operation of devices and mechanisms using the conceptual apparatus of a school physics course (values, laws, models, concepts) 2. Understanding the essence of the methods of working with information of physical content 3. Understanding the basic laws of building physics 4. Characteristics of mathematical material 5. Generalization of mathematical material 6. Understanding Mathematical Thinking 7. Understanding methods of automated information processing, network technologies for processing and transmitting information 8. Understanding interpolation: the process of collecting, transmitting, processing and updating information; programming language; programming technology; computer graphics 9. Formation of resource and information base for solving professional tasks
Prerequisites	Physics Computer science School Math
Disciplines forming the module	Physics I, II Mathematics I, II

	Information and communication technology
Module type (compulsory, optional)	Compulsory
Workload (credits RoK / academic hours)	2 credits / 60 hours
The duration of the module	1 semester
Form of study	intramural
Education technology	Modular
Forms of educational process organization	Lecture, independent work, practical session, laboratory classes, practices
Teaching methods	Oral interaction, testing, report, reference paper, creative task
Form of control	Exam, testing, course project
Necessary resources	Personal computer, educational and methodical literature in the following disciplines: Physics I, II, Mathematics I, II, Information and Communication Technologies. Deshko I.P., Kovalev S.N., Kryazhenkov KG, Mordvinov V.A., Trifonov N.I., Tulinov S.V., Tsypkin V. Information and Communication Technologies: A Manual, 2005. - P.147
Language of instruction	Russian, Kazakh
Post requisites	PM 1 – PM 6

Specification of Professional Module 1
“Development of design and technological documentation”

Scope of competence	Maintenance of power and low-voltage systems of buildings, illumination and lighting networks of buildings and constructions, including communication "Smart Houses"
Module name	Development of design and technological documentation
The purpose of the module	After studying this module the trainee will be able to develop design and technological documentation
Level of professional qualification	4
Training outcomes by module	<ol style="list-style-type: none"> 1. Perform drawings of simple and medium complexity 2. Create, edit and execute drawings using computer technologies 3. The use of computer technology in practice
Summary of content (sections, themes)	<ol style="list-style-type: none"> 1. Observance of rules of design drawings overall appearance and assembly drawings 2. Execution of solids projections, sections and sections and their and isometric views 3. Assembly drawings sketches of Decoration 4. Basic concepts of computer graphics hardware 5. Execution drawings and diagrams, using technically e means computer graphics 6. Creating and editing drawings of various professional orientation 7. Application of modern information technology 8. The use of graphical editors in solving specific business problems 9. Creating a database and develop forms for entering and viewing data
Prerequisites	Physics, Informatics, Mathematics (basic course);
Module forming Disciplines	Drawing Computer graphics
Module type (mandatory, optional)	Mandatory
Labor intensity (credits RoK/academic hours)	14 credits / 420 hours

The duration of the module	2 semesters
Form of teaching	Full-time
Training technologies	modular
Form of educational process organization	Lecture, individual work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Control forms	Exam, test, course project
Required resources	<p>Personal computer, multimedia equipment, Internet resources, copying, scanning and printing equipment, thematic posters on intellectual building management systems, including communication of “Smart Houses”, educational-methodical literature.</p> <p>V.P. Bolshakov, Engineering and computer graphics: tutorial/V.P. Bolshakov, V.T. Tozik, A.V. Chagin. — Spb.: BHV Petersburg, 2013. -288 p.</p> <p>V.M. Degtyarev, Engineering and computer graphics: tutorial for institutions of higher professional education/V.M. Degtyarev. -M.: IC Academy 2011. -240 p.</p> <p>L.A. Zalogova, Computer graphics. Elective course: Practoce /L.A. Zalogova. -M.: BINOM. LZ, 2011. -245 p.</p> <p>D.F.Mironov, Computer graphics in design: Tutorial/D.F. Mironov. — Spb.: BHV Petersburg, 2008. -560 p.</p> <p>P.Ya. Pantyuhin, Computer graphics. 2 vol. T.1. Tutorial: Computer graphics/ Tutorial / P.Ya. Pantyuhin. -M.: ID FORUM, NIC INFRA- M, 2012. -88 p.</p> <p>V.T. Tozik, Computer graphics and design: tutorial for the beginning vocational education/V.T. Tozik, L.M. Korpan. -M.: IC Academy, 2013. -208 p.</p>
Language of Training	Russian, Kazakh
Post-requisites	Technical mechanics

Specification of Professional Module 2
“Performance of basic metalwork and fitting and assembly work”

Scope of competence	Maintenance of water supply systems, sewerage, heating of buildings and constructions, including communication "Smart Houses"
Module name	Performance of basic metalwork and fitting and assembly work
The purpose of the module	After studying this module the trainee will be able to perform locksmith's treatment of the parts and installation of individual components
Level of professional qualification	4
Learning outcomes	<ol style="list-style-type: none"> 1. Define the properties and classify the materials used in the production of 2. Hold the main technical measurement 3. Perform different types of connections of details and soldering wires into boards
Summary of content (sections, themes)	<ol style="list-style-type: none"> 1. Knowledge of the types, properties and uses of the basic materials used in manufacture 2. Define the properties and applications of the basic materials used in manufacture 3. Classification of materials according to their use, properties, and applications 4. Application of different methods and tools for measuring 5. Installing different types of layouts 6. Execution of technical measurements on the drawings 7. The application of ways to markup, editing and cutting, bending, metal-cutting. 8. The various types of connections (threaded, welded, bonded, crimp, flanged) details. 9. The application of the basic mechanic mechanical works equipment and technology
Prerequisites	Physics, Informatics, Mathematics (basic course);
Module forming Disciplines	Materials science Technology of basic fitting and metalwork assembly work
Module type (mandatory, optional)	Mandatory

Labor intensity (credits RoK/academic hours)	18 credits / 540 hours
The duration of the module	3 semesters
Form of teaching	Full-time
Training technologies	modular
Form of educational process organization	Lecture, individual work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Control forms	Test, exam, course project.
Required resources	<p>Workbench with vise; marking plate; center-punch; inclinometer; hammer; chisel; a set of files; a set of drills; the dressing plate; scissors for metal; hacksaw for metal; sets of taps and dies; a set of countersinks; Sharpener; drilling machine; lathe; welding machine; individual protection means, Internet resources and posters on occupational health and safety, fire safety and environmental protection, methodical literature on the following subjects: materials science, technology of fitting and metalwork-assembly works</p> <p>Yu.T. Vishnevetsky Materials for technical colleges. Tutorial, Dashkov and C°, 2010</p> <p>G.A. Dvoeglazov Materials science: textbook -Rostov na-Donu: Phoenix, 2015.-445 p.</p> <p>Pokrovsky B.S. Metalwork-Assembly work Tutorial for students of secondary vocational education. – 9 edition, ster. -M.: Academy, 2014-352 p. ISBN 978-5-4468-2014-6.</p> <p>Bench-work (electronic resource): a set of electronic posters- Chelyabinsk: SouthUral State university, 2008</p>
Language of Training	Russian, Kazakh
Post-requisites	Welding and bonding of plastics

Specification of Professional Module 3
“Welding and bonding pipes with various plastic shaped parts”

Scope of competence	Maintenance of water supply systems, sewerage, heating of buildings and constructions, including communication "Smart Houses"
Module name	Welding and bonding pipes with various plastic shaped parts
The purpose of the module	After studying this module the trainee will be able to cook and to glue pipes with different plastic shaped parts
Level of professional qualification	4
Training outcomes by module	<ol style="list-style-type: none"> 1. To prepare the plastic pipes and fittings for welding works 2. Welding and joining of pipes with various plastic shaped parts 3. Perform basic types of welding
Summary of content (sections, themes)	<ol style="list-style-type: none"> 1. The execution of preparatory works for welding of pipelines, chamfering, cleaning the pipe ends 2. Selection of plastic pipes and shaped parts for welding works 3. Classification and definition of the properties of plastic pipes and shaped components on their destination 4. Detection of defects in welded seams and glued (cracks, sink). 5. Cutting and fitting parts in junctions. 6. Detection of defects and their removal 7. Preliminary and accompanying heated by welding parts with observance of the specified temperature 8. Hand cutting and preparation of plastics 9. Welding easy and medium difficulty of parts of constructions, pipelines of various plastics in all positions of the weld
Prerequisites	Physics, Informatics, Mathematics (basic course)

Module forming Disciplines	Occupational health and safety Welding and bonding of plastics Special technology
Module type (mandatory, optional)	Mandatory
Labor intensity (credits RoK/academic hours)	16 credits /480 hours
The duration of the module	2 semesters
Form of teaching	Full-time
Training technologies	modular
Form of educational process organization	Lecture, individual work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Control forms	Exam, test, course project.
Required resources	Ventilated room, Workbench with vise; marking plate; Kerner; inclinometer; hammer; chisel; a set of files; a set of drills; hacksaw for metal; welding apparatus ; variety of plastic pipes, appropriate fittings and sanitary equipment, using plastic parts and pipes; individual protection means, posters , multimedia equipment, Internet resources and posters on occupational health and safety, fire safety and environmental protection, methodical literature. E.R. Galimov, A.G. Ismailova, Yu.U. Sudaryov, N.Ya. Galimova, R.K. Nizamov Polymeric materials. Structure, properties and applications. Tutorial. Kazan: Kazan Publishing House. State Tech. University, 2001. 188p. E.R.Galimov, A.S.Maminov, A.G.Ablyassova, R.K. Nizamov, N.Ya.Galimova, V.M. Soldatkin Materials of instrumentation. Tutorial. Kazan: Kazan Publishing House. State Tech. University, 2008. 672p. S.S. Volkov Welding and bonding of polymeric materials. M.: Chemistry, 2001, 376 p. L.M. Amirova, Yu.U. Sudaryov, T.A. Ilyinkova, A.A.Kovalyov, A.G. Ismagilova. Welding of plastics: Tutorial. Kazan: Kazan Publishing House. State Tech. University, 2001. 28p.

	Zh. Amanzholov. Principles of life safety, Astana, 2008-232 p.
Language of Training	Russian, Kazakh
Post-requisites	Arrangement of modern sanitation systems and equipment in residential and public buildings, industrial enterprises

Specification of Professional Module 4
“Installation, maintenance and repair of engineering systems of buildings, including communications of Smart Houses”

Scope of competence	Maintenance of water supply systems, sewerage, heating of buildings and constructions, including communication "Smart Houses"
Module name	Installation, maintenance and repair of engineering systems of buildings, including communications of Smart Houses
The purpose of the module	After studying this module the trainee will be able to carry out installation, maintenance and repair of building engineering systems, including communication "Smart Houses"
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. Mount the water supply, sewerage, heating and ventilation 2. Maintain water supply systems, sewerage, heating and ventilation of buildings in working condition in accordance with the requirements 3. To repair water supply systems, sewerage, heating and ventilation of buildings in working condition in accordance with the requirements
Summary of content (sections, themes)	<ol style="list-style-type: none"> 1. Layout places laying pipes, drilling and punching and installation of fastenings 2. Selection of pipes, connections, laying of pipes and pipelines 3. Installation of water supply, sewerage, heating and ventilation 4. Implementation of maintenance works in the sewage system, internal drains, sanitary-engineering devices 5. Monitoring of technical condition of the equipment control system of water supply, sewerage, heating and ventilation of buildings 6. Compliance with occupational safety and health, and environmental protection Wednesday when you typical malfunctions and maintenance of sanitation systems 7. Repair of heating equipment, acquisition of materials, equipment and products for sanitary systems devices 8. Adjusting faucets, toilet tanks

	9. Repair of water supply and sewerage system of polymer pipes bolted, welded, glued, or up connections
Prerequisites	Physics Informatics
Module forming Disciplines	Technical mechanics Technology equipment operation of water supply systems, sewerage and heating systems The device of modern sanitation systems and equipment in residential and public buildings, industrial enterprises
Module type (mandatory, optional)	Mandatory
Labor intensity (credits RoK/academic hours)	13/390 hours
The duration of the module	3 semester
Training technologies	modular
Form of educational process organization	Lecture, individual work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Form of educational process organization	Lecture, individual work, practical lessons, labs, practice.
Control forms	Test, exam, course project.
Required resources	Workbench with vise; marking plate; center-punch; inclinometer; hammer; chisel; a set of files; a set of drills; the dressing plate; scissors for metal; hacksaw for metal; sets of taps and dies; a set of countersinks; Sharpener; drilling machine; lathe; welding machine; plastic pipe welding machine; various pipes, appropriate fittings and sanitary equipment, PPE, thematic posters, multimedia equipment, Internet resources and posters on occupational safety and health, fire safety and environmental protection, methodical literature. V.P. Nesterenko. A.I.Zitov, S.L. Katanuhina, N.A. Kupriyanov, V.V. Drobchik. Technical mechanics: a tutorial. -Tomsk: Publish TPU, 2007. -175 p. P.D. Horuzhij, A.A. Tkachuk Handbook for plumber. Pikh M.M.-1986.

	<p>N.N. Abramov Water supply: textbook for high schools. 3 ed., revised and added. M.: Stroiizdat, 1982.</p> <p>M.A. Somov Water supply systems and constructions: Textbook for high schools. M.: Stroiizdat, 1988.</p>
Language of Training	Russian, Kazakh
Post-requisites	Automation of technological processes

Specification of Professional Module 5
“Installation, maintenance and repair of power and low-current systems, including communications of Smart Houses”

Scope of competence	Maintenance of power and low-voltage systems of buildings, illumination and lighting networks of buildings and constructions, including communication "Smart Houses"
Module name	Installation, maintenance and repair of power and low-current systems, including communications of Smart Houses
The purpose of the module	After studying this module the trainee will be able to carry out installation, maintenance and repair of power and low-voltage systems, including communication "Smart Houses"
Level of professional qualification	4
Training outcomes by module	<ol style="list-style-type: none"> 1. Conduct assessment of current state of electrical equipment 2. Understand the fundamentals of installation and repair of internal electric networks 3. Carry out maintenance of power and low-voltage systems
Summary of content (sections, themes)	<ol style="list-style-type: none"> 1. The use of electrical defects 2. Use of methods for detection of defects in mechanical parts, magnetic wires, pin joints, insulation, connection diagrams 3. Assessment of the status of electrical measurement and audit tests. 4. Compliance with safety regulations when installing internal electric networks. 5. Application of conditionally-pictograms, schema elements, marking wires and cables 6. Observance of technology of laying of cables when connecting through various methods and termination lived cables and wires, laying and fastening of the wiring 7. Compliance with occupational safety and health, and environmental protection Wednesday when you typical malfunctions and maintenance of objects of power and low-voltage systems, lighting systems and lighting networks.

	8. Monitoring of technical condition of the equipment control system of power and low-voltage systems, lighting systems and lighting networks of buildings. 9. Performing preventive maintenance equipment power and low-voltage systems of buildings
Prerequisites	Physics, Informatics
Module forming Disciplines	Electrical and electromechanical equipment industry Installation and maintenance of electrical equipment
Module type (mandatory, optional)	Mandatory
Labor intensity (credits RoK/academic hours)	12 credits/360 hours
The duration of the module	3 semesters
Form of teaching	Full-time
Training technologies	modular
Form of educational process organization	Lecture, individual work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Control forms	Exam, test, course project
Required resources	<p>Workbench with vise; marking plate; center-punch; inclinometer; hammer; chisel; a set of files; a set of drills; the dressing plate; scissors for metal; hacksaw for metal; sets of taps and dies; a set of countersinks; Sharpener; drilling machine; lathe; welding machine; plastic pipe welding machine; various pipes, appropriate fittings and sanitary equipment, PPE, thematic posters, multimedia equipment, Internet resources and posters on occupational safety and health, fire safety and environmental protection, methodical literature.</p> <p>K.S. Demirchyan L.R. Neyman, N.V.Korovkin Theoretical principles of Electrotechnics. tutorial for high schools. 5 edition V. 2. — Spb.: Piter, 2004. – 512p.</p> <p>G.I.Atabekov Theoretical bases of electrical engineering. In 3 vol. - Tutorial for universities. -M.: Energy, 2008.</p> <p>R.M. Mustafina, A.D. Tastenov, G.M. Mustafina, D.B. Utegulova, O.Yu. Pakizh. Calculation of linear electric circuits of DC and single-phase sine wave</p>

	currents. Methodical recommendations for practical classes in TOE/ -Pavlodar, SIC PGU, 2006-98p.
Language of Training	Russian, Kazakh
Post-requisites	Automation of technological processes

Specification of Professional Module 6
“Maintenance of the intelligent building management system, including
“Smart House” communications”

Scope of competence	Maintenance of intellectual control system of buildings and structures
Module name	Maintenance of the intelligent building management system, including “Smart House” communications
The purpose of the module	After studying this module the trainee will be able to carry out maintenance of intellectual control system of the building, including communication "Smart Houses"
Level of professional qualification	4
Learning outcomes by module	<ol style="list-style-type: none"> 1. Diagnosis of intellectual building management systems 2. Skills maintenance of electrical and electronic equipment of intellectual building management systems 3. Skills maintenance other equipment of intellectual building management systems
Summary of content (sections, themes)	<ol style="list-style-type: none"> 1. Diagnosis of electrical system, ventilation, heating, water supply and ventilation. 2. Security Diagnostics, 3. Diagnosis of all life-support systems on Terminal intellectual building management systems 4. Accounting requirements for the installation of electric and electronic equipment. 5. Checking the charge and replace batteries in smoke detectors, carbon monoxide and other autonomous sensors 6. Checking the operation of the equipment, sensors, lamps, actuators 7. Cleaning air conditioners, testing their work in different modes 8. Replacement filters for water purification, air 9. Replacement of defective lamps, filters, sensors, timers, actuators, controllers and control panels
Prerequisites	Physics, Informatics
Module forming Disciplines	Theoretical bases of electrical engineering Equipment and technology for repair of domestic machines and devices Theory of automatic control

Module type (mandatory, optional)	Mandatory
Labor intensity (credits RoK/academic hours)	1 0 credits / 300 hours
The duration of the module	3 semesters
Form of teaching	Full-time
Training technologies	modular
Form of educational process organization	Lecture, individual work, practical lessons, labs, practice
Teaching methods	Oral interaction, testing, report, summary, creative task
Control forms	Test, exam, course project.
Required resources	<p>Workbench with vise; sharpener; drill; dielectric pad; the broom and scoop; stepladder (2 steps); a set of electrical panels; protection devices (circuit breakers, fuses, etc.); control devices (circuit-breakers, contactors, starters, etc.); cable support systems of various types; Shield distribution inter-floors; truck diagnostic closed; measuring instruments (multimeter, Tester megohmmeter, etc.); electrician tool kits: pliers, pliers, long nose pliers; device for insulation removing; crimping pliers; voltage Tester; Hammer; chisel; a set of files; Cordless rechargeable drill; networking drill; punch; groover; a bit set for the screwdriver; drill bits for metal; a set of drill bits for metal; Swivel chair; Allen wrench with interchangeable heads; Hacksaw for metal; bolt cutter; work pliers with a wire tray, 600 mm; clamp; control-measuring tools (Roulette, a metal ruler, a metal square, a bubble metal level gauge); personal protective equipment, thematic posters, multimedia equipment, Internet resources and posters on occupational health and safety, fire safety and environmental protection, methodical literature.</p> <p>S.P.Petrosov, S.N. Alekhin, Diagnosis and service of domestic machines and devices: tutorial for Students of education institutions, SPO, M.: Academy, 2003</p> <p>S.P. Petrosov, V.A.Smoljanichenko, Repair and maintenance of domestic machines and devices: tutorial for Students of education institutions of beginning vocation education, M.: Academy, 2003</p>

	<p>A.V.Polshkov, A.S. Shaburov Technical protection means. Lecture notes. -Perm: Published by Perm National Research polytechnic university 2013. — 249 p.</p> <p>Yu.D. Sibikin. Maintenance, repair of electrical equipment and networks, industrial enterprises, Academy, 2006.</p> <p>R.A. Kissarimov Adjustment of the electrical installation, Radiosoft 2007.</p> <p>I.M. Makarov, V.M. Lokhin. Intellectual automatic control systems M.: Phymathlit, 2001. – 576p.</p> <p>A.N. Starikov, S.I. Roschina, A.V. Vlassov “Smart House”: guidelines for students of qualification improvement courses, Vladimir State University named after Alexander Grigoryevich and Nikolay Grigoryevich Stoletovs. -Vladimir: Published by VISU, 2014</p>
Language of Training	Russian, Kazakh
Post-requisites	<p>Fundamentals of computer science and automation</p> <p>Fundamentals of electronics and microelectronics</p> <p>Fundamentals of metrology and Wed international environmental governance process control</p> <p>Automation of technological processes</p>

PLAN OF THE EDUCATIONAL PROCESS

Code and the education profile: 140000 - Construction and utilities
 Specialty: 1401000 - Construction and operation of buildings and structures
 Qualification: 1401333- Technician for intellectual building management systems

Form of training: Full-time
 Standard term of training: 3 years 10 months
 on the basis of the basic secondary education

Code module	The name cycles disciplines/modules, practices	Credits	Exam	Differential pass fail exam	The amount of training time (watches)				Distribution of semester	
					TOTAL	From them:				
						Theoretical training	Practical training *	Industrial training		Individual training
GED	General discipline	48		+	1448	1448				1-4
BM	Basic modules	30		+	900	480	-	360	60	3-8
BM 1	The use of professional vocabulary and the preparation of business papers in the field of professional activity	6	+	+	180	90		60	30	3-8
BM 2	Development and improvement of physical qualities	6	+	+	180	-	-	180	-	3-8

BM 3	Application of basic knowledge of economics in professional activities	3		+	90	60		30		3-8
BM 4	Understanding the history, role and place of Kazakhstan in the world community	3	+	+	90	90	-	-	-	3-8
BM 5	Application of the basics of philosophical knowledge, social sciences for socialization and adaptation in society and the work	6		+	180	150	-	30	-	3-8
BM 6	Occupational safety and prevention of accidents	4		+	120	60	-	30	30	3-8
BM 7	Using the laws of physics and the use of information technology in professional activities	2		+	60	30		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	Development of design and technological documentation	14	+	+	420	60	180	60	30	3-8
PM 2	Performance of basic metalwork and fitting and assembly work	18	+	+	540	180	300	120	30	3-8
PM 3	Welding and bonding pipes with various plastic shaped parts	16	+	+	480	120	240	90	30	3-8
PM	Professional Qualification Modules of Midlevel Specialist	35			1050	330	420	210	90	
PM 4	Installation, maintenance and repair of engineering systems of buildings, including communications of Smart Houses	13	+	+	390	120	180	90	30	3-8
PM 5	Installation, maintenance and repair of power and low-current systems, including communications of Smart Houses	12	+	+	360	120	120	60	30	3-8

PM 6	Maintenance of the intelligent building management system, including “Smart House” communications	10	+	+	300	90	120	60	30	3-8
	Subtotal:	161			4838	2618	1140	840	240	
UP	Prediploma practice	10			300		300			8
IC 1	Graduation project	9			270	180			90	8
FC 2	Intermediate certification	10			300	300				1-8
GC 01	Final certification	2			60	60				8
	Total compulsory education				5768	3158	1440	840	330	
C	Consultation	13			400	400				1-8
O	Optional classes	14			420	420				1-8
	Total:	219			6588	3978	1440	840	330	

Note:

* Control forms (number of coursework, examinations), study subjects (semester distribution) are approximate and may vary depending on the forms of training, the specificities of local specialties and other circumstances in accordance with the needs of employers.

* In accordance with GCEA, TVE educational institutions can modify up to 50% of the training time for mastering training material for modules, up to 50% on each module and up to 60% (up to 80% with dual training) of training and professional practice with preserving the total hours on compulsory education.