

NON-PROFIT JOINT STOCK COMPANY  
«"ALMATY UNIVERSITY OF POWER ENGINEERING AND  
TELECOMMUNICATIONS NAMED AFTER GUMARBЕК DAUKEEV»  
Institute of Energy and Green Technologies



«Agreed»  
Managing Director  
Technical Issues JSC  
«Alatau-Zharyk Company»  
Adilbekov N.K.  
2025y.



«Approving»  
Rector of AUPET

Nygyrictov G.S.  
2025y.

**MODULAR EDUCATIONAL PROGRAM**  
**"6B07101 - Electrical Engineering"**  
**HIGHER EDUCATION**

**Field of education (according to the classifier dated 13.10.2018):** 6B07 Engineering, manufacturing, and construction industries

**Specializing direction (according to the classifier dated 13.10.2018):** 6B071 Engineering and Engineering Science, **Group of educational programs - B062** Electrical Engineering and Power Engineering

**Duration of study 4 years**

**Academic degree awarded** – Bachelor of Engineering and Technology in the educational program "6B07101 Electrical Engineering"

**Qualification level according to the National Qualifications Framework:** Level 6.

Almaty 2025

Training trajectories (specializations):

- Electric stations
- Electrical networks and systems
- Electricity supply and energy conservation for infrastructure facilities
- Relay protection and emergency automation
- Digital-controlled electromechanical converters
- Smart Grid Design
- Renewable energy sources

The educational program 6B07101 "Electrical Engineering" was developed on the basis of: The National Qualifications Framework, Approved by the protocol of March 16, 2016 by the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations; the Sectoral Qualifications Framework in the field of "Electric Power Industry", (Approved by the protocol of March 16, 2016 by the Republican Tripartite Commission on Social Partnership and Regulation social and Labor Relations), the Sectoral Qualifications Framework "Energy" and draft professional standards; The State Mandatory Standard of Higher Education, Approved by the Government of the Republic of Kazakhstan dated 08/23/2012 No. 1080 (On approval of the State mandatory standards of Higher and Postgraduate Education, Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No. 2. Registered in Ministry of Justice of the Republic of Kazakhstan No. 28916 on July 27, 2022. In accordance with subparagraph 5-1) of Article 5 of the Law of the Republic of Kazakhstan "On Education", paragraph 1 of Article 27 and Article 36 of the Law of the Republic of Kazakhstan "On Legal Acts", Decree of the President of the Republic of Kazakhstan No. 917 dated June 11, 2022 "On Measures to Further Improve the System of Public Administration in the Republic of Kazakhstan", I ORDER:1. To approve: 1) State mandatory standard of higher education according to Annex 1 to this order; 2) State mandatory standard of postgraduate education according to Annex 2 to this order.

The educational program 6B07101 "Electrical Engineering" was developed at the Department of Power Supply and Renewable Energy Sources.

Head of the educational program  Bashkirov M.V.

The development of the educational program was attended by: Managing Director for Technical Affairs of Alatau Zharyk Kompaniys A.K. Adilbekov

Head of the Department EPE  Uteshkalieva L.Sh.

Head of the Department PSED  Shynybay Zh.S.

Head of the Department ESRS  Tergemes K.T.

The educational program 6B07101 "Electrical Engineering" was reviewed and approved at a meeting of the educational and methodological commission of the Institute of Energy and Green Technologies (Minutes No. 7 dated May 8, 2025).

Director of IEGT

 Amitov E.T.

The educational program 6B07101 "Electrical Engineering" was reviewed and approved by the Academic Council of AUPET named after Gumarbek Daukeev (Minutes No. 11 dated May 23, 2005).

### **List of designations and abbreviations**

HE	- Higher education
SMSE	- The State mandatory standard of education
EQF	- The European Qualification Framework
NCO	- National classification of occupations
RK	-Republic of Kazakhstan
NQF	- National Qualifications framework
NQS	- National qualifications system
GEM	- General educational module
EP	- Educational program
GED	General educational disciplines
RC	Required component
UC	The university component
BD	Basic disciplines
PD	Profile disciplines
IET	Individual educational trajectory
IQF	Industry qualifications framework
PS	Professional standard
PGE	Postgraduate education
LO	Learning outcome
CP	Course paper
CGW	Calculation and graphic work
SRW	Students' research work
CES	Catalog of elective subjects

## 1. Passport of the educational program

№	Field name	Note
1	Registration number	6B07100057
2	Code and classification of the field of education	6B07 Engineering, manufacturing, and construction industries
3	The code and classification of training areas	6B071 Engineering and Engineering
4	Group of educational programs	B062 Electrical engineering and power engineering
5	Name of the educational program	6B07101 Electrical engineering
6	Type of EP	Current EP;
7	Goal EP	Training highly qualified personnel for the domestic and global electric power industry, who possess innovative, theoretical, and practical knowledge, skills, and abilities to apply digital technologies for optimizing and managing electric networks.
8	ISCE Level	МСКО 6 Бакалавриат или его эквивалент
9	The NQF level	6
10	IQF level	6
11	Distinctive features of the EP	No
	Partner University (JEP)	No
	Partner University (two-degree educational program)	NorthChina Electric Power University, NCEPU.
	Миссия	Training highly qualified personnel for the domestic and global electric power industry, who possess innovative, theoretical, and practical knowledge, skills, and abilities to apply digital technologies for optimizing and managing electric network
12	List of competencies	LO-1 Capable of analyzing modern computer, information technologies, digital equipment and software in the electric power industry, SCADA systems, demonstrates skills in computer networks. Estimates the methods and algorithms of artificial intelligence used to find the best solutions in various optimization tasks, analysis of big data (Big Data).
13	Learning outcomes	LO -2. To be familiar with the design of power plants, electrical networks, relay protection of electrical networks and power supply systems for enterprises and lighting systems for indoor and outdoor lighting. To be able to analyze normal and abnormal modes and determine possible execution options and parameters for digital relay protection and automation. ON-3. He is able to determine the effective production and technological modes of operation of heat and power engineering facilities, and

	<p>make decisions in the field of energy and resource conservation. He applies practical skills in saving energy resources and improving energy efficiency, as well as engineering methods for calculating energy units and systems that provide the most efficient methods for producing and using energy.</p> <p>LO -4. Calculate the parameters, characteristics, and selection of electric machines, digital automated electric drive systems, and electrical switching devices. Know the basics of chemistry and the features of modern electrical materials. Have the skills to work with high-voltage equipment.</p> <p>LO -5. It is necessary to correctly calculate and select means of electrical measurements, automatic control systems, characteristics of electronic devices, basic and backup types of protection for high- and ultra-high-voltage power lines, based on complex relay protection and automation devices of microprocessor complexes.</p> <p>LO -6. Demonstrate and apply basic mathematical, physical, and other scientific knowledge, as well as the theoretical foundations of electrical engineering, electrical circuits, and the electromagnetic field, in an interdisciplinary context to solve electrical engineering problems</p> <p>LO -7 To have basic knowledge of legal and ethical norms and be able to use them in professional activities. To be able to independently develop and implement promising areas of intellectual, cultural, physical, and professional self-development and self-improvement. To provide scientific evidence of objective knowledge about the history of Kazakhstan. To be able to apply the principles of sustainable development and anti-corruption culture, social justice, inclusion, and environmental responsibility.</p> <p>LO -8. He is capable of independently installing, repairing, adjusting, testing, and operating electrical equipment at power plants, power grids, and power supply systems of all types of enterprises, as well as diagnosing the electromechanical systems of digitally controlled semiconductor energy converters, digital relay protection terminals.</p> <p>LO -9. To have the basics of social, language and economic knowledge.</p> <p>To have the skills of setting goals and objectives, describing research methods, creating and editing</p>
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		<p>reports and presentations. To have the skills of setting goals and objectives, describing research methods, creating and editing reports and presentations, rules of safety, labor protection and ecology. To demonstrate the ability to apply norms and rules of industrial and environmental safety, industrial sanitation, fire safety and labor protection</p> <p>LO -10. Will be able to participate in the development and design of elements of electrical installations of power plants and energy complexes based on renewable energy sources. Apply systems for monitoring wind energy and solar radiation. Capable of conducting financial and economic planning and management of renewable energy projects</p> <p>LO -11. Capable of developing a concept for the modernization of energy systems by integrating electrical and information technologies, from production, transmission, and distribution to consumption. Applies tools for digital modeling of distribution networks and the principles of device interaction in the Smart Grid</p>
14	The form of education	Daytime, remote.
15	Language of instruction	Russian, Kazakh, English
16	Volume of loans	240
17	Academic degree awarded	Bachelor of Engineering and Technology
18	Availability of an application for a training license	No. KZ80LAA00018161 dated 05 May 2020
19	Availability of accreditation EP	There are
	Name of the accreditation body	Independent Agency for accreditation and Rating, IAAR, ASIIN
	Validity period of accreditation	IAAR 05.04.2024-04.04.2029, ASIIN 22.03.2024-30.09.2029
20	Information about disciplines	Information about disciplines UC/CC EGD, PD, PD. Appendix 1.1
21	The field of professional activity	The field of science and technology that includes a set of technologies, means, methods, and techniques of human activity aimed at creating conditions for the production, transmission, distribution, and consumption of electricity.
22	Types of professional activity	<ul style="list-style-type: none"> <li>- production and technological;</li> <li>- service and operational;</li> <li>- organizational and managerial;</li> <li>- installation and commissioning;</li> <li>- design and calculation;</li> </ul>
23	Modular curriculum	

PC--20	<b>Capable</b> of building industrial SCADA systems,	32
<b>Professional competencies in specialization</b>		
<b>Electromechanical converters with digital control</b>		
PC--21	<b>The ability</b> to analyze the parameters and requirements of power sources, as well as the characteristics of the load, as the basis for the technical specifications for the design of electric drives and their digital components	70, 71, 72, 73
PC--22	<b>The ability</b> to carry out information preparation for solving project tasks, search for and systematization of technical and economic indicators of existing technical solutions, and their preliminary analysis	70, 71, 72, 73
PC--23	<b>Readiness</b> to compile technical documentation and established reports in accordance with approved forms	70, 71, 72, 73
PC--24	<b>Capable</b> of building industrial SCADA systems,	32
<b>Track (specialization) Renewable Energy Sources</b>		
PC-25	<b>Assess</b> the energy efficiency of technological equipment and production facilities, plan energy-saving measures, and evaluate their economic efficiency;	74, 75, 76, 77
PC-26	<b>Analyze</b> the energy efficiency of equipment and technological installations and production facilities, and plan energy-saving measures; demonstrate knowledge of methods for assessing the efficiency of using renewable energy sources	74, 75, 76, 77
<b>Production practice</b>		
PC-26	<b>Knowledge</b> of the basics of electrical engineering; the principles of operation of electric motors and generators of direct and alternating current, transformers, equipment for distribution devices, and electrical appliances; <b>Knowledge</b> of methods for splicing and soldering low-voltage wires, charging, and installing lighting fixtures (normal and dust-proof with incandescent lamps), as well as electric bells and other signaling devices;	18,34
PC-27	<b>Mastering</b> innovative technologies and advanced methods of work and production; <b>Gaining</b> organizational and professional experience; acquiring teamwork skills and competencies in corporate management principles;	10,11,57, 66,77

## 2. Matrix of correlation of learning outcomes for the educational program 6B07101 – Electric Power Engineering with the formed competencies

№	Название дисциплины	LO1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11
	<b>Required component GES(RC)</b>											
1	The history of Kazakhstan							v				
2	Philosophy							v				
3	Physical education							v				
4	Kazakh (Russian) Language 1									v		
5	Kazakh (Russian) Language 2									v		
6	Foreign language1									v		
7	Foreign language 2									v		
8	Information and communication technologies	v										
9	Module of socio-political knowledge (cultural studies, psychology)							v				
	Module of socio-political knowledge (sociology, political science)							v				
	<b>EGD (UC)</b>											
10	Module of the University Component of the (GED) (Economics, Law, Entrepreneurship, and Financial Literacy)									v		
	<b>RC (BD)</b>											
11	Sustainable Development: Ethics, Inclusion, and Safety									v		
	<b>BD(UC)</b>											
12	Fundamentals of scientific research and academic writing									v		
13	Differential and Integral Calculus I						v					
14	Linear algebra						v					
15	Differential and Integral Calculus II						v					
16	Physics I						v					
17	Physics II						v					
18	Safety measures in power plants									v		
19	Probability Theory and Elements of Mathematical Statistics						v					
20	Electrical engineering materials and products				v							
21	Artificial intelligence	v										
22	The basics of Big Data	v										

	<b>BD(UC)</b>											
23	Theoretical foundations of electrical engineering (1)						v					
24	Theoretical foundations of electrical engineering (2)						v					
25	Electric machines				v							
26	Electric stations		v									
27	Electrical networks and systems		v									
28	High voltage technology					v						
29	Fundamentals of Relay Protection of Electric Power Systems					v						
30	Power supply		v									
	<b>PD (UC)</b>											
31	Electric power storage devices										v	
32	Fundamentals of Building SCADA Systems in the Electric Power Industry	v										
33	Fundamentals of microprocessor technology	v										
34	Basics of electrical installation								v			
	<b>BD (CC)</b>											
35	Chemistry				v							
36	Introduction to the specialty						v					
	<b>BD(UC)</b>											
37	Differential equations						v					
	<b>BD (UC)</b>											
38	Electrical devices and measuring equipment				v							
	<b>BD (CC)</b>											
39	Thermal power plants			v								
40	Heat supply bases			v								
41	Майнор 1											
	<b>BD (CC)</b>											
42	Theory of automatic control						v					
43	Analysis of electrical circuits and electromagnetic field							v				
44	Майнор 2											
	<b>BD (CC)</b>											



64	Design of relay protection of electrical networks		v									
65	Installation, adjustment, and operation of relay protection equipment								v			
<b>Track (specialization) Smart Grid Design</b>												
66	Energy supply and energy efficiency of smart energy systems											v
67	Digital modeling of distribution networks											v
68	Automated systems for monitoring and accounting of electricity;											v
69	The general information model of CIM											v
<b>Trajectory (specialization) Digital-controlled electromechanical converters</b>												
70	Elements of an automated electric drive					v						
71	Design of relay protection of electrical networks					v						
72	Digital control systems for electric drives					v						
73	emiconductor Converter Devices in Electric Drive					v						
<b>Track (specialization) Renewable Energy Sources</b>												
74	Renewable energy equipment and technologies											v
75	Integration and operation of renewable energy systems											v
76	Design of renewable energy systems											v
77	Clean Energy Project Management											v
	<b>BD(UC)</b>											
78	Work placement internship									v		
	<b>PD(UC))</b>											
79	Pre-graduation internship		v									