Ministry of Agriculture of the Republic of Kazakhstan
NCJSC «Kazakh Agrotechnical Research University named after S. Seifullin»

APPROVE
Chairman of the Board - Rector
NCJSC «Kazakh Agrotechnical
Research University
named after S.Seifullin»

_____ Tireuov K.M.

Protocol No 16, «28» 06 2024 y.

EDUCATIONAL PROGRAM
«6B07107 Heat gas supply, ventilation and environmental engineering in agriculture»

The code and classification of the field of education
6B07 Engineering, Manufacturing and Civil engineering
The code and classification of the training areas
6B071 Engineering and engineering trades
Code in the International standard classification of education:
0710
Degree/qualification awarded:
Bachelor of Engineering and Technology in the educational program «6B07107 Heat gas supply, ventilation and environmental engineering in agriculture»

Astana 2024

Academic Committee:

№	S.N.M.	Academic degree, academic title	Post	Place of work	Signature
1	Isenov S.S.	Candidate of Technical Sciences, Associate Professor	Dean of the Faculty of Energy	NCJSC "KATRU named after S.Seifullin"	
2	Mergalimova A.K.	PhD, Associate Professor	Head of the Department of Thermal Power Engineering	NCJSC "KATRU named after S.Seifullin"	
3	Anuarbekov M.A.	Master of Engineering Sciences	Senior Lecturer of the Department of Thermal Power Engineering	NCJSC "KATRU named after S.Seifullin"	
4	Isataeva A.K.	Master of Engineering Sciences	Advisor of the Department of Thermal Power Engineering	NCJSC "KATRU named after S.Seifullin"	

Agreed with representatives of employers:

№	S.N.M.	Post	Place of work	Signature, seal
1	Dautkanov M.D.	Director	«Qyzmet-Service 01» LLP	

The Academic Committee was approved by the order of the Chairman of the Board-Rector of NCJSC " KATRU named after S.Seifullin"

No 374-Н from " 18 " 10 2023 y.

Educational program: 6B07107 Heat gas supply, ventilation and environmental engineering in agriculture

Reviewed on:

at the meeting of the Department of Thermal Power Engineering

Protocol No. 11 from " 18 " 06 2024 y.

at the meeting of the Faculty Council on Academic Quality

Protocol No. 16 from " 21 " 06 2024 y.

at the meeting of the Academic Council of the University

Protocol No. 10 from " 24 " 06 2024 y.

Date of EP passport updating «2» august 2024 y.

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1 Passport of the educational program

1.1 The purpose of the educational program

Creating conditions for students that ensure the development of personal qualities and the formation of the necessary set of competencies for professional activity, training a specialist capable of performing functional duties of designing, installing and operating buildings and structures, heat and gas supply and ventilation systems, as well as, in accordance with the requirements of employers and based on the needs of the labor market.

The objectives of the educational program are to solve practical problems related to heat supply and ventilation, gas supply of industrial, agricultural production and rural settlements, to provide energy-saving technology in agriculture, to develop and correctly issue technical documentation in the field of heat supply and ventilation, gas supply of agriculture, to determine the economic efficiency of technical solutions, to professionally solve environmental issues and environmental protection Wednesday.

The formed educational outcomes

ON1 To be able to use knowledge of the general principles, structure and functioning of heat and gas supply systems in the calculation, design, experimental and research activities.

ON2 To know professional competencies in solving practical problems in the field of operational, production and technological, installation and repair activities in heat and gas supply, as well as the influence of the water chemistry regime on the performance of heat networks.

ON3 Be able to apply information and communication technologies in professional activities, application software for designing, modeling, optimizing thermal power facilities.

ON4 To know the culture of thinking, be able to analyze and interpret information, develop ideas and critical arguments, practice skills to improve performance and physical stability. Be able to communicate effectively orally and in writing, including in a foreign language, in a professional environment and society, be prepared for effective and stress-resistant work in a team.

ON5 To possess theoretical and practical knowledge for solving educational, practical and professional problems in heat and gas supply and ventilation; know the basics and methods of scientific research and academic writing and apply them in the field of study; understand the implications of the principles and culture of academic integrity.

ON6 To know the basics of heat engineering, fluid and gas mechanics, heat engineering measurements, structural materials for solving engineering problems in the professional field.

ON7 To be able to form competencies in the field of economics and law, the foundations of an anti-corruption culture, ecology and life safety, as well as entrepreneurial skills, leadership and receptivity to innovation in solving professional problems.

ON8 To possess basic mathematical, natural science knowledge in an interdisciplinary context for solving heat and electrical problems.

ON9 To possess knowledge of environmental laws in complex engineering activities for the production and distribution of energy, where it is necessary to use: new efficient energy and resource-saving technologies at energy enterprises, renewable energy sources in thermal power engineering.

Compliance with the professional standards of the Republic of Kazakhstan:

1. Professional standard. «Operation of heat supply systems», Appendix No. 22 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated 26.12.2019 No. 262

2. Professional standard. «Adjustment of heat supply systems», Appendix No. 19 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated 26.12.2019 No. 262

Compliance with the OP atlas of new professions:
1. Aerohydrodynamics of wind and hydraulic turbines;
2. Meteorological power engineer;
3. Generating device mechanic.

2 General characteristics of the educational program (relevance, features, competitive advantages, uniqueness, stakeholders, etc.)

Currently, in accordance with a number of state programs for the development of agriculture, the preparation of a bachelor of engineering and technology in OP **6B07107 – "Heat gas supply, ventilation and environmental engineering in agriculture"** is very relevant, capable of fulfilling the functional responsibilities of designing, installing and operating buildings and structures, heat and gas supply and ventilation systems. At the same time, due to the high energy costs and technological backwardness of this industry, it is very important to train modern highly qualified personnel to carry out professional activities in accordance with the requirements of employers and based on the needs of the labor market.

The modular educational program has been developed in accordance with the National Qualifications Framework, coordinated with the Dublin Descriptors and the European Qualifications Framework.

This educational program consists of 3 cycles: 1) General education disciplines - OOD; Basic disciplines-DB; Core disciplines -PD. The educational program is developed on the basis of a modular system, and consists of 16 modules that form general cultural and professional competencies. During the entire course of study, the student will accumulate 213 credits of theoretical and 19 credits of practical training (educational practice - 1, industrial practice - 8, pre-graduation practice - 10), 8 credits for final certification.

The subjects of the bachelor's professional activity in the educational program **6B07107 – "Heat gas supply, ventilation and environmental engineering in agriculture"** are:

- maintenance, repair of heat and gas supply and ventilation systems, heating systems;
- maintenance and repair of small industrial and heating boilers in agriculture;
- installation and operation of the gas supply system for industrial and agricultural enterprises;
- installation and operation of centralized and autonomous heat supply for industrial enterprises and organizations;
- maintenance and repair of installations for the production and distribution of energy carriers in public and industrial buildings and structures;
- maintenance, repair of heating and heating networks;
- construction industry;
- participation in the design of heat and gas supply and ventilation systems, heating systems.

3 Competence model (portrait) graduate

3.1 Areas of professional activity

The field of professional activity of a bachelor is something without which life in a modern city or village is unthinkable - thermal and gas networks, as well as various ventilation and air conditioning systems. To successfully solve these problems, specialists are being trained who will have fundamental knowledge in the field of hydraulics, thermodynamics, heat transfer, heating, ventilation, gas supply and air conditioning, etc.

3.2 Types of professional activity

The types of professional activity of the graduate are:

- systems of heat and gas supply, ventilation, air conditioning and air purification from industrial pollution of industrial facilities and agricultural sectors;
- heat and gas supply systems for industrial enterprises;
- heat and gas supply systems for autonomous facilities;
- design of heat and gas supply, ventilation, air conditioning and air purification systems for residential, public and industrial buildings and structures;
- energy installations and complexes based on non-traditional and renewable energy sources;
- technological installations for the production, distribution and use of heat;
- installations for the production of compressed and liquefied gases, compressor, refrigeration and cryogenic installations, installations of air conditioning systems, heat pumps;
- auxiliary heat engineering equipment, heat and mass transfer devices for various purposes;
- heating networks;
- installation of air conditioning of heat carriers and working bodies;
- technological installations for the preparation and use of water for heating networks and consumers of heating;
- recycling water supply systems;
- real estate objects, land plots, urban areas, transport infrastructure facilities;
- objects of urban infrastructure and housing and communal services;
- machinery, equipment, technological complexes and automation systems used in the construction, operation, maintenance, repair and reconstruction of construction facilities and housing and communal services, as well as in the production of building materials, products and structures.
- construction industry;
- systems of automatic control and management of thermal technological processes, installations, systems and complexes;
- regulatory and technical documentation and standardization systems, methods and means of testing equipment and quality control of manufactured products.

3.3 General education competencies

1) aimed at forming the ideological, civic and moral positions of a future specialist, competitive on the basis of knowledge of information and communication technologies, building communication programs in the state, Russian and foreign languages, focusing on a healthy lifestyle, self-improvement and professional success;

2) form a system of general competencies that ensure the socio-cultural development of the personality of a future specialist based on the formation of his ideological, civic and moral positions;

3) develop the ability to interpersonal social and professional communication in the state, Russian and foreign languages;

4) contribute to the development of information literacy through the mastery and use of modern information and communication technologies in all areas of their lives and activities;

5) Form lifelong self-development and education skills;

6) form a personality capable of mobility in the modern world, critical thinking and physical self-improvement. The student should know the methods of scientific research and academic writing and apply them in the field of study.

3.4 Basic competencies

1) to evaluate the surrounding reality on the basis of worldview positions formed by knowledge of the fundamentals of philosophy, which provide scientific understanding and study of the natural and social world by methods of scientific and philosophical cognition;

2) interpret the content and specific features of the mythological, religious and scientific worldview;

3) to argue your own assessment of everything that is happening in the social and industrial spheres;

4) to show a civic position based on a deep understanding and scientific analysis of the main stages, patterns and peculiarities of the historical development of Kazakhstan;

5) to use methods and techniques of historical description to analyze the causes and consequences of events in the modern history of Kazakhstan;

6) to assess situations in various fields of interpersonal, social and professional communication, taking into account basic knowledge of sociology, political science, cultural studies and psychology;

7) synthesize knowledge of these sciences as a modern product of integrative processes;

8) to use scientific methods and techniques of research of a specific science, as well as the entire socio-political cluster;

9) to develop their own moral and civic position;

10) to operate with the social, business, cultural, legal and ethical norms of the Kazakh society;

11) demonstrate personal and professional competitiveness;

12) to put into practice knowledge in the field of social sciences and humanities, which is internationally recognized;

13) to make the choice of methodology and analysis;

14) summarize the results of the study;

15) synthesize new knowledge and present it in the form of humanitarian socially significant products;

16) to engage in communication in oral and written forms in Kazakh, Russian and foreign languages to solve the problems of interpersonal, intercultural and industrial (professional) communication;

17) to use language and speech tools based on a system of grammatical knowledge; to analyze information in accordance with the communication situation;

18) evaluate the actions and actions of the communication participants.

19) to use various types of information and communication technologies in personal activities: Internet resources, cloud and mobile services for the search, storage, processing, protection and dissemination of information;

20) to build a personal educational trajectory throughout life for self-development and career growth, to focus on a healthy lifestyle to ensure full-fledged social and professional activities through methods and means of physical culture.

3.5 Professional competencies

1. be able to independently solve issues related to:

- collection, analysis and interpretation of information (instrumental competence);
- development of ideas and critical argumentation (interpersonal competence);

- self-motivation and self-management (systemic competence)

2. be capable of effective use in various situations:

- their skills (instrumental competence);

- their emotional understanding (interpersonal competence);

- the ability to think and work flexibly, adapting to new changing circumstances (instrumental and interpersonal competence).

3. be able to:

- formulate and solve the problems of heat transfer in all elements of the building (instrumental, subject-specific competencies);

- use information technology in the design and construction of energy, heat engineering, gas technology equipment, networks and systems; reasonably select indoor microclimate parameters and other initial data for the design and calculation of heating, ventilation and air conditioning systems, heat and gas supply (instrumental, subject-specific competence);

- to find a compromise between different requirements (for cost, quality, safety and deadlines), both in long-term and short-term planning (interpersonal competencies);

4. have an idea:

- about spiritual values and their meaning (systemic competence);

- about the consequences of their professional activities (instrumental competence);

- on the organizational basis of measures to eliminate the consequences of accidents, catastrophes, natural disasters and other emergency situations (system competence);

5. to know and understand:

- fundamentals of the legislation of the Republic of Kazakhstan in the field of energy saving, legal moral and ethical standards in the field of professional activity (instrumental competence);

- concepts defining the thermal, air and humidity conditions of a building, including climatological and microclimatic terminology (systemic and subject-specific competencies);

- laws of heat, moisture, and air transfer in materials, structures, and elements of building systems and quantities that determine thermal and humidity processes (instrumental and subject-specific competencies);

- principles of operation, technical characteristics and design features of the installations and systems of heat and gas supply, ventilation and eco-engineering being developed and used; standards of thermal protection of external fences, normalization of parameters of the external and internal environment of the building (instrumental and subject-specific competencies);

- methods of theoretical and experimental research in the field of heat and gas supply, ventilation and eco-engineering;

- principles of design and reconstruction of indoor microclimate systems; fundamentals of construction, installation and operation of devices and systems of heat and gas supply, ventilation and eco-engineering (subject-specific competence);

- requirements for standardization, metrological support and life safety in the development and operation of devices and systems for heat and gas supply, ventilation and eco-engineering (system and subject-specific competencies);

- methods and tools for modeling and optimizing heat and gas supply, ventilation and eco-engineering (subject-specific competence);

- basic marketing and management methods in the field of heat and gas supply, ventilation and eco-engineering (subject-specific competence);

- rules and regulations for the design, construction, installation and operation of heat and gas supply, ventilation and eco-engineering (subject-specific competence);

6. own:

- verification calculation of the protective properties of external fences;

- to calculate the installation thermal power of heating and ventilation systems of buildings for various purposes;

- conduct a verification calculation of the thermal power of heat and gas supply systems for buildings of various purposes.

- methods of calculating heat consumption by various consumers of an industrial area (subject-specific competence);

- methods for calculating the hydraulic resistances of thermal networks (subject-specific competence);

- methods of designing, calculating and regulating energy production and distribution systems (subject-specific competence);

- methods of organizing installation, commissioning and repair work of thermal technology equipment and fuel and water supply systems (subject-specific competence).

4 The base of passing professional practices

Students are sent to an industrial, pre-graduate internship according to an agreement with enterprises that are the base of practice (or individual agreements or collective agreements) in accordance with the rector's order to conduct an internship. S.Seifullin KATU appoints practice supervisors for each student.

Students of this profile undergo practical training at enterprises of the fuel and energy complex: - thermal power plants (CHP), condensing power plants (KES), low-power boilers, heating networks; at any industries and enterprises where there is heat and gas supply, ventilation and air conditioning and corresponding equipment. They practice at: Astana Teplotransit JSC, Astana Energia JSC, GKP at the Kyzylordateploelectrocenter PCV, GKP at the Ozen Zhylu PCV, Ozen, Semey GKP Teplokommunenergo, Aktau, GKP Kaspiy Zhylu, Su Arnasy, Aktobe, JSC Transenergo, BAZIS-A Corporation; construction companies: BI-Group, BIG A, AIBYN Construction Group, Orda Invest, Nur Astana Kurylys, etc.

5 The structure of the educational program

№	Name of cycles and disciplines	Total labor intensity	
		in academic hours	in academic credits
1	2	3	4
1	**General education subjects (GER)**	**1680**	**56**
1.1	**Core subjects (CS)**	**1530**	**51**
	History of Kazakhstan	150	5
	Philosophy	150	5
	Foreign language	300	10
	Kazakh (russian) language	300	10
	Information and communication technologies	150	5
	Cultural studies and psychology	120	4
	Political science and sociology	120	4
	Physical education.	240	8
1.2	**University component(UC)**	**150**	**5**
	Basics of economics and law	150	5
2	**Base requirements(BS)**	**3480**	**116**
2.1	**University component(UC)**	**2070**	**69**
	Mechanics of liquid and gas	150	5
	Mathematics 1,2	270	9
	Physics	120	4
	Theoretical basis of heat engineering	180	6
	Professional Kazakh (Russian) language	90	3
	Professionally-oriented Foreign Language	90	3
	Mechanics	120	4
	Electrical engineering and electronics	120	4
	Measuring of Heat engineering	150	5
	Materials science in heat engineering	120	4
	Basics of the scientific researches	150	5
	Engineering and computer graphics	120	4
	Educational practice	30	1
	Internship	240	8
	Pre diploma practice	300	10
2.2	**Electives(ES)**	**1410**	**47**
	Professionally oriented English	90	3
	Artificial intelligence basics		
	Basics of financial literacy	90	3
	Basics of anti-corruption culture		
	Heat transfer in enclosing structures	150	5
	Warm mass-transfer		
	Computer technologies are in calculations	150	5
	Digital competencies in professional activities (Minor)		
	Corrosion and conservation of energy equipment	150	5
	Engineering systems of buildings and structures		

	Technological bases of preparation of the water and fuel at thermal power plants and industrial enterprises	150	5
	Physical and chemical methods of preparation of water		
	Special Issues of Fuel Combustion	180	6
	Fuel and combustion theory		
	Ventilation and air conditioning systems	150	5
	Design of ventilation and air conditioning systems		
	Alternative renewable energy sources	150	5
	Heat pump installations		
	Energy saving and energy efficiency in heat power engineering and heat technology	150	5
	Energy efficiency and energy audit of energy enterprises		
3	**Profession requirements(AS)**	**1800**	**60**
3.1	**University component(UC)**	**660**	**22**
	Heat generating plants	180	6
	Pumps, fans and compressors in systems of heat gas supply and ventilation	150	5
	Safety in power plants	150	5
	Heat networks and heat supply systems	180	6
3.2	**Electives(ES)**	**1140**	**38**
	Gas supply networks	150	5
	Heat and gas supply in rural areas		
	Superchargers and heat engines	180	6
	Steam and gas turbines		
	Calculation of efficiency in thermal power engineering	150	5
	Multimedia technologies (Minor)		
	Thermal power systems and energy use	180	6
	Theoretical foundations of thermal power plants		
	Environmental technologies in fuel combustion	180	6
	Implementation of technological processes and environmental technologies at thermal power plants		
	Operation and adjustment of heat supply and ventilation systems	150	5
	Autonomous heat supply		
	Building energy efficiency	150	5
	Energy audit of heat supply systems		
4	**Additional courses**		
4.1	Elective component (military training and other types of educational activities determined by the student himself)		
5	**Module of final certification (MoFC)**	**240**	**8**
5.1	Writing and defending a thesis (project) or preparing and passing a comprehensive exam	240	8
	Total	**7200**	**240**

6. Working curriculum (for the entire period of study)

The Ministry of Agriculture of the Republic of Kazakhstan
NC JSC "S.Seifullin Kazakh Agrotechnical Research University"

Considered at the meeting
of Academic Council
of the University
Protocol № 9
"28" 05 2024 y.

APPROVED
Member of the Board
Vice-Rector for Academic Affairs
NC JSC "KATIU"
_____ Abilheva R.D.
"___" _____ 20___ y.

CURRICULUM
for 2024-2028 academic year
For the modular education program "Heat gas supply, ventilation and environmental engineering in agriculture"
by the speciality/group of educational programmes B062 – Electrical and power engineering
Degree: Bachelor
Form of education: Full-time (bachelor 4 years) semester
Entry year: 01-09-2024

	Module code	Module name	Discipline cycle	Discipline component	Code of subject	Subject name	Academic credits	Academic study period	Control in the academic period			Number of hours								Distribution of credits per academic period							
													Classroom work						Independent work of		1 course		2 course		3 course		4 course	
																					1	2	3	4	5	6	7	8
																					Number of weeks in the academic period							
									Exams	Differentiated test	Term paper/project	Total	Lectures	Laboratory trainings	Practice	Studio lessons	Practice	Independent work of students	Independent work of students with the teacher		15	15	15	15	15	15	15	15
						General modules																						
1			GER	CS	IYa 1102	Foreign language	5	1	1			5/150			45			20	85	5.0									
2			GER	CS	KRYa 1101	Kazakh (russian) language	5	1	1			5/150			45			20	85	5.0									
3		Language	GER	CS	KRYa 1105	Kazakh (russian) language	5	2	2			5/150			45			20	85		5.0								
4			GER	CS	IYa 1106	Foreign language	5	2	2			5/150			45			20	85		5.0								
5			BS	ES	POIYa 3228	Professionally oriented English	3	6	6			3/90			30			12	48							3.0			
6			BS		OII 3216	Artificial intelligence basics			6			3/90			30			12	48										
7			GER	CS	PS 1111	Political science and sociology	4	1	1			4/120	15		30			16	59	4.0									
8			GER	CS	KP 1104	Cultural studies and psychology	4	2	2			4/120	15		30			16	59		4.0								
9		Public and political	GER	CS	IK 1112	History of Kazakhstan	5	2	2			5/150	15		30			20	85		5.0								
10			GER	UC	OEP 2110	Basics of economics and law	5	4	4			5/150	15		30			20	85				5.0						
11			GER	CS	Fil 2108	Philosophy	5	4	4			5/150	15		30			20	85				5.0						
12			BS	ES	OFG 2227	Basics of financial literacy	3	4	4			3/90	15		15			12	48				3.0						
13			GER	CS	IKT 1103	Information and communication technologies	5	1	1			5/150	15	30.0				20	85	5.0									
14		General education	BS	UC	M 1204	Mathematics 1	5	1	1			5/150	15		30			20	85	5.0									
15			BS	UC	Fiz 1205	Physics	4	1	1			4/120	15	15.0	15			16	59	4.0									
16			BS	UC	M 1206	Mathematics 2	4	2	2			4/120	15		30			16	59		4.0								
17			BS	UC	IKG 1207	Engineering and computer graphics	4	2	2			4/120	15	30.0				16	59		4.0								
18			GER	CS	FK 1113	Physical education.	2	1		1		2/60			30			8	22	2.0									
19		Physical education	GER	CS	FK 1114	Physical education.	2	2		2		2/60			30			8	22		2.0								
20			GER	CS	FK 2107	Physical education.	2	3		3		2/60			30			8	22			2.0							
21			GER	CS	FK 2109	Physical education.	2	4		4		2/60			30			8	22				2.0						
22			**BS**	**UC**	**UP 1217**	**Educational practice**	**1**	**2**				**1/30**					30				1.0								
23		Production	**BS**	**UC**	**PP 3218**	**Internship**	**3**	**5**				**3/90**					90							3.0				
24			**BS**	**UC**	**PP 4219**	**Internship**	**5**	**7**				**5/150**					150									5.0		
25			**BS**	**UC**	**PP 4220**	**Pre diploma practice**	**10**	**8**				**10/30**					300											10.0
						Modules of specialty/education programm																								
26			BS	UC	Meh 2210	Mechanics	4	3	3			4/120	15		30			16	59				4.0						
27			BS	UC	MT 2212	Materials science in heat engineering	4	3	3			4/120	15		30			16	59				4.0						
28			BS	UC	EE 2209	Electrical engineering and electronics	4	3	3			4/120	15	30.0				16	59				4.0						
29			BS	UC	TOT 2216	Theoretical basics of heat engineering	6	3	3			6/180	30		30			24	96				6.0						
30			BS	UC	TI 2208	Measuring of Heat engineering	5	3	3			5/150	15	15.0	15			20	85				5.0						
31		Theoretical disciplines	BS	ES	TOK 2222	Heat transfer in enclosing structures	5	3	3			5/150	15	15.0	15			20	85				5.0						
32			BS		Tep 2222	Warm mass-transfer			3			5/150	15	15.0	15			20	85										
33			BS	UC	MZhG 2211	Mechanics of liquid and gas	5	4	4			5/150	15	15.0	15			20	85					5.0					
34			BS	ES	KTTR 2223	Computer technologies are in calculations	5	4	4			5/150	15	30.0				20	85					5.0					
35			BS		CKPDM 2226	Digital competencies in professional activities (Minor)			4			5/150	15	30.0				20	85										
36			BS	UC	ONI 3215	Basics of the scientific researches	5	5	5			5/150	15		30			20	85						5.0				
37			BS	ES	KKEO 4201	Corrosion and conservation of energy equipment	5	7	7			5/150	15		30			20	85								5.0		
38			BS		ISZS 4201	Engineering systems of buildings and structures			7			5/150	15		30			20	85										

| | | |

7. Appendix 1. Academic calendar

Approve
Chairman of the Academic Council
NJSC "S.Seifullin KATIU"
_____ Tireuov K.M.
«28» 03 2024

ACADEMIC CALENDAR
for 2024-2025 academic year
by levels of training
BACHELOR

Presentation week, registration for disciplines	1 course from 26 to 29 August, 2024
I semester	**September 2 - December 13**
Constitution day	***August 30***
Knowledge Day	***September 1***
Republic Day	***October 25***
Independence Day	***December 16***
Boundary control 1	from October 14 to October 18, 2024
Boundary control 2	from December 9 to December 13, 2024
Exam session	from December 17 to December 27, 2024
Passing FX	from December 17, 2024 to January 3, 2025
New Year's Holiday	***January 1, 2***
Holidays	from January 6 to January 24, 2025
II semester	**from January 27 to May 8, 2025**
International Women's Day	***March 8***
Holiday Nauryz	***March 21, 22, 23***
Registration for disciplines	2,3,4,5 course from April 7 to April 11, 2025
Holiday of unity of the people of Kazakhstan	***May 1***
Defender of the Fatherland Day	***May 7***
Victory Day	***May 9***
Boundary control 1	from March 10 to March 14, 2025
Boundary control 2	from May 5 to May 8, 2025
Exam session	from May 12 to May 23, 2025
Passing FX	from May 12 to May 30, 2025
Registration for the summer semester	from June 2 to June 6, 2025
Final examination	until June 30, 2025
Summer semester	from June 9 to July 18, 2025
Holidays*(except for graduation courses)*	from May 26 to August 29, 2025
Capital Day	***July 6***
Practice	types and terms of professional practice are determined by the working Curriculum of Educational Program

Approved by the Academic Council of NJSC «S. Seifullin KATIU»,
protocol № 12 of 28.03.2024

Appendix 1 to the Academic Calendar

Approved by the Academic Council of the NJSC "S.Seifullin KATIUS", Protocol №12, of 28.03.2024 y.

Schedule of the educational process for the 2024-2025 academic year for the educational program Energy faculty

BACHELOR

Courses	September					October					November					December					January					February				Mart				April					May					June				July					August			
	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20	27	3	10	17	24	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
	30	6	13	20	27	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	31	7	14	21	28	7	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
B07102 - "Electric power industry"																																																						
I	PW	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	JEP	EP/BC	E/P	E/P	P/H	TD/H	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	H	H	H
II	H	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	H	IP	IP	IP
III	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	IP	IP	IP	IP
IV	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	IP	IP	IP	IP	IP	IP	IP/U	.	.	.	.	.	.	JBC2	E/P	FE	FE	FE	FE	FE	FE	FE								
B07103 - "Electrical engineering"																																																				
I	PW	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	JEP	EP/BC	E/P	E/P	E/TD/H	H/S	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	H	H	H
II	H	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	H	IP	IP	IP
III	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	IP	IP	IP	IP
IV	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	IP	IP	IP	IP	IP	IP	IP/U	IP/U	.	.	.	.	.	JBC2	E/P	FE	FE	FE	FE	FE	FE	FE								
6B07101- "Thermal Engineering", 6B07107-"Heat and gas supply, ventilation and eco-engineering in agriculture"																																																			
I	PW	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	/EP	/EP	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	TD/H	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	H	H	H
II	H	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	IP	IP	IP	IP
III	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	IP	IP	IP	IP
IV	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	U	U	U	U	U	U	U	U	U	U	.	.	.	JBC2	E/P	FE	FE	FE	FE	FE	FE	FE								
6B06201 - "Telecommunication Networks and Systems"																																																			
I	PW	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	TD/H	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	H	H	H
II	H	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	IP	IP	IP	IP
III	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	H	H	IP	IP
IV	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	IP	IP	IP	IP	IP/U	IP/U	IP/U	IP/U	IP/U	IP/U	.	.	.	JBC2	E/P	FE	FE	FE	FE	FE	FE	FE								
6B06202 - "Radio engineering and electronics"																																																			
I	PW	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	TD/H	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	H	H	H
II	H	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	IP	IP	IP	IP
III	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	IP	IP	IP	IP
IV	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	IP	IP	IP	IP	IP/U	IP/U	IP/U	IP/U	IP/U	IP/U	.	.	.	JBC2	E/P	FE	FE	FE	FE	FE	FE	FE								
6B07108 - "Automation and energy efficiency of processes and production", 6B08702 - "Energy supply and automation of agriculture"																																																		
I	PW	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	JEP	JEP	JEP	EP/BC	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	TD/H	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	H	H	H
II	H	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	H	IP	IP	IP	IP
III	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	H/TD/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	H/S/MT	S/H	H	IP	IP	IP	IP	IP
IV	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	.	.	.	JBC2	E/P	FE	FE	FE	FE	FE	FE	FE								
6B07108 - "Automation and energy efficiency of processes and production", (SOPR), 3 years																																																		
I	PW	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	JEP	JEP	JEP	EP/BC	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	TD/H	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	IP	IP	IP
B07102 - "Electric power industry", (SOPR), 3 years																																																	
I	PW	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	H	H	H	H	.	.	.	.	.	.	.	.	.	.	RD	.	.	JEP	EP/BC	E/P	E/P	P/H	TD/H	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	IP	IP	IP
II	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	H	H	H	H	.	.	.	.	.	.	.	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	TD/H	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	IP	IP	IP
6B06201 - "Telecommunication Networks and Systems", (SOPR), 3 years																																																		
II	IP	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	TD/H	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	IP	IP	IP
6B07110- "Thermal Engineering", (SOPR), 3 years																																																		
I	PW	.	.	.	.	.	.	JBC1	.	.	.	.	.	.	.	JBC2	E/P	E/P	P	H	H	H	.	.	.	.	.	JBC1	.	.	.	RD	.	.	.	JBC2	E/P	E/P	P/H	TD/H	H/S	H/S	H/S	H/S	H/S	S/H	H	H	H	IP	IP	IP

Conventions

Presentation week	Theoretical training	Enrollment in disciplines	Examination session	Passing FX	Holidays	Military trainin	Summer semester	Final examination	Educational practice	Industrial practice	Undergraduatepractice	Boundary control
PW	•	TD	E	P	H	MT	S	FE	EP	IP	U	BC

Public holidays

September 1	Knowledge day	March 8	International Women's Day
December 16	Independence Day of the RK	March 21-23	Holiday " Nauryz"
January 1-2	New year	May 1	Day of Unity of the Nations of Kazakhstan
August 30	New yaer	May 7	Defender of the Fatherland day
October 25	Republic Day	May 9	Victory Day
		July 6	Capital Day

registration for disciplines: RD

8. Description of the disciplines of compulsory and university components

№	Name of discipline	Short description of discipline)	Number of credits	Emerging competencies (codes)								
				ON 1	ON 2	ON 3	ON 4	ON 5	ON 6	ON 7	ON 8	ON 9
The GED/OK cycle												
1	Foreign language	Improving the initial level of foreign language proficiency achieved at the previous stage of education, and mastering by students the necessary and sufficient level of communicative professionally oriented competence to solve social and communicative tasks in various fields of everyday, cultural, professional and scientific activities when communicating with foreign partners, as well as for further self-education.	10				+					
2	Political science and sociology	Formation of the ability to critically understand the system of interpersonal relations in society, awareness of the nature of society, the system of its groups, institutions. Forms knowledge about the laws and patterns of world politics and modern political processes, explaining the essence and content of the policy of national states, based on ensuring national security and the realization of national interests.	4				+					
3	Philosophy	Formation of students' ideas about philosophy as a specific field of knowledge, about philosophical, scientific and religious pictures of the world, about the meaning of human life, forms of human consciousness and features of its manifestation in modern society, about the relationship of spiritual and material values, their role in human life, society and civilization.	5				+					
4	History of Kazakhstan	Knowledge of the prerequisites for the formation of the statehood of modern Kazakhstan at the source of world and Eurasian historical processes. The ability to critically analyze historical events based on retrospective, comparative historical and other scientific methods. Achieving a deep and holistic perception of	5				+					

		the history of the Fatherland, the ability to distinguish the true story based on facts and evidence.										
5	Cultural studies and psychology	The development of a socio-humanitarian worldview as the basis for the modernization of public consciousness through the formation of cultural identity, the ability to analyze and evaluate cultural situations based on an understanding of the nature of cultural processes, the specifics of cultural objects, the role of cultural values in intercultural communication, knowledge of the basics of general psychology, personality psychology, individual typological characteristics of personality: temperament, character, abilities.	4				+	+				
6	Information and communication technologies	Mastering theoretical knowledge in the field of modern information technologies, software for professional activities, studying the goals, objectives, problems and prospects of information technology development and acquiring skills in their application, determining the basic principles of organization and functioning of technical and software tools of automated systems used in professional activities, as well as the formation of necessary competencies.	5			+						
7	Professional Kazakh (Russian) language	Formation of knowledge and skills for successful mastery of types of speech activity, understanding of the peculiarities of the functioning of the Kazakh (Russian) language system, improvement of language skills in various situations of everyday, socio-cultural, professional communication, improvement and activation of oral and written speech, taking into account all types.	10				+					
8	Physical education	Ensuring that students have a sufficient level of physical readiness of future specialists, a high level of efficiency; the development of professionally significant physical and psychomotor abilities.The development of skills that ensure the preservation and strengthening of health, the development and improvement of psychophysical abilities and qualities.	8				+					

The GED/UC cycle												
9	Basics of economics and law	The discipline promotes knowledge of the subject of economic theory and methods of research, the basis of public production and forms of public economy, the mechanism of functioning of the market system, production, costs and income of the firm, national economy. To master the basics of the theory of the state and law, the basics of constitutional, administrative, civil, labor, family, criminal law.	5							+		
The BD/UC cycle												
10	Basics of the scientific researches	The discipline is aimed at the formation of students' knowledge about modern science, understanding, awareness and ability to properly organize research work, planning and conducting experiments, statistical processing and evaluation of the results of experiments, as well as mastering the ways and methods of preparing and forming the presentation of scientific information in professional activity.	5					+				
11	Electrical engineering and electronics	To study linear electric circuits of direct current, linear electrical circuits of single-phase sinusoidal current, three-phase circuits, concepts of nonlinear circuits and transients, magnetic circuits and transformers.	4								+	
12	Engineering and computer graphics	Formation of knowledge of design documentation in accordance with standards, rules for constructing drawings of detachable and one-piece connections of parts and assembly units, developing the skills necessary to complete and read technical drawings, perform sketches of parts, draw up design and technical documentation for production. Proficiency in working with computer drawing programs at a high level.	4			+			+			
13	Materials science in heat engineering	Formation of knowledge about the properties and methods of processing modern materials used in energy and thermal physics, the fundamentals of materials science and the technology of structural materials, the structure and basic properties of energy structural materials used in the repair, operation and maintenance of equipment, the essence of the phenomena occurring	4						+			

		in materials under the operating conditions of products, methods for obtaining materials with desired properties.										
14	Mathematics 1	The purpose of studying the discipline is to form students' scientific and practical understanding of mathematical methods for describing and solving practical problems in engineering, technology, economics. The objectives of the discipline are the assimilation of the basic concepts, methods and tasks of the sections: linear algebra; analytical geometry; elements of vector algebra; mathematical analysis, the study of functions.	9								+	
15	Mathematics 2	The discipline aims to provide students with serious mathematical training, which, in addition to the fact that it is based on the fundamental nature of knowledge, guarantees the development of a certain culture of thinking and the development of creative approach to solving tasks. The course assumes consideration of the simplest applications of higher mathematics in engineering, industry.	9								+	
16	Measuring of Heat engineering	The study of devices, principles of operation and methods of using means for measuring and controlling heat engineering and other quantities associated with the production and consumption of thermal energy. Mastering the skills of independent substantiation and selection of measuring instruments for solving the measurement problem, organizing and conducting measurement and control, processing measurement results, assessing their accuracy and reliability.	5					+	+			
17	Mechanics	The purpose of teaching the discipline is to form students' ideas about the concepts, laws and methods of classical mechanics, the basic laws of classical mechanics, kinematic and dynamic methods of describing mechanical systems, the laws of dynamics of a system of material points and a solid body, the laws of conservation of mechanical quantities, the basic concepts of continuum mechanics.	4						+			

18	Mechanics of liquid and gas	Formation of a complex of fundamental knowledge in the field of fluid and gas mechanics related to the movement of the working medium. The study of the general laws of motion and equilibrium of liquid and gaseous media, the main models of liquid and gaseous media. Formation of the ability to solve practical problems of fluid and gas mechanics by basic mathematical methods.	5						+			
19	Physics	The discipline studies the basic physical phenomena, fundamental laws and concepts, as well as methods of physical research. Considers techniques and methods for solving typical problems from various fields of physics, introduces modern scientific equipment, forms the skills of conducting an experiment, the ability to highlight specific physical content in applied problems of a future specialty.	4						+		+	
20	Theoretical basics of heat engineering	Formation of students' knowledge of the fundamental laws of thermodynamics, with the main forms of heat propagation in space, processes and equipment used in the design and operation of complex heat engineering systems, their repair and modernization, the main laws of the processes of interconversion of heat and work, the properties of ideal and real working fluids and coolants , cycles of thermal power plants and refrigeration machines.	6					+	+			
The BD/EC cycle												
21	Alternative renewable energy sources	Formation of students' knowledge of the main types of non-traditional renewable energy sources, their role in the overall energy production, prospects and features of their use in solving problems of heat supply and energy saving, methods and criteria for evaluating the effectiveness of technologies based on renewable energy sources, taking into account economic and environmental requirements in modern conditions.	5	+					+			+
22	Artificial intelligence basics	Introduction to Artificial Intelligence (AI). Application of AI in various fields. The basics of AI. Search algorithms and problem solving methods. Knowledge	3			+						

		representation. Machine learning. Neural networks and deep learning. Natural language processing. Computer vision and image processing. Robotics and intelligent agents. Ethical and social implications and I. Cognitive architectures and models of human thinking.										
23	Basics of anti-corruption culture	The course forms a system of knowledge on combating corruption, and the development on this basis of a civil position in relation to this phenomenon. As a result of mastering the discipline, students will be able to: navigate the legislation; analyze and apply legal acts in specific situations, follow moral.	3							+		
24	Basics of financial literacy	The concept, goals and objectives of financial literacy. Money, settlements and payments. Personal finances: income, expenses, budget. Taxes and taxation of individuals. Banking services for the population. Insurance. Financial markets and basics of investing. Individual entrepreneurship and startup. Personal financial security.	3							+		
25	Computer technologies are in calculations	Formation of students' knowledge, skills and abilities of using computer programs and technologies for calculating heat power facilities. Mastering the skills of using drawing software, modeling heat and power processes and heat power equipment, applying numerical methods to solve heat engineering problems, using application programs for data processing and performing heat engineering calculations.	5			+						
26	Corrosion and conservation of energy equipment	Acquaintance with technologies for protecting metal from corrosion, to ensure reliable and efficient operation of heat and power equipment. Formation of knowledge about: corrosion processes, technology and circuit solutions for protecting equipment from corrosion; influence of impurities in water on metal corrosion; influence of temperature and thermal loads on corrosion; inhibitors and stimulants of corrosion; technological modes of equipment conservation.	5	+	+							
27	Design of ventilation and air conditioning systems	The development of students' competencies aimed at designing effective ventilation and air conditioning	5					+				

		systems of buildings and structures with minimal energy costs for their operation. The study of the properties of air and the processes of changing its state, the thermal conditions of the room, the aerodynamic foundations of the organization of air exchange in the room, schematic diagrams and design solutions of equipment for ventilation and air conditioning systems.										
28	Digital competencies in professional activities (Minor)	The study of the discipline considers modern trends in the development of new digital technologies, the main ways of their application in science and education, as well as the application of basic methods, ways and means of obtaining, storing and processing information in solving professional problems.	5			+						
29	Energy efficiency and energy audit of energy enterprises	Formation of knowledge on: the legislative framework in the field of energy saving and energy audit, regulations on energy saving and energy audits, analysis of opportunities for energy saving and improving the efficiency of energy enterprises. Formation of skills: conducting an energy audit, compiling an energy passport of an object, calculating the heat loss of buildings and structures, calculating the economic costs of energy-saving measures.	5	+	+							+
30	Energy saving and energy efficiency in heat power engineering and heat technology	Formation of students' knowledge and skills in the field of legal, organizational, scientific, industrial, technical and economic measures aimed at the efficient use of energy resources. Skills for evaluating the efficiency of using energy carriers in energy complexes, compiling energy balances, analyzing an organization's energy passport, developing and implementing energy-saving technologies.	5					+				+
31	Engineering systems of buildings and structures	Study of general information on water supply, sewerage, hydraulics of cities and towns. Study of general information on the water supply of buildings. Internal sewerage of buildings and structures. Sewerage and sanitary cleaning of cities. Features of sanitary maintenance of certain types of structures.	5	+								+

32	Fuel and combustion theory	Formation of students' knowledge on: fuel preparation and fuel supply, the theory of combustion of organic fuels and skills for their practical application in the organization of combustion processes. Possession of information about the fuel and energy balance of the Republic of Kazakhstan, the role of various types of energy fuel in the national economy, the skills to perform basic technological calculations of combustion processes.	6	+					+			+
33	Heat pump installations	Formation in the process of preparation of competencies that allow preparing future bachelors to carry out work on the application and calculation of heat transformers in the energy sector, industry, and railways. transport and housing and communal services. The task of teaching the discipline is to acquire knowledge about the transformation of heat for various installations of compression, absorption, jet type.	5	+	+							
34	Heat transfer in enclosing structures	Formation of students' knowledge in the field of fundamental laws and methods of analysis and calculation of heat transfer processes, to determine the characteristics of heat and mass transfer processes in heat engineering installations and enclosing structures. Familiarization with the methodology of calculating heat loss through the enclosing structures of buildings and structures, the tasks of efficient operation of heat engineering equipment using modern methods of heat use.	5					+	+			
35	Physical and chemical methods of preparation of water	Formation of students' knowledge, skills and abilities in the application of modern physical-chemical, ion-exchange, thermal, membrane methods of water purification both for low-pressure, high-pressure heat and power equipment of boiler houses and thermal power plants, and for heating networks, wastewater. Mastering the characteristics of natural waters, schemes of water circulation in the tract, the technological process of water treatment.	5		+							

36	Professionally-oriented Foreign Language	Forms the professional foreign language speech of future specialists to increase the level of professional competence, proficiency in a professional foreign language for the implementation of written and oral information exchange, further development of speech activity. Rules of speech behavior in accordance with situations of professional communication, depending on the style and nature of communication in the social, household and academic spheres.	3				+					
37	Special Issues of Fuel Combustion	Formation of knowledge on: methods of fuel combustion and organization of combustion processes in boiler plants of stations and small boiler houses; modern technologies for fossil fuel combustion with the highest economic and environmental efficiency: the mechanism of the formation of harmful substances in the combustion process, the dependence of the temperature regime on the formation of nitrogen oxides; organization of liquid and solid ash removal in boiler furnaces.	6	+					+			+
38	Technological bases of preparation of the water and fuel at thermal power plants and industrial enterprises	Study of quality requirements, and methods of preparation of the make-up water of the station and heating networks. Knowledge of the skills of preparation, transportation of water, modes of operation of equipment and systems for water preparation and purification, determination of the dependence of technical and economic indicators on regime parameters, methods of chemical control over the state of water; methods of preparation of solid, liquid and gaseous fuels.	5	+								+
39	Ventilation and air conditioning systems	Formation of students' knowledge and skills: in matters of structural elements of the ventilation and air conditioning system; calculation of systems that provide a comfortable and environmentally friendly climate for living or working; develop recommendations for tracing air ducts, placement of supply and exhaust devices, aerodynamic calculation of ventilation networks, as well as the layout of ventilation and air conditioning	5					+				

		equipment.										
40	Warm mass-transfer	Theoretical foundations of engineering methods for calculating thermal processes are studied; more complex problems of convective heat transfer are also considered, including the problems of thermal convection, melting - crystallization, evaporation - condensation, methods for solving heat transfer problems. Students receive analytical solutions to the simplest problems, get acquainted with the methods of constructing self-similar solutions, as well as numerical methods for solving nonlinear problems of convective heat transfer.	5					+	+			
The PD/UC cycle												
41	Heat generating plants	Formation of students' knowledge on classification, principles of operation and basic characteristics of heat-generating installations, methods of efficient fuel combustion, temperature and water conditions of boiler houses, skills in the field of thermal, aerodynamic and hydraulic calculation of heat-generating installations, organization of efficient fuel combustion in furnace devices, calculation and analysis of work processes in the paths of boiler plants and steam generators.	6	+					+			+
42	Heat networks and heat supply systems	Familiarization of students with the arrangement of heat supply systems and heat networks in populated areas, the regulatory framework in the field of design and construction of heat supply systems, prospects for the development of heat supply systems. Formation in students of the skills necessary for the calculation and design of heat supply systems, the selection of equipment, as well as the development of schemes for heat supply systems for populated areas and individual objects.	6	+	+							
43	Pumps, fans and compressors in systems of heat gas supply and ventilation	Formation of students' knowledge, skills and application skills of modern compressors of various types, superchargers, fans used in heat and gas supply and ventilation systems. Familiarization with the hydro-gas dynamic processes occurring in the machines under	5	+				+				

		consideration, the methodology for calculating the main characteristics of machines and equipment selection, the principles of organizing economical, reliable and safe operating modes of equipment.										
44	Safety in power plants	Familiarization of students with the legislation of the Republic of Kazakhstan in the field of labor protection, with the basic requirements for organizing the safe operation of the main and auxiliary heat and power equipment of enterprises and industries, safety rules for electrical installation and commissioning, operation and repair of power equipment, measures to prevent accidents and accidents at work.	5		+							+
The PD/EC cycle												
45	Autonomous heat supply	Formation of skills necessary to understand the processes and phenomena associated with the heat supply system. Acquisition by students of theoretical knowledge and practical skills on the basics of design, installation and operation of autonomous heat supply systems, on the use of methods for determining calculation indicators for the design of autonomous heat supply systems, knowledge of modern technological equipment of autonomous heat supply systems.	5	+	+							+
46	Building energy efficiency	Mastering theoretical and practical knowledge by students and acquiring the skills necessary to solve scientific and technical problems in the field of energy saving facilities using modern efficient materials and technologies, and designing measures to improve the energy efficiency of buildings and structures.	5	+	+							+
47	Calculation of efficiency in thermal power engineering	Providing training in the field of economics and organization of heat and power production, which allows future specialists to navigate technical and economic information, use economic principles, laws and methods to effectively solve technological problems, principles and methods of organization, production, production processes that arise in the process of engineering activities.	5	+	+							

48	Energy audit of heat supply systems	The study of the strategy and methods of conducting an energy audit of heat supply systems of industrial heat and utilities, which allows students to solve practical problems related to obtaining qualitative and quantitative assessments of the state of energy systems, identify the causes and levels of unjustified energy losses and develop energy-saving measures. Proficiency in analyzing the actual state of energy use at enterprises.	5	+	+			+				
49	Environmental technologies in fuel combustion	Formation of students' knowledge about the harmful factors that arise when fuel is burned on thermal power equipment, ways to minimize and suppress them; ability to apply methods for determining the characteristics of emissions of harmful substances and their impact on the environment; acquisition of practical skills in regulation of emissions, radiation safety and payment for harmful emissions.	6		+					+		
50	Gas supply networks	Formation of students' theoretical and practical skills for solving professional tasks on gas supply of agriculture, fuel economy, efficient use of gas equipment and gas supply systems. Study of gas characteristics and methods of their determination, methods of gas supply and methods of calculating gas demand, methods of determining the quality and consumption of gas, the basics of safe operation of gas.	5	+	+							+
51	Heat and gas supply in rural areas	Formation of students' knowledge and skills on the main structural elements of technological schemes for heat and gas supply to rural areas, calculation and design of heating systems for settlements and buildings that provide a comfortable and environmentally friendly climate for living or working, taking into account environmental requirements.	5	+	+							+
52	Implementation of technological processes and environmental technologies at thermal power plants	Training of specialists for the implementation of environmental technical policy in the design, installation and operation of thermal power equipment of thermal power plants. Formation of knowledge in the field of the legislative framework of the environmental policy of the Republic of Kazakhstan, methods for	6		+					+		

		reducing harmful impurities by modes during the operation of thermal power equipment, technologies and schemes for cleaning waste water and gases from harmful impurities, environmental regulation of harmful emissions.										
53	Multimedia technologies (Minor)	The discipline provides features and procedure of designing multimedia objects, processing of multimedia information, functionality of modern programs and information and communication technologies used to create and modify multimedia products to solve practical problems in professional activities.	5			+						
54	Operation and adjustment of heat supply and ventilation systems	Formation of students' knowledge on the operation and adjustment of heat and gas supply and ventilation systems, schemes for connecting consumers to such systems, the features of the safe operation of systems under pressure and high temperature, the requirements for the safe operation of gas supply systems.	5	+	+			+				
55	Steam and gas turbines	Formation of knowledge on the types, designs, thermal schemes of steam and gas turbines, the features of their operation. Developing the skills to analyze the current state of steam turbine equipment and formulate recommendations for improving the energy efficiency of the main equipment, master the methodology for calculating steam and gas turbines, as well as the ability to compare, formulate conclusions, build their own arguments, express and justify their position.	6	+	+							+
56	Superchargers and heat engines	Formation of students' knowledge, skills and abilities of using modern compressors of various types, superchargers, fans, steam and gas turbines used in the energy sector of industrial enterprises, using the methods of technical and economic indicators of their work. Familiarization with the hydro-gas-dynamic processes occurring in the machines under consideration, the calculation of the main characteristics of the machines, the principles of equipment selection.	6	+	+							+
57	Theoretical foundations of thermal power plants	Familiarization of students with the main characteristics and operating parameters of power plants, electrical and thermal loads of thermal power plants, basic thermal	6	+	+							

		diagrams, their elements and technical and economic indicators of the operation of power units of thermal power plants and IES. Possession of methods for determining the needs of enterprises in thermal and electrical energy, replenishment of steam and condensate losses, principles for constructing and calculating thermal schemes of thermal power plants.										
58	Thermal power systems and energy use	Formation of knowledge: general principles, structure and functioning of sources and systems of heat and power supply; the basics of designing heat supply systems for industrial enterprises and the public sector, understanding the principles of building a heat and power system of an industrial enterprise, applying the acquired knowledge to calculate thermal schemes of heat sources, determining the need for steam and hot water for industrial consumers and the public sector.	6	+	+			+				+