Ministry of Agriculture of the Republic of Kazakhstan
Saken Seifullin Kazakh Agrotechnical Research University

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

_____ Tireuov K.M.

Protocol No 16, «28» 06 2024 y.

EDUCATIONAL PROGRAM
8D07102 «Heat gas supply and ventilation in agriculture»

The code and classification of the field of education
8D07 Engineering, Manufacturing and Civil engineering
The code and classification of the training areas
8D071 Engineering and engineering trades
The code in the International Standard Classification of Education:
0710
Degree/qualification awarded:
Doctor

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	Umurzakov R.A.		Doctoral student	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: 8D07102 «Heat gas supply and ventilation in agriculture»
(the cipher and the name of the program)

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.

Content

№	Component name	Page (recommendedsize)
1.	Passport of the educational program	4
2.	General characteristics of the educational program	6
3.	Sample (portrait)of a graduate's competence	7
4.	The basis of professional experience	10
5.	Structure of the educational program	11
6	Working curriculum (for the entire period of study)	12
7	Appendix 1. Academic calendar	14
8	The relationship between the achievability of the formed learning outcomes according to the educational program and academic disciplines	16

1 Passport of the educational program

1.1 The purpose of the educational program

Training of specialists capable of carrying out research, scientific, technical and educational activities in the field of heat and gas supply of buildings, industrial premises and agricultural structures.

The main objectives of the educational doctoral program "Heat and gas supply and ventilation in agriculture":

- to provide an individual educational trajectory of study in accordance with the specialization chosen by doctoral students;
- to provide full-fledged and high-quality scientific and pedagogical education, to form professional competence, to deepen theoretical and practical, as well as individual training of doctoral students in the field of heat and gas supply and ventilation in agriculture.
- to train specialists with a high level of professional culture (including the culture of professional communication), who have a civic position, are able to formulate and solve modern scientific and practical problems, teach at universities, successfully carry out research and management activities;
- to ensure the development of fundamental courses guaranteeing professional mobility at the intersection of sciences;
- to ensure the acquisition of the necessary amount of knowledge in the field of university pedagogy and psychology and the acquisition of experience in teaching technical disciplines at the university.

The ultimate goal of the program is to train, based on the consolidation of scientific and educational resources of the university, competitive specialists in the field of heating, ventilation and air conditioning systems, heat and gas supply, who are able to participate in the implementation of a technological breakthrough in the economy of the Republic of Kazakhstan.

Generated educational outcomes:

ON1. Analyze the operating modes of power supply equipment, determine the most rational parameters, manage the quality and reliability of the functioning of heat and gas supply and ventilation systems.

ON2. To know the design characteristics and operational features of heat and gas supply equipment in the agricultural industry.

ON3. To know and apply methods of scientific research, modern methods of searching for scientific information on the topic of scientific research, academic writing; understand the importance of the principles and culture of academic integrity.

ON4. Be able to use computer technologies and programs for thermal calculations and processing research results, apply methods of mathematical analysis and modeling

ON5. To possess the skills of pedagogical activity in the disciplines of the direction of the EP, conduct training sessions with students using modern forms and methods of teaching, develop educational and methodological documentation.

Compliance of the EP with professional standards of the Republic of Kazakhstan:

1. Professional standard. Professional standard: Teacher (faculty) of higher and (or) postgraduate education organizations. Order of the Minister of Science and Higher Education of the Republic of Kazakhstan No. 591 of 20.11.2023.

2. Professional standard. Support of innovative project. Appendix No. 11 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" No. 259 of 24.12.2019.

Compliance of Atlas of new professions with the EP:

1. Regeneration and utilization engineer. (Disciplines: "Designs of furnaces and burners for burning biogas and agricultural waste", " Resource-based technologies based on agricultural waste").

2. Renewable energy sources operational dispatcher. (Disciplines: "Energy saving in the system of heating, ventilation and air conditioning ").

3. Numerical methods in power engineering. (Disciplines: "Mathematical modeling of energy processes").

2 General characteristics of the educational program

Currently, in accordance with a number of state programs for the development of agriculture, the training of specialists in the OP "Heat and gas supply and ventilation in agriculture" is very relevant:

capable of performing research and practical work in heating, ventilation and air conditioning systems, heat and gas supply. 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 scientific and pedagogical personnel to carry out professional activities, in accordance with the requirements of employers and based on the needs of the labor market. The uniqueness of the educational program lies in the fact that this activity is associated with high risks associated with the operation of equipment with high parameters of the working environment (temperature, pressure) and large-sized structures.

The educational program has been developed in accordance with the National Qualifications Framework and is coordinated with the Dublin Descriptors and the European Qualifications Framework. The educational program is designed on the basis of a modular system for studying disciplines and contains 5 modules that form general cultural and professional competencies.

The educational program "Heat and gas supply and ventilation in agriculture" provides for the study of the following cycles:

- theoretical training in cycles of basic and core disciplines;
- additional types of training: pedagogical, research practice;
- research work of a doctoral student, including the completion of a doctoral dissertation;
- final state certification in the form of passing the state exam in the specialty and preparation and defense of the doctoral student's final work.

The standard period for the development of an educational program for the scientific and pedagogical direction of doctoral students is 3 years.

The complexity of mastering the educational program for doctoral students indicated in the credits for the entire period of study in accordance with the State Educational Standard of the Republic of Kazakhstan in the field of training "Heat and gas supply and ventilation in agriculture", including all types of classroom and independent work of the student, practice, and the time allotted for quality control in full-time education is 180 credits, including:

25 credits for the study of academic disciplines, 20 credits for all types of practices (pedagogical practice – 10 credits, research practice – 10 credits), research work of a graduate student - 123 credits, 12 credits for final certification.

3 Competence model (passport) of the graduate

3.1 Areas of professional activity:

The field of professional activity of a doctoral student in the educational program "Heat and gas supply and ventilation in agriculture" is an integral part of thermal engineering, which includes a set of tools, methods and methods of human activity created for use in the field of heating, ventilation and air conditioning, heat and gas supply.

The subjects of professional activity of graduates of this educational program 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.

The objects of the graduate's professional activity 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;
- normative and technical documentation and standardization systems, methods and means of testing equipment and quality control of manufactured products.

3.2 Types of professional activity:

The types of professional activity of a graduate are:

- scientific research;

- pedagogical;
- operational and research;
- production and technological;
- construction;
- organizational and managerial;
- design engineering.

3.3 General education competencies

– The general educational competencies of a doctoral graduate, formed as a result of mastering the educational program "Heat and gas supply and ventilation in agriculture":

– possess a culture of thinking, the ability to generalize, analyze, perceive information, set goals and choose ways to achieve it;

– be able to logically correctly, argumentatively and clearly build oral and written speech;

– have a willingness to cooperate with colleagues, work in a team;

– possess the ability to find organizational and managerial solutions in non-standard situations and the willingness to take responsibility for them;

– be able to use regulatory legal documents in their activities;

– strive for self-development, improve your skills and skills;

– be able to critically assess their strengths and weaknesses, identify ways and choose means to develop strengths and eliminate weaknesses;

– to be aware of the social significance of his future profession, has a high motivation to perform professional activities;

– possess the ability to analyze socially significant problems and processes;

– to use the basic laws of natural sciences in professional activities, applies methods of mathematical analysis and modeling, theoretical and experimental research;

– be aware of the essence and importance of information in the development of modern society; knows the basic methods, methods and means of obtaining, storing, processing information;

– have computer skills as a means of information management;

– possess the ability to work with information in global computer networks;

– speak one of the foreign languages at a level not lower than spoken;

– to master the basic methods of protecting production personnel and the public from the possible consequences of accidents, catastrophes, natural disasters;

– possess the means of independent, methodically correct use of methods of physical education and health promotion, ready to achieve the proper level of physical fitness to ensure full-fledged social and professional activities.

3.4 Basic competencies

The basic competencies of a doctoral graduate formed as a result of mastering the educational program "Heat and gas supply and ventilation in agriculture":

- conducting scientific research and development in the field of heat and gas supply, ventilation, air conditioning and air purification from industrial pollution of industrial and agricultural facilities, energy use and energy supply;

- development of plans, programs and methods for conducting tests, participating in experiments, conducting observations and measurements, drawing up their descriptions and conclusions during the development of modernization and operation of heat and gas supply, ventilation, air conditioning and air purification systems;

- carrying out a technical justification of the decisions taken on the development of heat and gas supply, ventilation, air conditioning and air purification systems;

- development of mathematical and simulation models of the functioning of heat and gas supply, ventilation, air conditioning and air purification systems;
- analysis of the state and prospects for the development of gas and heat supply, using the necessary tools and methods;
- analysis of the state and dynamics of the objects of activity;
- creation of theoretical models that allow predicting the properties and behavior of objects of activity;
- the use of computer technologies for modeling and processing the results of experimental and theoretical research;
- development of energy-efficient thermal technology equipment, installations and complexes;
- using methods of modeling and optimization of thermal technological processes, installations and systems;
- implementation of fundamentally new waste-free processes and complexes;
- establishment of energy saving potential and reserves in production sectors;
- research and implementation of low-waste and non-waste technologies;
- study of methods for controlling heat and mass transfer processes, methods and devices for converting various types of energy into thermal energy;

3.5 Professional competencies

The basic competencies of a doctoral graduate formed as a result of mastering the educational program "Heat and gas supply and ventilation in agriculture":

- conducting scientific research and development in the field of heat and gas supply, ventilation, air conditioning and air purification from industrial pollution of industrial and agricultural facilities, energy use and energy supply;
- development of plans, programs and methods for conducting tests, participating in experiments, conducting observations and measurements, drawing up their descriptions and conclusions during the development of modernization and operation of heat and gas supply, ventilation, air conditioning and air purification systems;
- carrying out a technical justification of the decisions taken on the development of heat and gas supply, ventilation, air conditioning and air purification systems;
- development of mathematical and simulation models of the functioning of heat and gas supply, ventilation, air conditioning and air purification systems;
- analysis of the state and prospects for the development of gas and heat supply, using the necessary tools and methods;
- analysis of the state and dynamics of the objects of activity;
- creation of theoretical models that allow predicting the properties and behavior of objects of activity;
- the use of computer technologies for modeling and processing the results of experimental and theoretical research;
- development of energy-efficient thermal technology equipment, installations and complexes;
- using methods of modeling and optimization of thermal technological processes, installations and systems;
- implementation of fundamentally new waste-free processes and complexes;
- establishment of energy saving potential and reserves in production sectors;
- research and implementation of low-waste and non-waste technologies;
- study of methods for controlling heat and mass transfer processes, methods and devices for converting various types of energy into thermal energy;

4 Base of professional practice (demonstration of all types of practice)

Doctoral students are sent to work practice, according to an agreement with enterprises that are the base of practice (individual agreements or collective agreements) in accordance with the rector's order to conduct an internship. S. Seifullin KATU appoints practice managers for each doctoral student.

Doctoral students of this profile practice in:

- "National Research Institute on Industrial Safety Problems of the Ministry of Emergency Situations of the Republic of Kazakhstan",
- Institute of Energy Research of the National Academy of Sciences of the Republic of Kazakhstan,
- Tomsk Polytechnic University,
- Warsaw University of Technology (Warsaw University of Technology),
- Moscow Energy Institute (Technical University),

also at the department, where there is a specialized research laboratory on energy problems. Scientific work is carried out on the basis of the laboratory within the framework of priority areas - effective solution of priority tasks in the field of energy.

Doctoral students also practice under individual contracts at any production facilities and enterprises where renewable energy equipment is available.

5 The structure of the educational program of the doctoral program 8D07102 "Heat and gas supply and ventilation in agriculture"

№ п/п	The name of the cycles of disciplines and activities	Total labor intensity	
		in academic hours	in academic credits
1	2	3	4
1.	**Theoretical training**	**1350**	**45**
1.1	**The cycle of basic disciplines (BS)**	**750**	**25**
1)	**The University component (UC):**	**750**	**25**
	Academic writing	150	5
	Energy saving in the system of heating, ventilation and air conditioning	150	5
	Methods of scientific researches	150	5
	Pedagogical training	300	10
1.2	**The cycle of core disciplines (AS)**	**600**	**20**
1)	**The University component (UC):**	**300**	**10**
	Research practice	300	10
2)	**Component of choice (EC):**	**300**	**10**
	Mathematical modeling of energy processes	150	5
	Methods of ultimate energy conservation in high temperature technology		
	Resource-based technologies based on agricultural waste	150	5
	Designs of furnaces and burners for burning biogas and agricultural waste		
2	**Research work**	**3690**	**123**
1)	Research work of a graduate student, including internship and completion of a master's thesis (NIRM)	3690	123
3	**Additional types of training (ATT)**	**-**	**-**
4	**Final certification (FC)**	**360**	**12**
	Preparation and defense of a master's thesis (Dmt)	360	12
	Total	**5400**	**180**

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

Министерство сельского хозяйства Республики Казахстан
НАО "Казахский агротехнический исследовательский университет им.С.Сейфуллина"

Рассмотрено
на заседании Академического
совета университета
Протокол № 10
24 06 2024г.

УТВЕРЖДАЮ
Член Правления - проректор
по научной и инновационной деятельности
НАО "КАТИУ им. С. Сейфуллина"
Сыралиев Е. О.
2024 г.

УЧЕБНЫЙ ПЛАН
на 2024-2027 учебные годы
для образовательной программы 8D07102 Теплогазоснабжение и вентиляция и сельском хозяйстве
область образования 8D07 Инженерные, обрабатывающие и строительные отрасли
направление подготовки 8D071 Инженерия и инженерное дело
группа образовательных программ D098 Теплоэнергетика
Степень: Докторантуры по направлениям (научно-педагогические)
Форма обучения: Очное (докторантура n-а 3 года)
Год поступления: 25-03-2024

Шифр модуля	Наименование модуля	Цикл дисциплины	Компонент дисциплины	Код дисциплины	Наименование дисциплины	Академические кредиты	Контроль по академическим периодам: Экзамены	Дифференцированный зачет/семестр	Дифференцированный зачет(опрос связи)	Практика ИНР	Курсовая работа/проект	Объем в часах: Всего	Аудиторные	в т.ч. Лекции	Практические	ЛПЗ	СРДП	СРД	Распределение кредитов по академическим периодам: 1 курс		2 курс		3 курс	
																			1	2	3	4	5	6
																			Недель в академическом периоде					
																			15	15	15	15	15	15
					Модули специальности/образовательной программы																				
1	Научно-технический	БД	ПК	AP 7312	Академическое письмо	5	1					150.0	45.0	15	30	0	20	85	5.0					
2		БД	ПК	MNI 7213	Методы научных исследований	5	1					150.0	45.0	15	30	0	20	85	5.0					
3	Базовый	БД	ПК	ESOVKV 7208	Энергосбережение в системе отопления, вентиляции и кондиционирования воздуха	5	1					150.0	45.0	15	30	0	20	85	5.0					
4		БД	ПК	PP 7211	Педагогическая практика	10				300		300.0		0	0	0	0	0		10.0				
5		ПД	ПК	RTOSO7302	Ресурсосберегающие технологии на основе сельскохозяйственных отходов	5	1					150.0	45.0	15	30	0	20	85	5.0					
6		ПД	ПК	MMIP7304	Математическое моделирование энергетических процессов	5	1					150.0	45.0	15	30	0	20	85	5.0					
7		ПД	ПК	IP 7303	Исследовательская практика	10				300		300.0		0	0	0	0	0		10.0				
					Научно-исследовательская работа (НИР)																			
8	Исследовательский	НИР	ОК	NIRDVTDD 7501	Научно-исследовательская работа докторанта, включая выполнение докторской диссертации	5				150		150.0		0	0	0	0	0	5.0					
9		НИР	ОК	NIRDVTDD 7502	Научно-исследовательская работа докторанта, включая выполнение докторской диссертации	10				300		300.0		0	0	0	0	0		10.0				
10		НИР	ОК	NIRDVDD 8504	Научно-исследовательская работа докторанта, включая выполнение докторской диссертации	30				900		900.0		0	0	0	0	0			30.0			
11		НИР	ОК	NIRDVDD 8505	Научно-исследовательская работа докторанта, включая выполнение докторской диссертации	30				900		900.0		0	0	0	0	0				30.0		
12		НИР	ОК	NIRDVDD 9507	Научно-исследовательская работа докторанта, включая выполнение докторской диссертации	30				900		900.0		0	0	0	0	0					30.0	
13		НИР	ОК	NIRDVDD 9508	Научно-исследовательская работа докторанта, включая выполнение докторской диссертации	18				540		540.0		0	0	0	0	0						18.0
Итого теоретического обучения						168	5	0	0	4290	0	5040	225	75	150	0	100	425	30.0	30.0	30.0	30.0	30.0	18.0
ДПО	Дополнительные виды обучения											0												
ИА	Итоговая аттестация																							
	Оформление и защита докторской диссертации					12						360.0												
	Итого					12				6		360												
						180				4296		5400	225	75	150	0	100	425						

Директор Института последипломного образования — Хусаинова Жибек Сентоша

Декан факультета — Исенов Сұлтанбек Сансызбаевич
Заведующий кафедрой — Мергалимова Алмагуль Кайрбековна

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
DOCTORAL

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 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	the types and terms of pedagogical, research practice are determined by the working curriculum of educational program

Note: for the winter recruitment of doctoral students, the beginning of training in accordance with with the terms of the second semester

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
DOCTORAL

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
8D07103 - "Electrotechnical complexes and systems"																																																				
I	PW	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	/DR	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	E/P	E/P	H	H	H	H	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	/DR	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	E/P	E/P	P/TD/H	H/S	H/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H
II	H	DR	DR	DR	DR	DR	DR RP	DR BC RP	DR RP	DR RP	DR RP	DR RP	DR RP	DR RP	DR RP	DR BC RP	E/P	E/P	H	H	H	H	DR	DR	DR	DR	DR	DR TP	DR TP BC	DR TP	DR TRP	DR TP	DR TP	DR TP	DR TP	DR TP	DR TP	E/P/TR	E/P	P/TD/H	H/S	H/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H
III	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	E/P	H	H	H	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	FE	FE	FE	FE	FE	FE							
8D07103 - "Electrotechnical complexes and systems", winter reception																																																			
I																							/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	/DR	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	E/P	E/P	P/TD/H	H/S	H/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H
I-II	H	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	/DR	/DR	/DR	/DR	/DR	/DR	/DR	/DR	E/P	E/P	H	H	H	H	/DR	/DR	/DR	/DR	/DR	DR RP	DR RP BC	DR RP	DR RP	DR RP	DR RP	DR RP	DR RP	DR RP	DR RP	E/P	E/P	P/TD/H	H/S	H/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H
II-III	H	DR	DR	DR	DR	DR	DR TR	DR TR	DR TR	DR TR	DR TR	DR TR	DR TR	DR TR	DR TR	DR TR	E/P	E/P	H	H	H	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	E/P	P/TD/H	H/S	H/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H
8D07102 -"Heat and gas supply and ventilation in agriculture " / 8D07101 - "Renewable energy "																																																			
I	PW	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	/DR	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	E/P	E/P	P/H	H	H	H	DR	DR	DR	DR	DR	DR	DR/BC	DR	DR	DR	DR	DR	DR/BC	E/P	E/P	P/TD/H	TD/H	S/H	S/H	S/H	S/H	S/H	H	H	H	H	H	H
8D07102 -"Heat and gas supply and ventilation in agriculture ", 8D07101 - "Renewable energy ", 2024-2027 winter reception																																																		
I-II	H	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	/DR	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	E/P	E/P	P/H	H	H	H	TP/DR	TP/DR	TP/DR	TP/DR	TP/DR	TP/DR	P/DR/BC	TP/DR	TP/DR	EP/DR	EP/DR	DR	DR	DR/BC	E/P/EP	E/P/EP	TD	S	EP/S	S/H	S/H	S/H	S/H	H	H	H	H	H	H
8D07102 -"Heat and gas supply and ventilation in agriculture ", 2023-2026 winter reception																																																		
II-III	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	E/P	P/H	H	H	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	E/P	P/TD/H	S/H	S/H	S/H	S/H	S/H	S/H	H	H	H	H	H	H
8D07102 -"Heat and gas supply and ventilation in agriculture "																																																		
III	H	DR/TP	DR/TP	DR/TP	DR/TP	DR/TP	DR/TP	DR/TP	DR/ÆP	DR/ÆP	DR	DR	DR	DR	DR	DR	E/P	E/P	P/H	H	H	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	FE	FE	FE	FE	FE	FE							
8D07102 -"Heat and gas supply and ventilation in agriculture " (after academic leave)																																																		
III	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	E/P	P/H	H	H	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	FE	FE	FE	FE	FE	FE							
8D08703 -"Energy supply and automation of agriculture", 8D07107 - "Control of technical systems"																																																		
I	PW	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	/DR	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	E/P	E/P	H	H	H	H	/DR/TP	/DR/TP	/DR/TP	/DR/TP	/DR/TP	DR/TP/BC	/DR/TP	/DR/TP	/DR/TP	/DR/TP	/DR	/DR	/DR	/DR/BC	E/P	E/P	P/TD/H	S/H	S/H	S/H	S/H	S/H	S/H	H	H	H	RP	RP	RP	RP
II	RP	DR/RP	DR/RP	DR/RP	DR/RP	DR/RP	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	E/P	H	H	H	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	E/P	P/TD/H	S/H	S/H	S/H	S/H	S/H	S/H	H	H	H	H	H	H
III	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	E/P	H	H	H	H	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	E/P	FE	FE	FE	FE	FE	FE							
8D07107 - "Control of technical systems", winter reception																																																		
I	PW	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	/DR	/DR	/DR	/DR	/DR	/DR	/DR	/DR/BC	E/P	E/P	H	H	H	H	DR/RP	DR/RP	DR/RP	DR/RP	DR/RP	DR/RP/BC	DR/RP	DR/RP	DR/RP	DR/RP	DR	DR	DR	DR/BC	E/P	E/P	P/TD/H	S/H	S/H	S/H	S/H	S/H	S/H	H	H	H	H	H	H

Conventions

Presentation week	Theoretical training	Enrollment in disciplines	Examination session	Passing FX	Holidays	Summer semester	Final examination	Teaching practice	Educational practice	Doctoral research work	
PW	•	TD	E	P	H	S	FE	TP	EP	BC	DR

Boundary Control

Director of the Institute of Postgraduate Education — Husainova Zhibek Seitovna
Dean of the Faculty Energy — Isenov Sultanbek Sansyzbayevich

8. Description of the disciplines of compulsory and university components

№	Name of the discipline	Short description (30-50 words)	Number of credits	Emerging competencies (codes)				
				ON 1	ON 2	ON 3	ON 4	ON 5
BD/UC cycle								
1	Academic writing	Development of relevant competencies among doctoral students aimed at developing the readiness and ability of scientific and pedagogical personnel to implement research projects and present results in writing in accordance with the norms of the international academic community. Acquaintance with the requirements for the design and structure of the presentation of the results of scientific research in scientific articles, dissertations, patents.	5			+		
2	Energy saving in the system of heating, ventilation and air conditioning	Obtaining knowledge about the current state of science in the field of energy saving, innovative technologies and equipment of DHW systems about the technically possible potential, regularities and principles of operation of systems and equipment, about ways to implement energy-efficient technologies for heat supply and create a microclimate for buildings and structures based on modern equipment.	5					+
3	Methods of scientific researches	Mastering the basic theoretical provisions, laws, principles, terms, concepts, processes, methods, technologies, tools, operations for the implementation of scientific activities; Formation of knowledge about: methods of planning and organization of scientific research; a general methodology of scientific design, creativity, a general scheme for organizing scientific research; conducting scientific research, analysis, experiments.	5		+			
AS/EC cycle								
4	Mathematical modeling of energy processes	Formation of knowledge, skills and abilities of doctoral students in applying mathematical methods for modeling and optimizing energy processes for various industrial enterprises. Mastering by doctoral students the methods and techniques of mathematical	5				+	

		modeling; conducting a computational experiment; the use of computer technology and computer technology for the study and selection of optimal options for installations and systems for such processes. поиска, анализа, проведения экспериментов.						
5	Methods of ultimate energy conservation in high temperature technology	Formation of knowledge among doctoral students: types, scope, design and operational features of high-temperature installations; about the existing methods of limiting energy saving in high-temperature technology, the search for new ways to improve the energy efficiency of high-temperature installations, methods for calculating energy saving and energy efficiency indicators.	5		+			
6	Resource-based technologies based on agricultural waste	Formation of doctoral students' competencies for the introduction of resource-saving, environmentally friendly and low-waste technologies into agricultural production. Familiarization of students with: types of agricultural waste, their impact on the environment, existing methods of waste disposal, the concept of creating waste-free and low-waste agricultural production.	5	+			+	
7	Designs of furnaces and burners for burning biogas and agricultural waste	Formation of doctoral students' competencies in the field of biogas combustion and agricultural waste. Knowledge of the designs of furnace and burner devices for use in the production of agricultural products and livestock breeding, a new management psychology focused on resource saving, waste disposal and decarbonization of energy systems.	5		+			