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

_____ Tireuov K.M.

Protocol No 16, «28» 06 2024y.

EDUCATIONAL PROGRAM
7M07101 «Thermal engineering» (2 y.)

The code and classification of the field of education
7M07 Engineering, Manufacturing and Civil engineering
The code and classification of the training areas
7M071 Engineering and engineering trades
The code in the International Standard Classification of Education:
0710
Degree/qualification awarded:
Master of Technical Sciences in the educational program 7M07101 «Thermal engineering»

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	Kaliev A.S.		Undergraduate student	NCJSC "KATRU named after S.Seifullin"	

Agreed with representatives of employers:

№	S.N.M.	Post	Place of work	Signature, seal
1	Tanyrbergenov N.M.	Director	«Kyrulus Group Company» LLP	

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

No. 3744 from " 18 " 10 2023 y.

Educational program: 7M07101 "Thermal Engineering"
(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 «29» august 2024 y.

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1 Passport of the educational program

1.1 The purpose of the educational program

Creating conditions for an effective educational process for the formation of personal qualities of a graduate, as well as general cultural and professional competencies that allow for professional and scientific and pedagogical activities related to a set of technologies, means, methods and methods of human activity created for the generation and use of electrical and thermal energy, conversion of various types of energy into heat and control of its flows.

The objectives of the educational program are the formation of the EP on the energy of thermal technologies, which includes extensive knowledge and work skills in the field of energy efficiency of thermal technologies and efficient use of fuel.

Objectives of the educational program:

- to provide an individual educational trajectory of study in accordance with the specialization chosen by undergraduates;
- 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 undergraduates in the field of technical regulation.
- to facilitate the acquisition by undergraduates of the most important and sustainable knowledge that ensures a holistic perception of the world;
- develop students' ability to self-resolve and acquire new knowledge;
- 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 promote the acquisition of skills to participate in scientific events of various levels, to continue scientific training in doctoral studies;
- to ensure the acquisition of the necessary amount of knowledge in the field of university pedagogy and psychology and the acquisition of teaching experience at the university.

The ultimate goal of the program is to train competitive specialists in the field of thermal power engineering, capable of participating in the implementation of a technological breakthrough in the economy of the Republic of Kazakhstan, based on the consolidation of scientific and educational resources of the University.

The general goals and objectives of the educational program are set out in the following sections.

Generated educational outcomes

ON1 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.

ON2 Be able to use the basic provisions and methods of social, humanitarian and economic sciences in solving personal and professional problems, use communication skills in Kazakh, Russian and foreign languages at a professional level.

ON3 To know computer technologies and programs for thermal calculations and processing of research results, apply methods of mathematical analysis and modeling.

ON4 To possess a culture of thinking, the ability to generalize, analyze, perceive information, including in a foreign language, set a goal and choose ways to achieve it, the ability to argue and publicly present the results of work. To form the leadership qualities necessary for the effective organization of labor in the working group in order to achieve a common scientific production result.

ON5 To possess methods of scientific research, modern methods of searching for scientific information on the topic of scientific research, academic writing; understand the implications of the principles and culture of academic integrity.

ON6 Be able to use the modes of operation of thermal power equipment, determine the most rational parameters, manage the quality and reliability of the functioning of thermal power systems. Implement modern, efficient, environmentally friendly, resource- and energy-saving technologies in heat and power systems.

ON7 To know the design features of modern highly efficient energy-saving heat and power equipment. Possess the skills of installation, commissioning and operation of thermal power equipment, correctly maintain the necessary documentation, as well as use regulatory documents when carrying out these works.

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. Commissioning 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" No. 262 of 26.12.2019.
3. 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" No. 262 of 26.12.2019.

Compliance of Atlas of new professions with the EP:

1. Reactor equipment engineer.
2. Developer-designer of electric and thermal energy storage devices.
3. RES Operational Dispatcher.

2. General characteristics of the educational program

Currently, the rapid development of industry and energy dictates its requirements, and the general renewal of technological installations requires their careful operation. Efficient use of energy is a continuous and constant necessity. Due to the fact that 85% of electricity in Kazakhstan is generated at coal-fired thermal power plants, the need for training in this field will be constantly high. The uniqueness of the educational program lies in the fact that this activity is associated with high risks caused by the operation of equipment with high parameters of the working environment (temperature, pressure) and large-sized structures. In addition, today it is difficult to imagine life without heat, electricity and hot water supply. In this regard, the purpose of the educational program is to create a future competent specialist in thermal power engineering and thermal engineering.

The modular educational program has been developed in accordance with the National Qualifications Framework and is aligned 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 modular educational program **7M07101 "Thermal Engineering"** 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 graduate student, including the completion of a master's thesis;
- final state certification in the form of passing the state exam in the specialty and preparation and defense of the master's thesis.

The standard period for the development of a modular educational program for the scientific and pedagogical field of study is 2 years.

The complexity of mastering a modular educational program for undergraduates indicated in credits for the entire period of study in accordance with the State Educational Standard of the Republic of Kazakhstan in the field of training **7M07101 Thermal Engineering**, including all types of classroom and independent work of the student, practice, and the time allotted for quality control in full-time education is 120 credits, including:

77 credits for the study of academic disciplines, 11 credits for all types of practices (pedagogical practice – 2 credits, research practice – 9 credits), research work of a graduate student - 24 credits, 8 credits for final certification.

3. Competence model (passport) of the graduate.

3.1 Areas of professional activity

The field of professional activity of the Master is heat power industry as an integral part of the technique, which includes a set of means and methods of human activity aimed ed for the generation and application of heat, the management of its flows and conversion of various types of energy into heat.

3.2 Types of professional activities:

- energy systems and complexes;
- energy supply systems of technical facilities and economic sectors;
- energy supply systems of industrial enterprises;
- energy supply systems of autonomous objects;
- power plants;
- power plants and complexes based on non-traditional and renewable energy sources;
- thermal technological schemes of production;
- technological installations for the production, distribution and use of heat;
- steam and water heating boilers for various purposes, steam generators of nuclear power plants;
- steam and gas turbines, power units;
- installations for the production of compressed and liquefied gas, compressor;
- refrigeration and cryogenic installations, air conditioning systems, heat pumps;
- installations, systems and complexes of high-temperature and thermo-wet technologies, chemical reactors;
- auxiliary thermal equipment, heat and mass transfer devices for various purposes;
- heating networks;
- heat carriers and air conditioning units of working bodies;
- process fluids, gases and vapors;
- melt, solid and bulk bodies as heat carriers and working bodies of energy and technological installations;
- fuel and oils;
- fuel and oil preparation systems;
- installations, systems and complexes for the preparation and use of water of normalized quality;
- technological installations for the preparation and use of water from thermal and nuclear power plants: pre-cleaning equipment, ionite and membrane installations, technological installations for the preparation and use of water from heating networks and heat consumers;
- circulating water supply systems;
- sewage treatment plants, systems and complexes;
- installations, systems and complexes for the preparation and use of water in food industry;
- technological equipment for the preparation and operation of water from evaporators and steam turbines;
- systems of automatic control and control of heat and electrical-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) formation of worldview, civic and moral principles of a competitive future specialist on the basis of knowledge of information and communication technologies, creation of communication programs in the state, Russian and foreign languages, orientation to a healthy lifestyle, self-improvement and professional achievements;

2) form a system of general competencies that ensure the socio-cultural development of the personality of the future specialist on the basis of the formation of worldview, civic and moral principles;

3) development of interpersonal social and professional communication skills in the state, Russian and foreign languages;

4) promotes the development of information literacy by mastering and using modern information and communication technologies in all spheres of their life and activity;

5) develops self-development and educational skills throughout life;

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

3.4 Core competencies

- conducting research and development in the field of heat power engineering and heat technology, energy use and energy supply in separate sections (stages, tasks) of the topic in accordance with approved methods;
- development of program plans and methods for conducting tests, participation in experiments, observations and measurements, drawing up their descriptions and conclusions during the development of modernization and operation of thermal power and heat engineering equipment;
- carrying out technical justification of the decisions taken on the development of heat power and heat technology systems;
- development of mathematical and simulation models of the functioning of thermal power and heat technology installations and systems;
- analysis of the state and prospects for the development of heat power engineering, heat technology power engineering, using the necessary tools and methods;
- analysis of the state and dynamics of 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 studies;
- development of energy-efficient heat-technological equipment, installations and complexes;
- use of methods of modeling and optimization of thermal processes, installations and systems;
- implementation of fundamentally new waste-free processes and complexes;
- establishment of the potential and reserves of energy saving in the production sectors;
- development of new promising and unconventional methods of processing technological and natural waters and fuel preparation;
- research and implementation of low-waste and non-waste technologies;
- study of physico-chemical processes of water and fuel preparation with extensive use of modeling and computer technologies;
- study of methods for controlling the processes of heat and mass transfer,

methods and devices for converting various types of energy into heat

3.5 Professional competencies

1. Ability to independently solve related problems:
- collection, analysis and interpretation of information (instrumental competence);
- development of ideas and critical arguments (interpersonal competence);
- self-motivation and self-management (systemic competence)
2. Be able to use effectively in different situations:
- own skills (instrumental competence);
- emotional understanding (interpersonal competence);

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

3. Know:

- formulate the goals of the project (program) for solving tasks, determine the priorities for solving tasks (instrumental, subject-specific competencies);

-use of information technologies in the design and assembly of energy, heat-technical, heat-technological equipment, networks and systems (instrumental, subject-specific competencies);;

- compromise between different requirements (cost, quality, safety and deadlines) in long-term as well as short-term planning (interpersonal competencies);

4. Have an understanding:

- on spiritual values and their significance (systemic competence);

- on the consequences of their professional activity (instrumental competence);

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

5. Know and understand:

- fundamentals of 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);

- modern and promising areas of development of heat-energy and heat-technological systems (system and subject-specific competencies);

- principles of operation, technical characteristics and structural features of thermal power and thermal technological installations and systems being developed and used (instrumental and subject-specific competencies);

- methods of conducting theoretical and experimental research in the field of thermal power engineering

- fundamentals of design, construction, installation and operation of thermal power devices and systems (subject-specific competence);

- Requirements for Standardization, Metrological support and life safety in the development and operation of thermal power devices and systems (system and subject-specific competencies);

- methods and means of modeling and optimization of thermal power plants and systems (subject-specific competence);

- basic methods of marketing and management in the field of thermal power engineering (subject-specific competence);

- rules and norms for the design, construction, installation and operation of thermal power systems and installations (subject-specific competence);

6. Mastering:

- thermodynamic methods for calculating heat machine cycles and efficiency of cycles (instrumental and subject-specific competencies);

- methods for calculating the flow and heat transfer of liquids and gases (subject-specific competence);

- methods for calculating heat losses of various consumers of the industrial district (subject-specific competence);

- methods of calculating the hydraulic resistance of heating networks (subject-specific competence);;

- methods of Design, Calculation and regulation of systems for the production and distribution of energy sources (subject-specific competence);;

-with methods of Organization of installation, adjustment and repair of thermal technological equipment and fuel and water supply systems (subject-specific competence).

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

Students are admitted to production, pre-diploma practice in accordance with the order of the rector to conduct practice in accordance with the agreement concluded with enterprises that are the base of practice (or individual contracts or collective agreements). From the side of S. Seifullin KATU each student is assigned heads of practice.

Students of this profile practice at fuel and energy fuel enterprises:-thermal power plants (CHP), condensing power plants (CPS), nuclear power plants (nuclear power plants), low - power boilers, heating networks; - oil and gas processing enterprises; at any industries and enterprises with thermal power equipment.

These are: JSC "Astana energy", JSC "Astana Teplotranzit", State Enterprise for PCV "Kyzylorda Teplotrocenter", State Enterprise "Uzen zhylys", State Enterprise "Teplokommuenergo" in Uzen, Semey, Aktau, state enterprise "Caspian Teylys, Su Arnasy", Aktobe, Transenergo JSC and others."

5. Structure of the educational program

№ 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**	**2640**	**88**
1.1	**The cycle of basic disciplines (BD)**	**1050**	**35**
1)	**The University component (UC):**	**600**	**20**
	Foreign language (professional)	150	5
	History and philosophy of science	150	5
	Pedagogical training	60	2
	Psychology of management	150	5
	Pedagogics of higher school	90	3
2)	**Component of choice (EC)**	**450**	**15**
	High temperature processes and installations	150	5
	Physical and chemical modeling of heat engineering processes		
	Gas turbine units for oil and gas transportation	150	5
	Features and prospects for the development of heat and gas supply in the agro-industrial complex		
	Methods of protection of equipment from corrosion	150	5
	Systems of technical water supply of thermal power plants		
1.2	**The cycle of core disciplines (PD)**	**1590**	**53**
1)	**The University component (UC):**	**1020**	**34**
	Engineering experiment	120	4
	Methods of extim energysaving	150	5
	Scientific and tehnical problems in power system and heattechnology	150	5
	Heat supply based on renewable energy sources	150	5
	Cycles and installations of processes heating engineers	180	6
	Research practice	270	9
2)	**Component of choice (EC)**	**570**	**19**
	Designs of furnace-burner devices for heat supply of buildings and structures	120	4
	Ways of development of low-power boilers		
	Production waste plants at thermal power stations	150	5
	Production of secondary fuels from waste		
	Approximate methods for solving thermal engineering problems	150	5
	Technological methods to reduce the formation of harmful emissions at thermal power plants		

	Heat transfer calculations in enclosing structures	150	5
	Energy-efficient enclosing structures		
2	**Research work**	**720**	**24**
1)	Research work of a graduate student, including internship and completion of a master's thesis (NIRM)	720	24
3	**Additional types of training (ATT)**	**-**	**-**
4	**Final certification (FC)**	**240**	**8**
1)	Preparation and defense of a master's thesis (Dmt)	240	8
	Total	**3600**	**120**

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

НАО "Казахский агротехнический исследовательский университет им.С.Сейфуллина"

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

УТВЕРЖДАЮ
Член Правления - проректор по научной и
инновационной деятельности
НАО "КАТИУ им. С. Сейфуллина"
Сыргалиев Е.О.
24 06 2024 г.

УЧЕБНЫЙ ПЛАН

на 2024-2026 учебные годы
Область образования: 7М07 Инженерные, обрабатывающие и строительные отрасли
Направление подготовки: 7М071 Инженерия и инженерное дело
Группа образовательных программ: М098 Теплоэнергетика
Образовательная программа: 7М07101 Термическая инженерия (2 г.)
Степень: Магистратура по направлениям (Научно-педагогическое)
Форма обучения: Очное (магистратура 2 года) семестры
Год поступления: 2024год (летний прием)

Шифр модуля	Наименование модуля	Цикл дисциплины	Компонент дисциплины	Код дисциплины	Наименование дисциплины	Академические кредиты	Контроль по академическим					Объем в часах							Распределение			
							Экзамены	Дифференцированный зачет(практика)	Дифференцированный зачет(курсовая)	Практика/НИР	Курсовая работа/проект	Всего	Аудиторные	в т.ч. Лекции	в т.ч. Практические	в т.ч. ЛПЗ	СРМП	СРМ	1 курс 1	1 курс 2	2 курс 3	2 курс 4
																			Недель в академическом периоде			
																			15	15	15	15
Общие модули																						
1	Общественные науки	БД	ВК	IYaP 5202	Иностранный язык (профессиональный)	3	1					90.0	30.0	0	30	0	12	48	3.0			
2		БД	ВК	PU 5205	Психология управления	5	1					150.0	45.0	15	30	0	20	85	5.0			
3		БД	ВК	IFN 5201	История и философия науки	5	2					150.0	45.0	15	30	0	20	85		5.0		
4		БД	ВК	IYaP 5210	Иностранный язык (профессиональный)	3	2					90.0	30.0	0	30	0	12	48		3.0		
5		БД	ВК	PVSH 5207	Педагогика высшей школы	3	2					90.0	30.0	15	15	0	12	48		3.0		
6		БД	ВК	PP 6206	Педагогическая практика	2				60		60.0		0	0	0	0	0				2.0
Модули специальности/образовательной программы																						
7	Профессиональный	ПД	ВК	NTPTT 5301	Научно-технические проблемы теплоэнергетики и теплотехнологии	5	1					150.0	45.0	15	30	0	20	85	5.0			
8		ПД	ВК	IE 5306	Инженерный эксперимент	4	2					120.0	45.0	15	30	0	16	59		4.0		
9		ПД	ВК	CUTP 5305	Циклы и установки теплотехнических процессов	6	2					180.0	60.0	30	30	0	24	96		6.0		
10		ПД	ВК	NOTA 6307	Надежность оборудования ТЭС и АЭС	5	3					150.0	45.0	15	30	0	20	85			5.0	
11		ПД	ВК	TSTA 6308	Технологические системы ТЭС и АЭС	5	3					150.0	45.0	15	30	0	20	85			5.0	
12		ПД	ВК	PTE 6309	Проектирование тепловых электростанций	6	3					180.0	60.0	30	30	0	24	96			6.0	
13		ПД	ВК	IP 6304	Исследовательская практика	6				180		180.0		0	0	0	0	0				6.0
14		ПД	КВ	OOPCT 5302	Образование отходов в подразделениях и цехах теплоэлектростанции	5	1					150.0	45.0	15	30	0	20	85	5.0			
15				PVTPPO 5302	Получение вторичного топлива при переработке отходов		1						45.0	15	30	0	20	85				
16		ПД	КВ	TMSOVVT 5303	Технологические методы снижения образования вредных выбросов на ТЭС	5	1					150.0	45.0	15	30	0	20	85	5.0			
17				PMRTZ 5303	Приближенные методы решения теплотехнических задач		1						45.0	15	30	0	20	85				
18	Базовый	БД	КВ	GUDTNG 5203	Газотурбинные установки для транспортировки нефти и газа	5	1					150.0	45.0	15	30	0	20	85	5.0			
19				OPRTA 5203	Особенности и перспективы развития теплогазоснабжения в АПК		1						45.0	15	30	0	20	85				
20		БД	КВ	KMTP 5204	Компьютерное моделирование теплотехнических процессов	5	2					150.0	45.0	15	30	0	20	85		5.0		
21				VPU 5204	Высокотемпературные процессы и установки		2						45.0	15	30	0	20	85				

22		БД	КВ	RRET 6208	Режимы работы и эксплуатация ТЭС	6	3					180.0	60.0	30	30	0	24	96			6.0	
23		БД	КВ	EE 6209	Электрооборудование электростанций	4	3					120.0	45.0	15	30	0	16	59			4.0	
	Научно-исследовательская работа (НИР)																						
24	Исследовательский	НИР	ОК	NIRMVVMD 5501	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	2				60		60.0		0	0	0	0	0	2.0			
25		НИР	ОК	NIRMVVMD 5502	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	4				120		120.0		0	0	0	0	0		4.0		
26		НИР	ОК	NIRMVVMD 6503	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	4				120		120.0		0	0	0	0	0			4.0	
27		НИР	ОК	NIRMVVMD 6504	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	14				420		420.0		0	0	0	0	0				14.0
1	**Общеобразовательные дисциплины(ООД)**					**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Обязательный компонент(ООД/ОК)					0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Вузовский компонент(ООД/ВК)					0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Компонент по выбору(ООД/КВ)					0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	**Базовые дисциплины(БД)**					**41**		**0**	**0**	**60**	**0**	**1230**	**375**	**120**	**255**	**0**	**156**	**639**	**13**	**16**	**10**	**2**
	Обязательный компонент(БД/ОК)					0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Вузовский компонент(БД/ВК)					21		0	0	60	0	630	180	45	135	0	76	314	8	11	0	2
	Компонент по выбору(БД/КВ)					20		0	0	0	0	600	195	75	120	0	80	325	5	5	10	0
3	**Профилирующие дисциплины(ПД)**					**47**		**0**	**0**	**180**	**0**	**1410**	**390**	**150**	**240**	**0**	**164**	**676**	**15**	**10**	**16**	**6**
	Обязательный компонент(ПД/ОК)					0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Вузовский компонент(ПД/ВК)					37		0	0	180	0	1110	300	120	180	0	124	506	5	10	16	6
	Компонент по выбору(ПД/КВ)					10		0	0	0	0	300	90	30	60	0	40	170	10	0	0	0
Итого теоретического обучения						112	17	0	0	960	0	3360	765	270	495	0	320	1315	30.0	30.0	30.0	22.0
ДВО	**Дополнительные виды обучения**																					
ИА	**Итоговая аттестация**											0										
	Оформление и защита магистерской диссертации					8						240.0										
	Итого					8				4		240										
						120				964		3600	765	270	495	0	320	1315				

Директор института послевузовского образования — Хусаинова Жибек Сеитовна
Декан факультета — Исенов Султанбек Сансызбаевич
Заведующий кафедрой — Мергалимова Алмагуль Каирбергеновна

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
MASTER

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 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 and research practice are determined by the working curriculum of educational program

Note: for the winter enrollen of Master 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 KATIU", Protocol №12, of 28.03.2024 y.

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

MASTER

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
		36	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
7M07103 - "Electricity networks", 7M07104 - "Power supply of industrial enterprises cities and agro industrial complexes" (Scientific & pedagogical direction)																																																					
I	PW	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	H	H	H	H	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	P/TD/RP	RP/S	RP/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H	H
II	H	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	E/P	E/P	H	H	H	H	U/RP	U/RP	U/RP	U/RP	U	U	U	U	U	U	U	U	U	U	FE	FE	FE	FE	FE	FE	FE	FE							
7M07114 -"Power supply of industrial enterprises cities and agro industrial complexes", winter reception																																																				
I	PW	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	H	H	H	H	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	P/TD/RP	RP/S	RP/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H	H
II	H	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	E/P	E/P	H	H	H	H	U/RP	U/RP	U/RP	U/RP	U	U	U	U	U	U	U	U	U	U	FE	FE	FE	FE	FE	FE	FE	FE							
7M07101 - "Thermal Engineering", 7M07102-"Heat and gas supply, ventilation and eco-engineering in agriculture "																																																				
I	PW	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	P/H	H	H	H	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	P/TD/H	D/H/S	S/H	S/H	S/H	S/H	S/H	H	H	H	H	H	H	H
II	H	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	P/H	H	H	H	U/TP	U/TP	U/EP	U/EP	U/EP	U/EP	U/EP	U/EP	U/EP	U/EP	LI/EP	U/EP	U	U	U	U	U	FE	FE	FE	FE	FE	FE	FE							
7M07102-"Heat and gas supply, ventilation and eco-engineering in agriculture " , winter reception																																																			
I																	H	H	H	H	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	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	H
7M06204 - "Multiservice Telecommunication Technologies "																																																			
I	PW	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	H	H	H	H	/U/TP	/U/TP	/U/TP	/U/TP	/U	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	E/P	E/P	P/TD/H	H/S	H/S	H/S	H/S	H/S	H/S/S	H	H	H	H	H	H	H
7M06204 - "Multiservice Telecommunication Technologies ", winter reception																																																			
1-II	H	/U	/U	/U/TP	/U/TP	/U	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	E/P	E/P	H	H	H	H	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U	/U	/U	E/P	E/P	P/TD/H	H/S	H/S	H/S	H/S	H/S	H/S/S	H	H	H	H	H	H	H
7M06205 - "Radio-electronic technologies and systems "																																																			
I	PW	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	H	H	H	H	/U/TP	/U/TP	/U/TP	/U/TP	/U	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U	/U	E/P	FE	FE	FE	FE	FE	FE							
7M07105 - "Control of technical systems"																																																			
I	PW	/U	/U	/U	/U	/U	U	/U	/U	/U	/U	/U	U	/U	/U	/U	E/P	E/P	H	H	H	H	/U	/U/TP	/U/TP	/U/TP	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	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	/RP/U	/RP/U	/RP/U	/RP/U	/RP/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	H	H	H	H	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	FE	FE	FE	FE	FE	FE							
7M08705 - "Energy supply and automation of agriculture"																																																			
I	PW	/U	/U	/U	/U	/U	U	/U	/U	/U	/U	/U	U	/U	/U	/U	E/P	E/P	H	H	H	H	/U	/U/TP	/U/TP	/U	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U/RP	/U	/U	/U	/U	/U	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	PW	/U	/U	/U	/U	/U	U	/U	/U	/U	/U	/U	U	/U	/U	/U	E/P	E/P	H	H	H	H	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	U/RP	E/P	FE	FE	FE	FE	FE	FE							
7M07105 - "Control of technical systems", winter reception																																																			
I	PW	/U	/U	/U	/U	/U	U	/U	/U	/U	/U	U	/U	/U	/U	/U	E/P	E/P	H	H	H	H	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	/U/TP	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

Conventional signs

Presentation week	Theoretical training	Enrollment in disciplines	Examination session	Passing FX	Holidays	Summer semester	Final examination	Teaching practice	Educational practice	Industrial practice	Undergraduate practice
PW	•	TD	E	P	H	S	FE	TP	EP	IP	U

Public holidays

Director of the Institute of Postgraduate Education — Husainova Zhibek Seitovna

Dean of the Faculty — Isenov Sultanbek Sansyzbayevich

8. Description of the disciplines of compulsory and university components

№	Name of discipline	Short description of discipline (30-50 words)	Number of credits	Emerging competencies (codes)						
				ON 1	ON 2	ON 3	ON 4	ON 5	ON 6	ON 7
BD/UC cycle										
1	Foreign language (professional)	Language of professional and academic purpose at an advanced level, scientific and conceptual apparatus of the specialty, scientific information base, interpretation of scientific information, argumentation, persuasion, scientific controversy, academic writing.	5		+					
2	History and philosophy of science	The structure and functions of scientific knowledge, methods of science in their professional activities; differences between ideological, political, religious constructions from scientific concepts. Means and methods of modern science, analysis of philosophical and ideological, epistemological, logical and methodological issues, the style of scientific thinking.	5		+		+			
3	Pedagogics of higher school	Fundamentals of pedagogy of high school. Subject and tasks of pedagogy of higher school. Methodology and methods of pedagogical research in higher education. Didactics of higher school. Pedagogical process in higher school. Laws and principles of training. Methods, forms and means of higher education. The current state of higher education in the Republic of Kazakhstan. Professional development of a teacher of higher education. The process of education in higher education. The purpose of education as a pedagogical problem. Teaching and educational team as a form of functioning of a holistic pedagogical process.	3	+	+		+			
4	Psychology of management	Introduction to the psychology of management. Conceptual apparatus of the psychology of management. Leader and team. Conflicts in the workplace. Managerial communication. Decision making technology. The	5		+		+			

		concept of the subject and object of management. Leader and leader. Psychology of the order. Personality as a subject and object of management. Democratic leadership style and its features. Psychology of criticism. Psycho types of subjects of communication. Psychological persuasive technique. Psychological problems of selection of leading cadres. Psychological problems of training and retraining of managerial personnel. Selection and placement of personnel. Staff rotation. Certification and staff turnover.								
BD/EC cycle										
5	High temperature processes and installations	Formation of in-depth knowledge of the characteristics, principles of operation, features of operation of high-temperature installations. Development of skills of practical application of the principles of organization of high-temperature technological processes, determination of parameters of individual stages of processes in heat-technological reactors, work with structural diagrams of high-temperature heat-technological installations.	5						+	+
6	Gas turbine units for oil and gas transportation	Formation of basic knowledge on GTU maintenance technologies in accordance with the requirements of regulatory and technical documentation. Skills of planning and organization of maintenance, works on carrying out scheduled preventive maintenance of gas turbine units, organization of inspections of technical condition and industrial safety expertise, evaluation of operational reliability of gas turbine installations are being developed.	5						+	+
7	Methods of protection of equipment from corrosion	Knowledge is being formed about: the mechanisms of corrosion, its impact on the engineering infrastructure of cities; methods and methods of reducing and preventing corrosion; the use of modern materials, equipment, devices, technologies; improving the operation of protection systems. Skills are being developed: determination of characteristics and parameters of corrosion processes; calculation of corrosion protection of	5						+	+

		systems; application of basic means of protection of engineering systems and equipment from corrosion.								
8	Features and prospects for the development of heat and gas supply in the agro-industrial complex	Formation of a new business psychology focused on resource and energy saving, waste disposal and environmental protection among future specialists competent in the field of features and prospects of heat and gas supply in the agro-industrial complex, in the production of agricultural food and livestock breeding, familiarization with the possibilities of improving the efficiency of agro-industrial enterprises complex during the decarbonization of energy systems.	5						+	+
9	Systems of technical water supply of thermal power plants	The purpose of teaching the discipline is the formation of students' competencies in the design and operation of water supply systems for thermal power plants and nuclear power plants, which determine the energy efficiency, safety and efficiency of power plants. Course content: the course covers the types of water supply systems, issues of organization and operation. Ways of modernization of technical water supply systems in order to increase the efficiency of the stations.	5						+	+
10	Physical and chemical modeling of heat engineering processes	Formation of the ability of students to apply the basic laws of natural science disciplines, methods of physical and chemical modeling for making design decisions in their professional activities, in order to simulate processes, devices, systems and methods in the field of power engineering.	5			+		+	+	+
PD/UC cycle										
11	Engineering experiment	Familiarization with the theoretical provisions of the theory of planning experimental research; formation of skills: on the organization and planning of scientific work, conducting a scientific experiment and processing its results; use (under the guidance of) modeling methods; data collection, analysis of scientific and technical information on the subject of research; development of technical documentation, basic regulatory documents on intellectual	4			+		+	+	+

		property issues, preparation of documents for patenting								
12	Methods of extim energysaving	Formation of competencies of undergraduates in the field of modern approaches to energy conservation and energy management, in which issues of energy management, efficiency improvement are considered not only from the point of view of technical, but also taking into account organizational, economic, motivational, informational aspects. The methods of organizing the optimal functioning and development of the energy supply part of organizations are considered; the principles of energy resources management and energy efficiency improvement.	5						+	+
13	Scientific and tehnical problems in power system and heattechnology	Scientific and technical problems in the generation and distribution of energy resources, ways of rational use of various types of energy resources with high efficiency, reliability and safety are considered. The scientific search for optimal solutions to the problems arising in the generation and distribution of energy is carried out, taking into account the requirements of quality, reliability and cost, life safety and environmental cleanliness.	5					+	+	+
14	Heat supply based on renewable energy sources	Formation of knowledge about renewable energy sources, the possibilities of their use in solving problems of heat supply and energy conservation. Study of types of renewable energy sources, prospects and features of use, their role in the overall energy production; fundamentals of State energy policy, methods and criteria for evaluating the efficiency of energy use, taking into account economic and environmental requirements in modern conditions.	5						+	+
15	Cycles and installations of processes heating engineers	Study of: patterns of energy conversion of various types, accompanied by thermal phenomena; cycles of internal combustion engines and gas turbines, the design of internal combustion engines, gas turbine engines and the basics of their calculation; devices of refrigeration units and air conditioning systems; heat exchange, which is the doctrine of the processes of heat propagation in space with an	6						+	+

		inhomogeneous temperature field; design and basics of calculation of heat exchangers.								
PD/EC cycle										
16	Designs of furnace-burner devices for heat supply of buildings and structures	Formation of undergraduates' competencies in the field of designs of furnace and burner devices for heat supply of buildings and structures for various purposes using the possibilities of resource and energy saving, as well as renewable energy sources based on waste disposal and recycling.	4						+	+
17	Production waste plants at thermal power stations	Familiarization of students with: waste generation processes of thermal power plants; types of waste entering the environment, their physical and chemical characteristics; indicators of their energy and environmental impact; technologies for capturing solid particles from flue gases; methodology of system-structural analysis, which examines trends and alternatives for the development of waste-free energy production and all processes of interaction of thermal power plants with the environment.	5						+	+
18	Production of secondary fuels from waste	Formation of knowledge about the methods of handling industrial, household waste, secondary raw materials and fuel resources. Acquaintance with the technological reasons for the formation of waste and harmful emissions. Mastery of skills: development of proposals for the introduction of new equipment and technologies and their technological and economic justification; calculation and analysis of resource and energy saving as a result of their implementation.	5						+	+
19	Approximate methods for solving thermal engineering problems	Formation of undergraduates' in-depth knowledge of methods for solving heat engineering problems, the use of computer technologies, methods of modeling and optimization of heat power and heat technology processes, installations and systems. Mastering methods and techniques of analog, physical and mathematical modeling of processes, apparatuses and systems of heat power	5			+		+		

		engineering and heat technology, skills of conducting a computational experiment.								
20	Ways of development of low-power boilers	The study of the principles of operation of the designs of modern low-power boilers, the processes occurring in them, promising directions for the development of small boiler construction. Acquisition of skills: performing heat engineering, hydraulic and aerodynamic calculations of low-power boiler units; operation of low-power boiler units, commissioning and research work; development and optimization of technological schemes for the production of thermal energy.	4						+	+
21	Heat transfer calculations in enclosing structures	The purpose of mastering the discipline is: to obtain in-depth information about the current level of knowledge in the field of heat and mass transfer in building envelopes, about the theory of the state and moisture transfer in building materials, about the laws of moistening building envelopes, about the main directions of energy saving when improving building envelopes due to full accounting physical factors.	5						+	+
22	Technological methods to reduce the formation of harmful emissions at thermal power plants	Formation of undergraduates: a clear understanding of the principles of environmental engineering policy, properties and interaction of the environment with industrial production; knowledge of the basics of operation and adjustment of various types of environmental devices; skills in choosing the most environmentally efficient construction of a heat engineering process, developing an effective way to suppress the formation of harmful substances and methods for cleaning emissions from thermal power plants.	5			+		+		+
23	Energy-efficient enclosing structures	Formation of in-depth knowledge: in the field of heat and mass transfer; about the current level of development of enclosing structures of buildings and structures; about the theory of the state and transfer of moisture in building materials; about the laws of humidification of enclosing structures; about the main directions of energy	5						+	+

		conservation in improving the enclosing structures of buildings due to the possible full consideration of physical factors acting in enclosing structures.								