Ministry of Agriculture of the Republic of Kazakhstan
S. Seifullin Kazakh agrotechnical University

The Academic Council of the University
considered
2022 «31» 08
protocol № 19

Approve
Chairman of the board of JSC
"K. Seifullin Kazakh agrotechnical University named after S. Seifullin
K.K. Aituganov

EDUCATIONAL PROGRAM
6B07101 Thermal Power Engineering

Code and classification of the field of education:
6B07 "Engineering, manufacturing and construction industries"
Code and classification of training areas:
6B071 Engineering and engineering trades
The international standard classification of education
code: 0710
Qualification: Bachelor's degree in the educational program
6B07101 Thermal Power Engineering
Training period: 4 years

Astana 2022

Author's team:

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JSC named after S. Seifullin "KATU" No. 932 dated 12.12.2018, the author's team was approved by the order.

Considered at the meeting of the Department of heat power engineering,
Protocol No. 1 of "27" 08.2022

Approved by the Council of the Faculty of energy,
Protocol No. "" _ _ _ _ 2022

Dean of the Faculty of energy _____ IsenovS.S.

Head of the department" Heat Power Engineering" _____ Mergalimova A.K.

Content

1. Passport of the educational program.

1.1 purpose of the educational program.

Training of qualified specialists in demand on the labor market with scientific, pedagogical and professional competencies in accordance with the requirements of the National Qualification Framework of the Republic of Kazakhstan and the industry qualification framework for carrying out professional activities within the framework of ensuring high-quality operation and improvement of facilities for heat and energy engineering.

The objectives of the educational program are the formation of 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.

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

Generated learning outcomes.

RT 1 practice the skills of mastering the culture of thinking, analyzing and interpreting information, developing ideas and critical arguments, and increasing productivity and physical resilience. Be able to communicate effectively in oral and written, including in a foreign language, in a professional environment and in society, be ready for effective and stress-resistant work in a team.

RT 2 use the developed competencies in the field of Economics and law, the basics of anti-corruption culture, ecology and life safety, as well as entrepreneurial skills, leadership and a tendency to innovation in solving professional problems.

RT 3 application of knowledge of the laws of Environmental Protection in complex engineering activities for the production and distribution of energy. Application: New efficient energy and resource-saving technologies in energy enterprises, renewable energy sources in the thermal power industry.

RT 4 application of basic mathematical, natural science knowledge in an interdisciplinary context to solve heat and electricity problems.

RT 5 apply knowledge about the main and auxiliary equipment of energy production in computational, design, experimental and research work.

RT 6 application of professional competencies in solving practical problems in the field of operational, production and technological, installation and repair activities. The influence of the water-chemical regime on the operational characteristics of heat-power equipment.

RT 7 apply basic knowledge of heat engineering, mechanics of liquids and gases, measurements of heat engineering, structural materials to solve engineering problems in the professional field. Understanding the general principles, structure and function of thermal systems, setting and solving problems of energy engineering.

RT 8 apply theoretical and practical knowledge to solve educational, practical and professional tasks in the field of Study; know the basics and methods of scientific research and academic writing and apply them in the field of study; understand the consequences of the principles and culture of academic integrity.

RT9 the use of information and communication technologies in professional activities, applied software for the Design, Modeling, Optimization of thermal power facilities.

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

At present, the rapid development of industry and energy dictates its own requirements, and the general modernization of technological installations is their careful use. The efficient use of energy

and renewable resources is a continuous and sustainable need. Due to the fact that 85% of electricity in Kazakhstan is produced at coal thermal power plants, the need for preparation for this EP is constantly growing. In addition, today it is difficult to imagine life without heating, electricity and hot water supply. In this regard, the purpose of the educational program is to create a future qualified specialist in the heat-energy and heat-technical profile.
The educational program was developed in accordance with the National Qualifications Framework, agreed with Dublin descriptors and the European Qualifications Framework.
This educational program consists of 3 cycles: 1) general education disciplines - op; basic disciplines-op; profile disciplines-op. 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 training, the student collects 219 theoretical and 21 practical training credits.
The disciplines of The Bachelor's professional activity in the educational program 6b071 - "Thermal Power Engineering" are systems:
- thermal power plants;
- industrial and heating boilers;
- Heat Technologies;
- centralized and autonomous energy supply of industrial enterprises and organizations;
- production and distribution of energy sources;
- heat transfer and heating networks;
- water and fuel preparation;
- Automated management of heat power and heat technology facilities;;
- also, methods and means of modeling and optimization of objects of thermal power engineering and thermal technology, basic and auxiliary equipment, processes and apparatuses of thermal technology, electrical machines and apparatuses.

3. Competence model (passport) of the graduate.

3.1 areas of professional activity.
The field of professional activity of The Bachelor Heat power industry is an integral part of the technique, which includes a set of means, methods and methods of human activity created for the generation and application of heat, the management of its flows and the conversion of various types of energy into heat.
3.2 types of professional activities.
Types of professional activity of a graduate:
- energy systems and complexes;
- energy supply systems for technical facilities and economic sectors;
- energy supply systems of industrial enterprises;
- energy supply systems for 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, installations of 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 the 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

1) assessment of the surrounding reality on the basis of worldview positions formed by knowledge of the basics of philosophy, which provides a scientific understanding and study of the natural and social world by methods of scientific and philosophical knowledge;
2) explanation of the content and originality of the mythological, religious and scientific worldview;
3) prove your assessment of everything that happens in the social and industrial spheres;
4) a deep understanding of the main stages, patterns and originality of the historical development of Kazakhstan and a civic position based on scientific analysis;
5) use methods and techniques of historical description to analyze the causes and consequences of events of the modern history of Kazakhstan;
6) assess the situation in various areas of interpersonal, social and professional communication, taking into account the basic knowledge of Sociology, Political Science, cultural scientists and psychology;
7) synthesis of knowledge of these sciences as a modern product of integrative processes;

8) use scientific methods and techniques for studying exact science, as well as the entire socio-political cluster;

9) develop their moral and civil position;

10) operation of public, business, cultural, legal and ethical standards of Kazakhstan society;

11) demonstrate personal and professional competitiveness;

12) apply knowledge in the field of social and humanitarian Sciences recognized in the world in practice;

13) carry out the selection of methodology and analysis;

14) summing up the results of the study;

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

16) enter into oral and written communication in Kazakh, Russian and foreign languages to solve the tasks of interpersonal, intercultural and industrial (professional) communication;

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

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

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

20) build an individual educational trajectory throughout life for self-development and career growth, focus on a healthy lifestyle to ensure full-fledged social and professional activity through methods and means of Physical Culture.

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 KATU. S. Seifullin 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.

№	Name of cycles and disciplines	Total labor intensity	
		in academic hours	in academic credits
1	2	3	4
	The cycle of general education disciplines	**1680**	**56**
	Required component	1530	51
	Modern 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
	University components	**150**	**5**
	Fundamentals of Economics and law	150	5
	Cycle of basic disciplines (NP) (list of disciplines in accordance with the IPS)	**3360**	**112**
	University component (BD/UK)	**2190**	**73**
	Fluid and gas mechanics	150	5
	Mathematics 1, 2	270	9
	Physics	120	4
	Theoretical foundations 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
	Thermal technical measurements	150	5
	Materials Science in heat engineering	120	4
	Fundamentals of scientific research	90	3
	Engineering and computer graphics	120	4
	Professional practice	570	19
	Selection component (NP / TC)	**1170**	**39**

	Computer technologies in thermal energy calculations	150	5
	Chemical control at TPP	90	3
	Physico-chemical methods of water preparation	150	5
	Fuel and combustion theory	180	6
	Heat transfer in thermal technical processes and installations	150	5
	Energy saving and energy efficiency in renewable energy sources	150	5
	Alternative renewable energy sources	150	5
	Repair and adjustment of thermal power plants	150	5
	Cycle of profiling disciplines (PP) (list of disciplines in accordance with the IPS)	**1800**	**60**
	University component (IP/IP)	**660**	**22**
	Boiler plants and steam generators	180	6
	Compressors and heat engines	150	5
	Heating networks and Heat Supply Systems	180	6
	Safety equipment in power plants	150	5
	Component of choice (PP/TC)	**1140**	**38**
	High temperature processes and installations	150	5
	Operation of thermal technical equipment	150	5
	Steam and gas turbines	180	6
	Implementation of technological processes and environmental technologies at TPP	180	6
	Operating modes of thermal power plants	150	5
	Theoretical foundations of thermal power plants	180	6
	Calculation of efficiency in the heat power industry	150	5
	Additional types of training by experience (STS)		
	Component of choice (military training and Other types of		

	educational activities that the student determines independently)		
	Final certification	**360**	**12**
	Writing and defending a thesis (project) or preparing and passing a comprehensive exam		
	Total	**7200**	**240**

Appendix 3 Description of disciplines of compulsory and university components

Basic information about the subject:	
1. Name of the discipline	**Foreign Language**
2. Number of loans	**10**
3. Prerequisites:	Foreign language school course

4. Post-requisites:	Professionally oriented foreign language
5. Competencies:	The purpose of teaching the discipline is to increase the initial level of proficiency in a foreign language, achieved at the previous stage of education, and to master the level of communicative professionally-oriented competence necessary and sufficient for solving socio-communicative tasks in various areas of domestic, cultural, professional and scientific activity, as well as further self-education of students when communicating with foreign partners.
6. Course author	**Department of foreign languages**
7. Main literature	**1**. Julie Lachance ((July 21, 2015). *Practice Makes Perfect Premium: Basic English.* McGraw-Hill Education; 2 edition 2. Chris Lele. (March 20, 2018) *The Vocabulary Builder Workbook: Simple Lessons and Activities to Teach Yourself.* Zephyros Press; Workbook edition 3. Deborah Capras (01 Jan 2015). *Small Talk : B1+*. HarperCollins Publishers 4. Mark Hancock (27 Apr 2017). *English Pronunciation in Use* Intermediate Book with Answers and Downloadable Audio. CAMBRIDGE UNIVERSITY PRESS 5. Katie Foufouti (28 Dec 2017). O*xford Skills World: Level 4: Reading with Writing* Student Book / Workbook. Oxford University Press 6. Herbert Puchta, Jeff Stranks, Peter Lewis-Jones (31 Oct 2015). *Think* (SB+audio, WB+audio, TB, Tests – levels 1, 2, 3, 4*)*. CAMBRIDGE UNIVERSITY PRESS 7. British National Corpus: http://www.natcorp.ox.ac.uk 8. The Corpus of Contemporary American English (COCA): http://www.americancorpus.

8. Content of the discipline

The course program is designed for 300 hours of training, including: 90 hours – for classroom work and 180 hours – for independent work. The course ends with passing a comprehensive exam.

1	Vocabulary up to 3000 words	Active dictionary-1200-1500 words, passive dictionary 1500-1800
2	Reading	The formation of reading skills in almost complete understanding 10% is true without special vocabulary when unfamiliar words
3	Writing	Formation of the ability to independently write a note, a personal letter, a greeting card, a questionnaire, a form, a customs declaration, a notification plan(more than 20 sentences without a dictionary)
4	Listening	Formation of the ability to hear sincere messages up to 2 minutes with an understanding of the plot and point of view of the speaker
5	Talking	Formation of verbal communication skills with a duration of 2-3 in monologues and the ability to participate in spontaneous dialogue (10-15 phrases)

1. Name of the discipline	**Kazakh (Russian) language**
2. Number of loans	10
3. Prerequisites:	School course of Russian language and literature
4. Post-requisites:	Professional Russian language

5. Competencies:	Knowledge of the culture of thinking, the ability to analyze and interpret information, the development of ideas and critical arguments, the use of skills to increase employability and physical stability. Be able to communicate effectively orally and in writing, including in a foreign language, in a professional environment and in society, be ready for effective and stress-resistant work in the team.
6. Course author	Department of Kazakh and Russian languages
7. Main literature	1.Туксаитова Р.О. Русский язык и культура речи: учебное пособие для студентов всех специальностей. – Астана: Издательство КАТУ им.С.Сейфуллина, 2018. – 157 с. 2.Туксаитова Р.О. Русский язык. Учебное пособие для студентов экономическихспециальностей. – Астана: «Казахский агротехнический университет им. С.Сейфуллина»,2016. -170 с. 3.Муратбекова А.М., Кукенова Г.А., Омарова Г.Т. Русский язык: учебное пособие для студентов всех специальностей энергетического факультета. – Астана: Издательство КАТУ им. С.Сейфуллина, 2017.- 155 с. 4.Кукенова Г.А., Муратбекова А.М., Омарова Г.Т. Русский язык, учебное пособие для специальностей архитектурного факультета, , КАТУ, 2017. – 202с.
8. Content of the discipline	Formation of knowledge and skills for successful mastery of types of speech activity, giving an idea of the features of the functioning of the Kazakh (Russian) language system, improving language skills in various conditions of household, socio-cultural, professional communication, improving and activating oral and written speech, taking into account all types of activities.
1. Name of the discipline	**Modern history of Kazakhstan**
2. Number of loans	5
3. Prerequisites:	Basic education at school
4. Post-requisites:	Cultural Studies, Political Science, Philosophy, Sociology
5. Competencies:	Knowledge of the culture of thinking, the ability to analyze and interpret information, the development of ideas and critical arguments, the use of skills to increase employability and physical stability. Be able to communicate effectively orally and in writing, including in a foreign language, in a professional environment and in society, be ready for effective and stress-resistant work in the team. The ability to adopt competencies in the field of Economics and law, the basics of anti-corruption culture, ecology and life safety, as well as entrepreneurial skills, leadership and innovation in solving professional tasks.
6. Course author	Department of history of Kazakhstan
7. Main literature	1.Современная история Казахстана [Текст] : учебник для студентов неисторических спец. (бакалавриата) высш. учеб. заведений / Б. Г. Аяган [и др.]. ; ред. Б. Г. Аяган ; Ин-т истории гос-ва М-ва образования и науки РК. – Алматы: Раритет, 2010, 2.Аминов Т.М. Современная история Казахстана. Учебное пособие. Алматы., 2017 г. 3.Назарбаев Н.А. Эра независимости.- Алматы: ҚАЗақ-парат, 2017. 4.Нуртазина Р.А. Национальная безопасность Республики Казахстан: учеб.пособие.- Алматы: Бастау, 2014 5.Ертлесова Ж. Реформы 90-х: интервью с ключевыми участниками

	событий. - Алматы, Атамұра. - 2016. 1.Әминов Т.М. Қазіргі Қазақстан тарихы. А., 2017. 2. Абишева Ж.Р., Енсепов Б.Б. Қазақ зиялыларының азаттық күресі: тарихы мен тағылымы (XIX ғасырдың бірінші ширегі).Оқу құралы. С.Сейфуллин ат. ҚазАТУ баспасы, 2016 ж 3. Абишева Ж.Р., Аубакирова Х.А., Бекмағанбетов Ө.Ж., Енсепов Б.Б. Қазақстанның қазіргі заманғы тарихы.- Астана,2019. http://portal.kazatu.kz/e-books/content/74PgCvMxGEjAe60MLUu1/index.pdf 4. Аубакирова Х.А. История Казахстана. А., 2020.
8. Content of the discipline	Knowledge of the prerequisites for the formation of the statehood of modern Kazakhstan at the origins of world and Eurasian historical processes. Ability to critically analyze historical events on the basis of retrospective, comparative-historical and other scientific methods. To achieve a deep and holistic perception of the history of the Fatherland, the ability to distinguish true history based on facts and evidence.
1. Name of the discipline	**Philosophy**
2. Number of loans	5
3. Prerequisites:	Cultural Studies, Political Science, Philosophy, Sociology, modern history of Kazakhstan.
4. Post-requisites:	History and philosophy of science, philosophy of modern society.
5. Competencies:	Knowledge of the culture of thinking, the ability to analyze and interpret information, the development of ideas and critical arguments, the use of skills to increase employability and physical stability. Be able to communicate effectively orally and in writing, including in a foreign language, in a professional environment and in society, be ready for effective and stress-resistant work in the team. The ability to adopt competencies in the field of Economics and law, the basics of anti-corruption culture, ecology and life safety, as well as entrepreneurial skills, leadership and innovation in solving professional tasks.
6. Course author	Department of philosophy
7. Main literature	Садықова Т.М."Философия" пәнінен барлық мамандықтарға арналған электронды оқу құралы, 2016ж. http://portal.kazatu.kz/e-books/content/YKtMyuy27jL3R68tx85p/ Х. С. Әбділдина, Е.К. Әрінов «Қазақ руханиятының әйгілі ойшылдары» оқу құралы, 2016ж. http://repository.kazatu.kz/jspui/handle/123456789/79 Абдина А.К.Учебное пособие по дисциплине "Философия",2017жhttp://portal.kazatu.kz/e-books/content/JHv44gZT9D7b71HVy70A/ Какимжанова М.К.Учебное пособие "Занимательная философия", 2018г. http://repository.kazatu.kz/jspui/handle/123456789/109 А.К.Абдина, Т.М.Садыкова, Д.В.Ни, Х.С.Абдильдина, А.Г.Гаппасова Учебник по дисциплине "Философия" для

	полиязычных групп, 2017г. http://portal.kazatu.kz/e-books/content/3HU9UezMAoGjg6ekGAGU/ А.К.Абдина, А.Г.Гаппасова Учебное пособие "История и философия науки", 2018г. http://portal.kazatu.kz/e-books/content/iZfpcGtpsvoJ0ETgTPgx/
8. Content of the discipline	The purpose of teaching the discipline is to form in students an idea of a specific field of knowledge about philosophy, philosophical, scientific and religious pictures of the world, the meaning of human life, the forms of human consciousness and the features of its manifestations in modern society, the ratio of spiritual and material values, their role in human life., society and civilization.
1. Name of the discipline	**Political science and sociology**
2. Number of loans	4
3. Prerequisites:	Cultural Studies, Political Science, Philosophy, Sociology, modern history of Kazakhstan.
4. Post-requisites:	Professional activity
5. Competencies:	Knowledge of the culture of thinking, the ability to analyze and interpret information, the development of ideas and critical arguments, the use of skills to increase employability and physical stability. Be able to communicate effectively orally and in writing, including in a foreign language, in a professional environment and in society, be ready for effective and stress-resistant work in the team. Mastering theoretical and practical knowledge to solve educational-practical and professional tasks in the studied field; knowledge of the basics and methods of scientific research and academic writing and their application in the studied field; Understanding the essence of the principles and culture of academic integrity.
6. Course author	Departments of history and philosophy of Kazakhstan
7. Main literature	Х.С. Әбділдина, Т.М. Садықова, З.Б. Хамзина"Саясаттану" пәнінен оқу құралы, 2018ж http://portal.kazatu.kz/e-books/content/ExufE9bbXjnej6GabRaa/ Шериязданова Г.Р. Саясаттану және әлеуметтануға кіріспе, Елеусизова С.К. Жанарстанова М.Б. Политология и социология. Учебное пособие, 2017г. http://portal.kazatu.kz/e-books/content/JgT9dM8mbU1XRrupXK7U/ Әбділдина Х. С., Садықова Т.М., Паңғалиева Ж.Қ. «Әлеуметтану» оқу құралы, 2016 ж. http://portal.kazatu.kz/e-

	books/content/laNYTEL8M7gXfkg53JeA/ Елеусизова С.К. Жанарстанова М.Б. Политология и социология. Учебное пособие, 2017г. http://portal.kazatu.kz/e-books/content/JgT9dM8mbU1XRrupXK7U/
8. Content of the discipline	The ability to adopt competencies in the field of Economics and law, the basics of anti-corruption culture, ecology and life safety, as well as entrepreneurial skills, leadership and innovation in solving professional tasks.
1. Name of the discipline	**Cultural studies and psychology**
2. Number of loans	4
3. Prerequisites:	Cultural Studies, Political Science, Philosophy, Sociology, modern history of Kazakhstan.
4. Post-requisites:	General pedagogy, general psychology
5. Competencies:	1 understanding the psychological foundations of personality and creating an indicative basis for studying personality in students; 2 skills are formed and developed to effectively build interaction and relationships with people, develop a strategy for personal growth, and develop the path of successful professional activity. 3 ability to apply the specifics of psychological knowledge in specific activities; 4 developed skills for analyzing the psychological causes underlying the decrease in the effectiveness of activities; 5 application of psychological knowledge in future practical activities; 6 know and understand the psychological foundations of occupational stress and ways to overcome it.
6. Course author	Department of vocational training
7. Main literature	Гомбрих Э. Өнер тарихы Ұлттық аударма бюросы, Алматы, 2019ж. Саид Эдуард Уади Ориентализм Ұлттық аударма бюросы, Алматы, 2019ж. Молдабеков Ж.Ж. «Қазақтану». - Алматы, 2015. Молтобарова К.И. «Мәдениеттану» - Алматы, 2018. Барнард Алан Антропология тарихы мен теориясы Ұлттық аударма бюросы, Алматы, 2018ж. С.Г.Терминасова Тіл және мәдениетаралық коммуникация Ұлттық аударма бюросы, Алматы, 2018ж. Ғабитов Т.Х. Қазақ мәдениетінің тарихы Алматы: Қазақ

	университеті, 2016. Ғабитов Т.Х., Затов Қ. Қазақ мәдениетінің рухани кеңістігі - Алматы: Раритет, 2013. Ғабитов, Т. Х. Мәдениеттану Алматы: Раритет, 2008. Гомбрих Э. Өнер тарихы Ұлттық аударма бюросы, Алматы, 2019ж. Саид Эдуард Уади Ориентализм Ұлттық аударма бюросы, Алматы, 2019ж. Молдабеков Ж.Ж. «Қазақтану». - Алматы, 2015. МолтобароваК.И.. «Мәдениеттану» - Алматы, 2018. З.Ж.Наурызбаева, Ш.Ә.Нұрпеісова, Е.Исмаилов, Б. Алан Антропология тарихы мен теориясы Ұлттық аударма бюросы, Алматы, 2018ж. С.Г.Терминасова Тіл және мәдениетаралық коммуникация Ұлттық аударма бюросы, Алматы, 2018ж.
8. Content of the discipline	The development of a socio-humanitarian worldview as the basis for the modernization of public consciousness through the formation of cultural identity, understanding the nature of cultural processes, the specifics of cultural objects, the role of cultural values in intercultural communication, the ability to analyze and evaluate cultural situations on the basis of knowledge of the basics of general psychology, personality psychology, individual typological features.
1. Name of the discipline	**Information and communication technologies**
2. Number of loans	5
3. Prerequisites:	Mathematics, physics
4. Post-requisites:	Computer graphics, operating systems, computer networks, database theory.
5. Competencies:	Be able to use information and communication technologies, applied software in professional activities for the Design, Modeling, Optimization of thermal power facilities.
6. Course author	Department of information and communication technologies
7. Main literature	1. Shynybekov D.A., Uskenbayeva R.K., Serbin V.V., Duzbayev N.T., Moldagulova A.N., Duisebekova K.S., Satybaldiyeva R.Z., Hasanova G.I., Urmashev B.A. Information and communication technologies. Textbook: in 2 parts. Part 1, 1st ed. - Almaty: IITU, 2017. - 588 p., ISBN 978-601-7911-03-4 (A textbook in English with the stamp of the Ministry of Education and Science of the Republic of Kazakhstan) 2. Shynybekov D.A., Uskenbayeva R.K., Serbin V.V., Duzbayev N.T., Moldagulova A.N., Duisebekova K.S., Satybaldiyeva R.Z., Hasanova G.I., Urmashev B.A. Information and communication technologies. Textbook: in 2 parts. Part 1, 1st ed. - Almaty: IITU, 2017. - 588 p., ISBN 978-601-7911-04-1 (A textbook in English

	with the stamp of the Ministry of Education and Science of the Republic of Kazakhstan) 3. Urmashev B.A. Information and communication technology: Textbook / B.A. Urmashev. – Almaty, 2016. - 410 p., ISBN 978-601-7940-02-7 (A textbook in English with the stamp of the Ministry of Education and Science of the Republic of Kazakhstan) 4. Нурпеисова Т.Б., Кайдаш И.Н. ИКТ. Учебное пособие / Алматы, изд-во Бастау, 2017, 183 с. 5. Nurpeisova T.B., Kaidash I.N. ICT, Almaty, Bastau, 2017. 241 p. 6. А.У. Актаева , Р.С. Ниязова, А.Ә. ШәріпбайАқпараттық қауіпсіздік және қорғау: техникалық құрылғылар: ЖОО арналған оқулық. – Алматы: Эверо, 2021. – 240 б.
8. Content of the discipline	Mastering theoretical knowledge in the field of modern information technologies, software of professional activities, studying the goals, objectives, problems and prospects of development of information technologies and mastering the skills of 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 the necessary competencies.
1. Name of the discipline	**Physical education**
2. Number of loans	8
3. Prerequisites:	biology, anatomy, human physiology, hygiene, medical control, valeology, pedagogy, psychology
4. Post-requisites:	The program of the course "physical culture" develops students ' skills and abilities in the field of Physical Culture, forms the needs for leading a healthy lifestyle, maintaining and strengthening health, improves the level of Physical Culture to realize their abilities in the process of daily activities
5. Competencies:	Knowledge of the culture of thinking, the ability to analyze and interpret information, the development of ideas and critical arguments, the use of skills to increase employability and physical stability. Be able to communicate effectively orally and in writing, including in a foreign language, in a professional environment and in society, be ready for effective and stress-resistant work in the team.
6. Course author	Шкурков А.С., Сатбаев Е.К.
7. Main literature	1. В.И. Ильинич. Физическая культура студента. Москва,

	2001 г. 2. Г.Д. Иванов, А.К.Кульназаров. Физическое воспитание студентов. Алматы, 2002 г. 3. Теория и методика физического воспитания. Под общ.ред. А.П.Матвеева и Д.Новикова. М., 2005.
8. Content of the discipline	Providing students with a sufficient level of physical fitness of future specialists, a high level of working capacity; developing professionally significant physical and psychomotor abilities. Development of skills that ensure the preservation and strengthening of Health, the development and improvement of psychophysical abilities and qualities.
1. Name of the discipline	**Fundamentals of Economics and law**
2. Number of loans	5
3. Prerequisites:	Economics
4. Post-requisites:	Economics and law
5. Competencies:	Knowledge of the culture of thinking, the ability to analyze and interpret information, the development of ideas and critical arguments, the use of skills to increase employability and physical stability. Be able to communicate effectively orally and in writing, including in a foreign language, in a professional environment and in society, be ready for effective and stress-resistant work in the team.
6. Course author	Department of economic theory and law
7. Main literature	1. Куратко Д.Ф. Кәсіпкерлік: теория, процесс, практика /Ағылшын тілінен аударма. - 10-басылым. - Алматы : Ұлттық аударма бюросы, 2018. - 480 б. / 57 экз. 2. Нұрғалиева А.А., Корабаев Б.С. Кәсіпкерлік: оқу құралы. - С. Торайғыров ат. Павлодар мемлекеттік ун-ті. - Алматы: Экономика, 2016. 3. Кондратьева И. В. Экономика предприятия: учебное пособие для вузов. – Лань, 2021. – 232с. 4. Управление организацией (предприятием): Учебное пособие для бакалавров. - Российский университет транспорта, 2020. – 167с.
8. Content of the discipline	The purpose of teaching the discipline is: the formation of

	knowledge on the basics of Economics and law; the ability to put into practice the knowledge gained on basic legal and economic laws, the establishment of the relationship between the state, legal and economic phenomena, the identification of the properties of subjects of law; the mastery of economic categories and laws, the institutional and legal framework
1. Name of the discipline	**Mathematics 1 and 2**
2. Number of loans	9
3. Prerequisites:	Mathematics 1 and 2. Applied Mathematics
4. Post-requisites:	High Mathematics
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems. Be able to apply knowledge about the main and auxiliary equipment of Energy Industries in computing, design and design, experimental and research activities and use information and communication technologies in professional activities, applied software for Design, Modeling, Optimization of thermal power facilities.
6. Course author	Department of Higher Mathematics
7. Main literature	1. Математика [Текст] : учеб.пособие / К. К. Такабаев, Е. А. Грипп, Г. Р. Елеусизова ; рец.: М. Н. Оспанов, А. Ж. Аскарова. - Астана :КазАТУ им. С.Сейфуллина, 2016. - 249 с. 1. 2. Д.Т. Письменный. Конспект лекций по высшей математике. Москва, Айрис-пресс, 2011. - 608с. 2. К.Н. Лунгу. Сборник задач по высшей математике. М.: Айрис-пресс, 2015. 3. В.А.Болотюк. Практикум и индивидуальные задания по интегральному исчислению функции одной переменной. Учебное пособие. –СПб.: Издательство «Лань», 2012.-336с. 4. Шипачев, В. С. Высшая математика: учебное пособие для вузов / В. С. Шипачев. — 8-е изд., перераб. и доп. — Москва: Издательство Юрайт, 2019. — 447 с. 5. Гусак, А. А.Основы высшей математики: пособие для студентов вузов /А. А. Гусак, Е. А. Бричикова. – Минск: ТетраСистемс, 2012. –208 с. 6. Белько И.В. Высшая математика для инженеров. М.: Новое знание, 2007 7. Данко П.Е., Попов А.Г., Кожевникова А.Я. Высшая математика в упражнениях и задачах. Ч 1. Оникс, 2008

8. Content of the discipline	Basic definitions, concepts, theorems of the sections of mathematical analysis provided for in the program; the ability to: solve mathematical problems, use the accumulated mathematical knowledge in the study of other disciplines; the ability to build mathematical models of typical professional problems and find ways to solve them.
1. Name of the discipline	**Physics**
2. Number of loans	4
3. Prerequisites:	Physics, chemistry
4. Post-requisites:	Theoretical foundations of heat engineering
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems.Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of Physics and Chemistry
7. Main literature	Физика - Physics : (Русско-английский учебно-методический комплекс / Ж. К. Абельдина // . - Астана : КазАТУ, 2012. - С. 346. Физика: учебно-методический комплекс/ Ж. К. Абельдина // . - Астана : КазАТУ, 2012. - С. 128. Физика [Текст] : учеб.-метод. комплекс / Ж. К. Абельдина;. - Астана : КазАТУ им.С.Сейфуллина, 2012. Техникалық ғылымдар және технологиялар бағытындағы мамандықтарға арналған "Физика 1" оқу әдістемелік кешені: К. Абикешов . . - Астана : КазАТУ, 2012. - С. 134. Введение в виртуальную физику: Ж. К. Абельдина ; Астана : Мастер По, 2012. - 177 с. Физика - 1 : А. К. Мукашева Астана : КазАТУ им.С.Сейфуллина, 2012. - 131 с Физика : учебное пособие / А. Сыздыков, Е. Т. Әкімбеков // . -

	Астана : КазАТУ, 2013. - С. 162. Молекулалық физика есептерінің жинағы: Низан Ильясов. - Алматы : Нур-Принт, 2012. - 237 б. Физика: оқу-әдістемелік кешен / Е. Әкімбеков, А. Мусатаева. - Астана : С.Сейфуллин атындағы ҚазАТУ, 2017. - 169 б. Физика : оқу-әдістемелік кешен / Т. С. Нурбатырова ; Нұр-Сұлтан : С.Сейфуллин атындағы ҚазАТУ, 2019. - 160 б. Физика: учебно-метод. комплекс / Ж. К. Абельдина - Нур-Султан : КазАТУ им. С.Сейфуллина, 2019. - 141 с. Физика - 1: практикум / Т. С. Нұрбатырова, А. Б. Мусатаева // . - Астана : КазАТУ, 2017. - С. 123.
8. Content of the discipline	The purpose of the discipline is to acquire knowledge of fundamental physical laws and principles about the most important discoveries in the field of physics, which had a decisive influence on the development of technology and technology. Formation of a scientific approach to the analysis of observed phenomena, understanding of physical phenomena and laws necessary for the activities of a specialist in the energy industry.
1. Name of the discipline	**Theoretical foundations of heat engineering**
2. Number of loans	6
3. Prerequisites:	Physics. Mathematics 1 and 2. Chemistry. Computer science.
4. Post-requisites:	Thermal mass transfer
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems. Understanding the general principles, structure and function of heating systems, knowledge of the basics of heat engineering, liquid and gas mechanics, thermal technical measurements, structural materials for solving engineering tasks in the professional field, setting and solving energy engineering tasks.
6. Course author	Department of thermal power engineering
7. Main literature	1. Достияров А.М., Умирзаков Р.А., Калиева А.К. Техническая термодинамика и теплотехника// Учебник, Нур-Султан,

	КАТУ, 2020 г. 2. Жылутехника : учебное пособие / сост.: А. М. Достияров [и др.] // . - Астана : КазАТУ, 2019. - С. 165. 3. Теплотехника : учеб. пособие / Г. А. Круглов, Р. И. Булгакова, Е. С. Круглова. - СПб. : Лань, 2017. - 208 с. 4. Теплотехника и тепловая работа печей: учеб. пособие / В. Я. Дзюзер. - 2-е изд., испр. и доп. - СПб. : Лань, 2016. - 384 с. 5. Термодинамика және статистикалық механика: оқулық / Р. Харди, К. Бинек ; ауд.: Қ. М. Төреханова, Б. М. Саяқова ; ҚР Білім және ғылым минстрлігі; Ағылшын тілінен ауд. - Алматы : Қазақстан Республикасы Жоғары оқу орындарының қауымдастығы, 2016. - 514 б. 6. Основы гидравлики и теплотехники: учебник / Н. Н. Лапшев, Ю. Н. Леонтьева. - М. : Издательский центр "Академия", 2012. - 400 с.
8. Content of the discipline	Students have the basic forms of heat distribution in space to form the Basic Laws of thermodynamics, processes and equipment used in the design and operation of complex heating systems, their repair and modernization, the Basic Laws of the processes of mutual change of heat and work, the properties of ideal and real working bodies and heat carriers, cycles of thermal power plants and refrigeration machines.
1. Name of the discipline	**Engineering and computer graphics**
2. Number of loans	4
3. Prerequisites:	Physics. Mathematics 1 and 2.
4. Post-requisites:	Technical thermodynamics and heat mass exchange
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of power industries in computing, design and design, experimental and research activities, use information and communication technologies in professional activities, applied software for Design, Modeling, Optimization of thermal power facilities.
6. Course author	Department of thermal power engineering
7. Main literature	Компьютерные технологии при проектировании и

	эксплуатации технологического оборудования : учеб. пособие / Г. В. Алексеев [и др.]. - 3-е изд., испр. и доп. - СПб. : ГИОРД, 2012. - 256 с. Информационно-коммуникационные технологи: учеб. пособие / Т. Б. Нурпеисова, И. Н. Кайдаш ; М-во образования и науки РК. - Алматы : Бастау, 2017. - 544 с. Операционные системы, сети и интернет-технологии : учебник / С. А. Жданов [и др.] ; ред. В. Л. Матросов. - М. : Издательский центр "Академия", 2014. - 272 с.
8. Content of the discipline	Formation of knowledge of design documentation in accordance with the standards, the rules for drawing up drawings of detachable and non-detachable connections of parts and assembly units, execution and reading of technical drawings, execution of sketches of parts, the formation of the necessary skills for drawing up design and technical documentation of production. Master the skills of working with computer drawing programs at a high level.
1. Name of the discipline	**Boiler plants and steam generators**
2. Number of loans	6
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Cycles and installations of thermal processes
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of thermal power engineering
7. Main literature	Atyaksheva A.V. Boilers and heat generators.// Учебноепособие. Nur-Sultan: SakenSeifullin Kazakh Agrotechnical University, 2021. Төмен және орта қуатты қазан қондырғылары және оның

	көмекші жабдықтары: оқу құралы / А. М. Достияров, Г. М. Тютебаева, А. Н. Сапарғалиева ; - Астана : С.Сейфуллин атындағы ҚазАТУ, 2018. - 154 б. B.B. Adamson Heat boilers and steam generators. D. 7449 North Washtenaw Ave Chicago, IL 60645 Version (0.3.4.0 July 25, 2013 Қазандық қондырғылар мен бу генераторлары: учебное пособие / А. М. Достияров, Г. М. Тютебаева // . - Астана : КазАТУ, 2017. Кузнецов К.К. Нормативный метод. Расчёт котла. Москва, 2017 –300 с. Теплотехника и тепловая работа печей [Текст] : учеб. пособие / В. Я. Дзюзер. - 2-е изд., испр. и доп. - СПб. : Лань, 2016. - 384 с. Б.К. Бузников, В.В. Роддатис Производственно – отопительные котельные. – 2019- 105 стр Исследование тепловых процессов и аэродинамических характеристик угольных теплостанций [Текст] : моногр. / А. С. Аскарова, С. А. Болегенова, В. Ю. Максимов. - Алматы : Қазақ университеті, 2015. - 122 с. Котельные установки, работающие на твердом топливе [Текст] : учеб. пособие / Б. А. Соколов. - М. : Издательский центр "Академия", 2012. - 64 с. А.М. Достияров, А.А. Кибарин, Г.М.Тютебаева, Г.С. Катранова. Камеры сгорания и микрофакельные устройства, (монография) Алматы, ул. Байтурсунова, 126/1, Издательство АУЭС им. Г.Даукеева, 2020, 195 с.
8. Content of the discipline	The formation of students ' knowledge about the classification, principles of operation and main characteristics of boiler plants and steam generators, methods of efficient fuel combustion, temperature and water modes of boilers. Possess the skills of thermal, aerodynamic and hydraulic calculation of boilers, the organization of efficient fuel burning in various ignition devices, the analysis of work processes in the tracts of boiler installations and steam generators.
1. Name of the discipline	**Fluid and gas mechanics**

2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Scientific and technical problems in Heat Power Engineering and heat technology
5. Competencies:	Understanding the general principles, structure and function of heating systems, knowledge of the basics of heat engineering, liquid and gas mechanics, thermal technical measurements, structural materials for solving engineering tasks in the professional field, setting and solving energy engineering tasks.
6. Course author	Department of thermal power engineering
7. Main literature	Atyaksheva A.V. Fluid and gas mechanics// Учебное пособие, Nur-Sultan: SakenSeifullin Kazakh Agrotechnical University, 2021. Основы гидравлики и теплотехники : учеб. пособие / З. Х. Замалеев, В. Н. Посохин, В. М. Чефанов. - СПб. : Лань, 2014. - 352 с. Acheson, D. J. Elementary Fluid Dynamics. Oxford, England: Oxford University Press, 2015. Основы гидравлики и теплотехники : учебник / Н. Н. Лапшев, Ю. Н. Леонтьева. - М. : Издательский центр "Академия", 2012. - 400 с. Разработка приближённо-аналитических методов исследования околозвуковых течений в соплах: автореферат дис. на соиск. учён. степ. канд. физ.- мат. наук. Спец. 01.02.05 - Механика жидкости, газа и плазмы / А. Т. Дыйканова ; науч. рук. У. М. Туганбаев. - Бишкек : [б. и.], 2014. - 22 с.
8. Content of the discipline	Formation of a complex of fundamental knowledge in the field of fluid and gas mechanics related to the movement of the working medium. To study 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.
1. Name of the discipline	**Electrical engineering and electronics**
2. Number of loans	4
3. Prerequisites:	Mathematics. Physics. Computer science.
4. Post-requisites:	Cycles and installations of thermal processes
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an

	interdisciplinary context for solving thermal and electrical problems.
6. Course author	Department of thermal power engineering
7. Main literature	1.Электротехника и электроника [Текст] : учебник / А. Н. Горбунов [и др.]; М-во образования и науки Респ. Казахстан. - Астана :КазАТУ им. С. Сейфуллина, 2013. - 615 с. : ил. - Библиогр.: с. 607. - Предм. указ.: с. 608 - 612. - ISBN 5-88156-67-1 2. Регулирование объектов теплоэнергетики. Липатников Г.А., Гузеев М.С. 2007 г. 3. Производственно-практическое издание. Мулёв Ю.В. 2003 г.
8. Content of the discipline	The purpose of the discipline is to teach the basics of Electrical Engineering and electronics, to form knowledge: fundamentals of the theory of Electrical and magnetic circuits; device and principle of operation of transformers and electrical machines; Metrological and operational characteristics of electrical measuring instruments; characteristics and parameters of modern electronic devices, semiconductor devices and integrated circuits, fundamentals of digital electronics and microprocessor.
1. Name of the discipline	**Steam and gas turbines**
2. Number of loans	6
3. Prerequisites:	Higher Mathematics; Physics; Special Problems of fuel combustion; heat-technological processes and installations; heat - mass transfer; technical thermodynamics; principle of Operation, design and thermal calculation of boiler installations
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.

6. Course author	Department of thermal power engineering
7. Main literature	Бу және газ турбиналар : оқу құралы / И. Б. Бақытжанов ; Қазақстан Респ. Білім және ғылым министрлігі. - Алматы : АЭжБУ, 2011. - 83 б Достияров А.М., Сапаргалиева А.Н., Умирзаков Р.А. Бу және газ турбиналары, оқу құралы, 2017 ж. Достияров А.М., Яманбекова А.К., Катранова Г.С. Газтурбиналық қондырғылар: оқуқұралы. Алматы, 2020. Умирзаков Р.А, Ахмедьянов А.У, Айтмагамбетова М.Б. Парогазотурбинные установки. Нур-Султан Казахский агротехнический университет им. С.Сейфуллина, 2020
8. Content of the discipline	Formation of knowledge about the types, designs, heating schemes of steam and gas turbines, features of their operation. Development of skills in analyzing the current state of steam turbine equipment and the formation of recommendations for improving the energy efficiency of the main equipment, mastering the methodology for calculating steam and gas turbines, as well as the development of the ability to compare, formulate conclusions, build your own argument, Express and justify your position.
1. Name of the discipline	**Compressors and heat engines**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of thermal power engineering
7. Main literature	Совершенствование теоретических методов расчёта и

	обоснование параметров и режимов жидкостнокольцевых вакуумных насосов с учётом особенностей 1технологических процессов в АПК [Текст] : Автореферат дис. на соиск. учён. степ. д-ра техн. наук, / Ю. В. Родионов ; науч. консультант А. Н. Завражнов. - Мичуринск-Наукоград : [б. и.], 2013. - 31 с. Сығымдағыштар және жылу қозғалтқыштар. Учебное пособие, Нур-Султан, КАТУ, 2016 г.
8. Content of the discipline	Formation of students ' knowledge, skills and skills of application of modern compressors, blowers, fans, steam and gas turbines of various types used in the energy economy of industrial enterprises by methods of technical and economic indicators of their work. Familiarization with the hydrogazodynamic processes taking place in the machines under consideration, the calculation of the main characteristics of the machines, the principles of equipment selection.
1. Name of the discipline	**Theoretical foundations of thermal power plants**
2. Number of loans	6
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of thermal power engineering
7. Main literature	Мергалимова А.К., Айтмагамбетова М.Б., Теоретические основы тепловых и атомных электростанций. - Нур-Султан: КазАТУ им. С.Сейфуллина, 2020, учебное пособие Тугерова К.Б, Умирзаков Р.А, Бошман Л.А. Теплоэнергетические установки тепловых электростанций.// Учебник. Нур-Султан: Некоммерческое акционерное общество «Talap», 2020 г.

	Энергетикалық терминдер сөздігі = Словарь энергетических терминов = Dictionaryofenergeticsterms (казахско - русско - английский) [Текст : Электронный ресурс] : словарь / Б. К. Алияров, Б. Н. Алияров, М. Б. Алиярова. - Алматы : Нур-Принт, 2017. Теплотехническое оборудование: учебник / В. М. Боровков, А. А. Калютик, В. В. Сергеев. - 3-е изд., стер. - М. : Издательский центр "Академия", 2015. - 192 с. : ил. - (Проф. образование. Энергетика). - Библиогр.: с. 190.
8. Content of the discipline	Familiarization of students with the main characteristics and parameters of the operation of power plants, electric and thermal loads of TPP, basic heating schemes, their elements and technical and economic indicators of the operation of power units of TPP and CPP. To determine the needs of enterprises for heat and electricity, to master the methods of filling steam and condensate losses, the principles of drawing up and calculating thermal schemes of TPP.
1. Name of the discipline	**Fundamentals of scientific research**
2. Number of loans	3
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	High temperature processes and installations
5. Competencies:	Mastering theoretical and practical knowledge to solve educational-practical and professional tasks in the studied field; knowledge of the basics and methods of scientific research and academic writing and their application in the studied field; understanding the meanings of the principles and culture of academic integrity.
6. Course author	Department of thermal power engineering
7. Main literature	Основы методологии научного творчества и инновационной деятельности: учеб. пособие / А. Т. Канаев ; рец.: А. С. Ногай , А. З. Исагулов, А. И. Чернявский ; М-во образования и науки РК. - Астана : КазАТУ им.С.Сейфуллина, 2016. - 185 с. Основы научных исследований и УНИРС: учебник для учащихся вузов / И. Т. Ковриков ; М-во образования и науки РФ; Федеральное агентство по образованию; Гос.

	образовательное учреждение высш. проф. образования "Оренбургский гос. ун-т". - , 3-е изд. - Оренбург : Агенство "Пресса", 2011. Инженерный эксперимент в промышленной теплотехнике, теплоэнергетике и теплотехнологиях [Текст] : учеб. пособие / Б. А. Семенов. - 2-е изд., доп. - СПб. : Лань, 2013. - 400 с.
8. Content of the discipline	The formation of knowledge of the basic principles and problems of scientific research in the field of energy, the principles and trends of the current scientific problem in its application to the chosen direction, opportunities and prospects of the selected scientific topic. Development of practical skills of students in conducting scientific research, analyzing the results obtained and developing recommendations for improving some type of activity.
1. Name of the discipline	**Chemical control at TPP**
2. Number of loans	3
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Boiler plants and steam generators
5. Competencies:	To have knowledge of environmental laws in comprehensive 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 the heat power industry. Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment, the basics of thermal engineering, liquid and gas mechanics, thermal technical criteria, structural materials for solving engineering tasks in the professional field with an understanding of the general principles, structure and functioning
6. Course author	Department of thermal power engineering
7. Main literature	Су дайындаудың технологиялық негіздері және жылу электрорталықтарындағы су жұмысының тәртібі: оқу құралы /

	А. М. Достияров, Р. А. Өмірзақов, А. М. Жақсылық ; - Астана : С.Сейфуллин атындағы ҚазАТУ, 2018. - 240 б. Гужулев Э.П. и др. Водоподготовка и вводно-химические режимы в теплоэнергетике: Омск: Изд-во ОмГТУ, 2005. – 384 с. Физико-химические методы подготовки воды : учеб. пособие / К. С. Идрисова ; М-во образования и науки Респ. Казахстан. - Алматы : АУЭС, 2011. - 82 с.
8. Content of the discipline	The purpose of teaching the discipline is to gain students ' knowledge about the organization and conduct of chemical control over the quality of a heat carrier in the conditions of preparation and operation of equipment at a thermal power plant, methods of preparation, transportation of Water Resources, modes of operation of equipment and water treatment systems, the dependence of technical and economic indicators on regime parameters, methods of chemical control over the state of water.
1. Name of the discipline	**Thermal technical measurements**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Heat mass transfer
5. Competencies:	Understanding the general principles, structure and function of heating systems, knowledge of the basics of heat engineering, liquid and gas mechanics, thermal technical measurements, structural materials for solving engineering tasks in the professional field, setting and solving energy engineering tasks.
6. Course author	Department of thermal power engineering
7. Main literature	Измерительная техника: учебник / В. Ю. Шишмарев. - 3-е изд., испр. - М. : Издательский центр "Академия", 2011. - 288 с. : рис., табл. - (Среднее профессиональное образование. Электротехника). - Библиогр.: с. 282 - 283. Технологиялық өлшеулер және аспаптар: оқу құралы / Б. Р. Нүсіпбеков, А. Қ. Хасенов ; ҚР білім және ғылым Министрлігі; Е.А.Бөкетов атындағы Қарағанды мемлекеттік

	ун-ті. - Қарағанды : Издатсервис, 2011. - 142 б Ақпараттық өлшеу техникасы : оқу-әдістемелік кешен. 5В05071800 - "Электр энергетикасы" мамандығына арналған / Қазақстан Респ. Білім және ғылым министрлігі ; құраст. М. С. Мақажанов ; пікір жазған Ж. Н. Тойбаев. - Астана : С.Сейфуллин атындағы ҚазАТУ, 2015. - 79 б Технологиялық өлшеулер мен өлшеу құралдары [Текст] : оқу құралы / Т. Тапалов. - Үшінші рет толық., қайта өнделді. - Қарағанды : MedetGroup, 2015. - 208 б. Информационно-измерительная техника : учеб.-метод. комплекс / М-во образования и науки Респ. Казахстан ; сост. В. И. Рожков ; рец. И. А. Пястолова. - Астана : КазАТУ им.С.Сейфуллина, 2015. - 59 с. Метрология и измерительная техника: кн. - справ. В 3 т. Т. 2 / В. Богев, М. Джамбазов, Г. Дюкенджиев ; ред. Х. Радев ; пер.: М. Игова, К. Коджабашева ; пер. с болг. - Челябинск : ЮУрГУ, 2015. - 1098 с.
8. Content of the discipline	To study the devices, principles and methods of using means of measurement and control of thermal technical and other quantities related to the production and consumption of thermal energy. Possess the skills to solve the measurement problem, organize and conduct measurements and control, process measurement results, independently justify and select measuring instruments to assess their accuracy and reliability.
1. Name of the discipline	**Materials Science in heat engineering**
2. Number of loans	4
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Materials science
5. Competencies:	Knowledge of the basics of heat engineering, fluid and gas mechanics, thermal technical measurements, structural materials for solving engineering tasks in the professional field, setting and solving energy engineering tasks, with an understanding of the general principles, structure and functioning of heating systems.

6. Course author	Department of thermal power engineering
7. Main literature	Материалтану [Текст] : оқулық / Е. Б. Сүлеймен [ж.б.] ; Қазақстан Респ. Білім және ғылым министрлігі. - Қарағанды : ҚарМТУ, 2011. - 371 б Металтану негіздері [Текст] : оқулық / Е. Б. Сүлеймен ; Қазақстан Республикасы Білім және ғылым министрлігі. - Алматы : Бастау, 2015. - 336 б Металтану және термиялық өндеу: оқулық / Е. Б. Сүлеймен ; - Астана : С.Сейфуллин атындағы ҚазАТУ, 2012. - 248 б Строительные материалы: учебник / В. В. Ни. - Астана : Фолиант, 2013. - 304 с. Исследование структуры и свойств стали после совмещенной деформационно - термической обработки: моногр. / А. Т. Канаев ; М-во образования и науки Респ. Казахстан, Евраз. нац. ун-т им. Л. Н. Гумилёва, Каз. агротехн. ун-т им. С. Сейфуллина. - Астана : Мастер По, 2012. - 192 с. Азаматтық нысандарда қолданылатын құрылыс материалдары: оқулық. I т. / М. С. Мамлюк, Д. П. Заниевски ; ауд.: Е. Т. Бесімбаев, Д. Т. Сартаев, А. М. Байсариева ; Ағылшын тілінен ауд. - Үшінші бас. - Алматы : Қазақ тілі, 2016. - 216 б. Құрылыс материалы мен бұйымдары: оқулық. 2 бөлім / Ф. Б. Абдушкуров, С. Т. Дузельбаев ; ҚР Білім және ғылым министрлігі. - Алматы : Бастау, 2021. - 232 б.
8. Content of the discipline	The formation of knowledge about the properties and processing methods of modern materials used in energy and thermal physics, the basics of Materials Science and 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 in materials in the conditions of operation of products, methods for obtaining materials.
1. Name of the discipline	**Physico-chemical methods of water preparation**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering.

	Applied mechanics of liquid and gas.
4. Post-requisites:	Boiler plants and steam generators
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of thermal power engineering
7. Main literature	Су дайындаудың технологиялық негіздері және жылу электрорталықтарындағы су жұмысының тәртібі: оқу құралы / А. М. Достияров, Р. А. Өмірзақов, А. М. Жақсылық ; - Астана : С.Сейфуллин атындағы ҚазАТУ, 2018. - 240 б. Гужулев Э.П. и др. Водоподготовка и вводно-химические режимы в теплоэнергетике: Омск: Изд-во ОмГТУ, 2005. – 384 с.
8. Content of the discipline	The formation of students ' knowledge, skills and abilities in the application of modern physico-chemical, ion exchange, thermal, membrane methods of water purification both for low and high pressure thermal power equipment of boilers and thermal power plants, as well as for heating networks, wastewater. Mastering the characteristics of natural waters, schemes of water circulation in the tract, the technological process of water treatment
1. Name of the discipline	**Heat transfer in thermal technical processes and installations**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Electrical equipment of thermal power plants
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems. Understanding the general principles, structure and function of heating systems, knowledge of the basics of heat engineering, liquid and gas mechanics, thermal technical measurements, structural materials for solving engineering tasks in

	the professional field, setting and solving energy engineering tasks.
6. Course author	Department of thermal power engineering
7. Main literature	1. Достияров А.М., Умирзаков Р.А., Калиева А.К. Техническая термодинамика и теплотехника// Учебник, Нур-Султан, КАТУ, 2020 г. 2. Жылутехника : учебное пособие / сост.: А. М. Достияров [и др.] // . - Астана : КазАТУ, 2019. - С. 165. 3. Теплотехника : учеб. пособие / Г. А. Круглов, Р. И. Булгакова, Е. С. Круглова. - СПб. : Лань, 2017. - 208 с. 4. Теплотехника и тепловая работа печей: учеб. пособие / В. Я. Дзюзер. - 2-е изд., испр. и доп. - СПб. : Лань, 2016. - 384 с. 5. Термодинамика және статистикалық механика: оқулық / Р. Харди, К. Бинек ; ауд.: Қ. М. Төреханова, Б. М. Саяқова ; ҚР Білім және ғылым минстрлігі; Ағылшын тілінен ауд. - Алматы : Қазақстан Республикасы Жоғары оқу орындарының қауымдастығы, 2016. - 514 б. 6. Основы гидравлики и теплотехники: учебник / Н. Н. Лапшев, Ю. Н. Леонтьева. - М. : Издательский центр "Академия", 2012. - 400 с.
8. Content of the discipline	The formation of students ' knowledge about the fundamental laws and methods of analysis and calculation of heat transfer processes in heat exchange apparatuses, the effective use of heating equipment using modern methods of heat use, the characteristics of the thermal state of elements of thermal machines and apparatuses. Mastering practical skills to determine the characteristics of heat-mass transfer processes in thermal and technical installations.
1. Name of the discipline	**Professional Kazakh (Russian) language**
2. Number of loans	3
3. Prerequisites:	Kazakh (Russian) language. Foreign language. Philosophy
4. Post-requisites:	Master's disciplines
5. Competencies:	Knowledge of the culture of thinking, the ability to analyze and interpret information, the ability to develop ideas and critical arguments, and the use of skills to increase productivity and physical resilience. Be able to communicate effectively orally and

	in writing, including in a foreign language, in a professional environment and in society, be ready for effective and stress-resistant work in a team. The ability to form competencies in the field of Economics and law, the basics of anti-corruption culture, ecology and life safety, as well as entrepreneurship, leadership and skills in adopting innovations in solving professional tasks.
6. Course author	Department of thermal power engineering
7. Main literature	Туксаитова Р.О. Русский язык и культура речи: учебное пособие для студентов всех специальностей. – Астана: Издательство КАТУ им.С.Сейфуллина, 2018. – 157 с. Туксаитова Р.О. Русский язык. Учебное пособие для студентов экономическихспециальностей. – Астана: «Казахский агротехнический университет им. С.Сейфуллина»,2016. -170 с. Резуанова Ғ.К. Қазақ тілі (оқулық). – Нұр-Сұлтан: КАТУ баспасы, 2020. –160б.
8. Content of the discipline	The formation of communicative competence of a student who is able to solve communication problems in the field of professional activity through language. In the professional field, the development of the ability to listen, think orally and in writing, analyze, synthesize, reason, give an adequate assessment. Master the professional terminology necessary for professional communication with native speakers.
1. Name of the discipline	**High temperature processes and installations**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Cycles and installations of thermal processes
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.

6. Course author	Department of thermal power engineering
7. Main literature	1. Энергетикалық отындар: абразивтілік пен тозу [Текст] : оқулық / А. М. Достияров, Г. Ә. Әкімбек, Б. Т. Бахтияр ; Қазақстан Республикасы Білім және Ғылым министрлігі, "Алматы энергетикажәне байланыс университеті" коммерциялық емес акционерлік қоғамы. - Алматы : АЭжБУ, 2020. - 218 б. Достияров, А.М., Баубеков, К.Т., Саттинова, З.К. Картжанов, Н.Р. Отын жағудың арнаулы сұрақтары. Учебник. Астана, КАТУ, 2015 г. Исследование тепловых процессов и аэродинамических характеристик угольных теплостанций: моногр. / А. С. Аскарова, С. А. Болегенова, В. Ю. Максимов. - Алматы : Қазақ университеті, 2015. - 122 с. Б.И. Диханбаев. Учебно-методический комплекспо дисциплине «Высокотемпературные процессы и установки», Астана: КазАТУ им. С. Сейфуллина, 2016.
8. Content of the discipline	To study the types of high-temperature heating installations, their characteristics, principles of operation, features of operation and areas of their application. Master the methods of operation of reactors and energy sources of high-temperature thermal technological installations; be able to apply in practice the principles of organizing technological processes, determine their individual stages in thermal technological reactors, structural schemes of high-temperature thermal technological installations.

1. Name of the discipline	**Professionally oriented foreign language**
2. Number of loans	3
3. Prerequisites:	Бакалавриаттағы "шет тілі" B1-B2 деңгейі
4. Post-requisites:	Шет тіліндегі мамандық бойынша пәндер
5. Competencies:	Ойлау мәдениетін білу, ақпаратты талдай және түсіндіре білу, идеялар мен сыни дәлелдерді дамыта білу, өнімділік пен физикалық тұрақтылықты арттыру дағдыларын қолдану. Ауызша және жазбаша түрде, оның ішінде шет тілінде, кәсіби ортада және қоғамда тиімді қарым-қатынас жасай білу, ұжымда тиімді және стрессқе төзімді жұмысқа дайын болу.

6. Course author	Department of heat power engineering
7. Main literature	РустемоваС.,ЮнусовЕ. Foodindustry. Учебно-методическое пособие, 2018 г. ЖумадиллаеваО.А. ProfessionalEnglish. ReadingComprehension, учебноепособие. Рахимбекова Г.О. «Cadastre» , учеб.пособие для студентов, магистрантов и докторантов, 2015 Жумадиллаева О.А.. ProfessionalEnglish Есхожин К.Д., Нукешев С.О., Мейрамова С.А., Жумадиллаева О.A.Fundamentaldevicesofinternalcombustionengine. Жумадиллаева О.А. Dairy products. 6М072700 «Тамақ өнімдері технологиясы» мамандығының магистранттарына арналғаноқу құралы№ 96 б. 2019 Жумадиллаева О.А. ProfessionalEnglish 6М072800 «Қайта өңдеу өндірістерінің технологиясы» мамандығының магистранттарына арналғанмультимедиялық электронды оқу құралы,2019 Капанова Д.Е., Байгошкарова М.И, Сборник текстов на английском языке для всех специальностей бакалавриата и магистратуры, 2017
8. Content of the discipline	The formation of students ' knowledge of professionally-oriented foreign language communication with the development of the student's personal qualities, knowledge of the country's culture of the language being studied and the acquisition of special skills based on professional and linguistic knowledge, the need to use the skills of using appropriate speech patterns and foreign language in a professional foreign language environment with an understanding of the tactics of speech.
1. Name of the discipline	**Operation of thermal technical equipment**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.

6. Course author	Department of heat power engineering
7. Main literature	А.М. Достияров, А.А. Кибарин, Г.М.Тютебаева, Г.С. Катранова. Эксплуатация ТЭС, учебное пособие. Москва, ИД «Академия Естествознания», 2020. Жылуэнергетикалық қондырғыларды эксплуатациялау: оқу құралы / А. М. Достияров, Қ. Т. Баубеков, Н. Р. Картжанов ; - Астана : С.Сейфуллин атындағы ҚазАТУ, 2015. - 124 б А. М. Достияров. Жылу технологиясын және жылулық қондырғыларды өндірісте пайдалану. оқу құралы. Астана : С.Сейфуллин атындағы ҚазАТУ, 2015. - 254 б.
8. Content of the discipline	Study of thermal installations, equipment, technologies and features of operation. Familiarization with the regulatory documentation for the organization of operational work with supervision in the manufacture, installation, adjustment, testing and commissioning of manufactured products and objects. Preparation of students to lead the team of performers, make decisions, and determine the procedure for performing work.
1. Name of the discipline	**Safety equipment in power plants**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	To have knowledge of environmental laws in comprehensive 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 the heat power industry.
6. Course author	Department of heat power engineering
7. Main literature	Охрана труда и техника безопасности на предприятиях: учебник / Р. О. Жилисбаева, С. В. Хромцов. - Караганда : Medet Group, 2014. - 252 с. Безопасность жизнедеятельности: курс лекций / Н. Г. Приходько. - Алматы : NURPRESS, 2018. - 360 с. Безопасность эксплуатации промышленного оборудования и технологических процессов: учебное пособие / Г. В. Пачурин, В. И. Миндрин, А. А. Филиппов ; под редакцией Г. В. Пачурина. - Старый Оскол : ТНТ, 2020. - 192 с. Безопасность жизнедеятельности. Практикум: учебное пособие / Н. В.

	Косолапова, Н. В. Прокопенко. - М. : КНОРУС, 2016. - 156 с.
8. Content of the discipline	Familiarization of students with the legislation of the Republic of Kazakhstan in the field of labor protection, the basic requirements for the organization of safe operation of basic and auxiliary thermal power equipment of enterprises and industries, safety rules for performing electrical installation and start-up work, operation and repair of power equipment, measures to prevent accidents and accidents at work.
1. Name of the discipline	**Жылу желілері және жылумен жабдықтау жүйелері**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment. Knowledge of the basics of heat engineering, fluid and gas mechanics, thermal technical measurements, structural materials for solving engineering tasks in the professional field, with an understanding of the general principles, structure and functioning of heating systems, setting and solving energy engineering tasks.
6. Course author	Department of heat power engineering
7. Main literature	Жылуландыру және жылу желілері: учебное пособие / А. М. Достияров // . - Астана : КазАТУ, 2018. - С. 130. Жылумен жабдықтау негіздері: оқу құралы / В. В. Стояк, С. К. Абильдинова ; Қазақстан Респ. Білім және ғылым министрлігі. - Алматы : АЭжБУ, 2012. - 88 б : сурет., кестелер. - Әдебиет.: б. 86. Котельные систем теплоснабжения / В. Ш. Магадеев. - М. : Энергия, 2017. - 320 с. Теплогазоснабжение и вентиляция [Текст] : учебник / Е. М. Авдолимов [и др.]. - 3-е изд., стер. - М. : Издательский центр "Академия", 2014. - 400 с. : рис., табл. - (Бакалавриат). - Библиогр.: с. 396 - 397. Отопление, вентиляция и кондиционирование воздуха [Текст] : учеб. пособие / Ю. Д. Сибикин. - 7-е изд., перераб. и доп. - М. : Издательский центр "Академия", 2013. - 336 с. Внедрение ресурсосберегающей системы теплоснабжения для энергоэффективного функционирования децентрализованных объектов: отчет о научно-исследовательской работе. - Нур-Султан : НАО "КАТУ им. С.Сейфуллина", 2020. - 109 с. Инженерные системы зданий и сооружений. Теплогазоснабжение и вентиляция: учебник для студентов высш. учеб. заведений / Е. М. Авдолимов

	[и др.] ; ред. П. А. Хаванов. - М. : Издательский центр "Академия", 2014. - 320 с. Инженерные системы зданий и сооружений. Теплогазоснабжение и вентиляция [Текст] : учебник для студентов высш. учеб. заведений / Е. М. Авдолимов [и др.] ; ред. П. А. Хаванов. - М. : Издательский центр "Академия", 2014. - 320 с.
8. Content of the discipline	To acquaint students with the structure of heat supply systems and heating networks of settlements, the regulatory framework in the field of design and construction of heat supply systems, the prospects for the development of heat supply systems. The formation in students of the skills and abilities necessary for the calculation and design of heat supply systems, the selection of equipment, as well as the development of schemes of heat supply systems for settlements and individual objects.
1. Name of the discipline	**Mechanics**
2. Number of loans	4
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Understanding the general principles, structure and function of heating systems, knowledge of the basics of heat engineering, liquid and gas mechanics, thermal technical measurements, structural materials for solving engineering tasks in the professional field, setting and solving energy engineering tasks.
6. Course author	Department of heat power engineering
7. Main literature	1. Механика, учебное пособие, Козырев А.В., 2012. 2. Основы технической механики И.С. Опарин, 2015
8. Content of the discipline	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 for describing mechanical systems, the laws of dynamics of systems of material points and solids, the laws of conservation of mechanical quantities, the basic concepts of mechanics of a continuous medium.
1. Name of the discipline	**Implementation of technological processes and environmental technologies at TPP**
2. Number of loans	6
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	To have knowledge of environmental laws in comprehensive 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 the heat power industry. Be able to apply knowledge about the main and auxiliary equipment of power industries in computational, design, experimental and research activities.
6. Course author	Department of heat power engineering
7. Main literature	Г.М. Тютебаева. Учебно-методический комплекс по дисциплинам «Реализация технологических процессов и природоохран-ныхтехнологии при сжигании топлива», Астана: КазАТУ им. С. Сейфуллина, 2019.
8. Content of the discipline	Training of specialists for the implementation of the technical policy of Environmental Protection 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 of reducing harmful impurities in the operation of thermal power equipment, technologies and schemes for cleaning wastewater and gases from harmful impurities, Environmental rationing of harmful emissions.
1. Name of the discipline	**Repair and adjustment of thermal power plants**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of heat power engineering
7. Main literature	Достияров А.М., Тютебаева Г.М. РЕМОНТ ОБОРУДОВАНИЯ ТЭС, учебное пособе, Нур-Султан, КАТУ, 2019 г. Ремонт тепломеханического оборудования: учебное пособие / В. Р. Ведрученко, А. С. Анисимов. - Москва : Учебно-методический центр по образованию на железнодорожном транспорте, 2015. - 160 с. Ремонт теплотехнического оборудования и тепловых сетей: учеб. / В. М. Боровков, А. А. Калютик, В. В. Сергеев. - 2-е изд., стер. - М. : Издательский центр "Академия", 2012. - 208 с.
8. Content of the	Formation of knowledge in the field of technology for repair and adjustment of basic

discipline	and auxiliary equipment at TPP construction sites and existing energy enterprises. To acquaint students with the main technological processes of repair of boilers and steam turbines, auxiliary equipment, the sequence and methods of their installation, repair methods, planning the organization of repair of the main and auxiliary equipment of power plants.
1. Name of the discipline	**Alternative renewable energy sources**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering..
4. Post-requisites:	Master's disciplines
5. Competencies:	Studies the modes of operation of electricity consumers and generators, their use in real conditions in the management of power plants, determination of their operating conditions during design, research and training, the skill of analyzing mode parameters in solving one of the tasks of planning the operating mode of the unit based on renewable energy sources in the agro-industrial complex.
6. Course author	Department of heat power engineering
7. Main literature	НЕТРАДИЦИОННЫЕ ВОЗОБНОВЛЯЕМЫЕ ИСТОЧНИКИ ЭНЕРГИИ, учебное пособие, 2020 г. Ветроэнергетика [Текст] : справ. - метод. изд. / - М. : Теплоэнергетик ; М. : Интехэнерго-Издат, 2014. - 304 с. Использование солнечной энергии для производства тепловой энергии: справ. - метод. изд. /; - М. : Теплоэнергетик ; М. : Интехэнерго-Издат, 2015. - 304 с. Геотермальная энергетика [Текст] : справ. - метод. изд. / - М. : Теплоэнергетик ; М. : Интехэнерго-Издат, 2015. - 304 с. Жаңартылатын энергия көздері. Учебное пособие, Астана, 2016 г. Баламалы энергия көздері. Учебное пособие, Астана, 2017 г.
8. Content of the discipline	The formation of students ' knowledge about the main types of non-traditional renewable energy sources, their role in energy production in general, the prospects and features of their use in solving the tasks of heat supply and energy saving, methods and criteria for assessing the effectiveness of technologies based on renewable energy sources, taking into account economic and environmental requirements in modern conditions.
1. Name of the discipline	**Operating modes of thermal power plants**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics

	of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of heat power engineering
7. Main literature	Достияров А.М., Тютебаева Г.М. РЕМОНТ ОБОРУДОВАНИЯ ТЭС, учебное пособе, Нур-Султан, КАТУ, 2019 г. Ремонт тепломеханического оборудования: учебное пособие / В. Р. Ведрученко, А. С. Анисимов. - Москва : Учебно-методический центр по образованию на железнодорожном транспорте, 2015. - 160 с. Ремонт теплотехнического оборудования и тепловых сетей: учеб. / В. М. Боровков, А. А. Калютик, В. В. Сергеев. - 2-е изд., стер. - М. : Издательский центр "Академия", 2012. - 208 с.
8. Content of the discipline	Formation of knowledge on the operational characteristics of TPP equipment, the basics of proper technical operation, the main reasons for the occurrence of emergency situations, the modes of operation of station equipment. Master the methods of conducting rational modes of operation of thermal power equipment of TPP, ensuring reliable, economical and safe operation of the main and auxiliary equipment in the process of performing the Load Dispatch schedule.
1. Name of the discipline	**Energy saving and energy efficiency in renewable energy sources**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	The ability to form competencies in the field of Economics and law, the basics of anti-corruption culture, ecology and life safety, as well as entrepreneurship, leadership and skills in adopting innovations in solving professional tasks. 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 the heat power industry, to apply knowledge about the main and auxiliary equipment of Energy Industries in accounting, design, experimental and research activities.

6. Course author	Department of heat power engineering
7. Main literature	Диханбаев Б.И., Интенсивное ресурсоэнергосбережение в переработке минерального сырья, учебник, 2018 г. Основы энергосбережения и энергоэффективности: учеб. пособие / М. Ш. Алинов ; М-во образования и науки Респ. Казахстан. - Алматы : Бастау, 2015. - 288 с. Жасыл технологиялар = Зеленые технологии [Текст] : оқу құралы / М. Ш. Алинов ; Қазақстан Республикасы Білім және ғылым министрлігі. - Алматы : Бастау, 2020. - 192 б. Жылуэнергетика мен жылутехнологияларда энергияны үнемдеу: оқу құралы / И. Б. Бақытжанов ; Қазақстан Респ. Білім және ғылым министрлігі. - Алматы : АЭжБУ, 2011. - 86 б
8. Content of the discipline	Formation of students ' knowledge and skills in the field of legal, organizational, Scientific, Industrial, Technical and economic measures aimed at the effective use of energy resources, assessment of the effectiveness of the use of energy carriers in energy complexes, development of energy balances, analysis of the energy passport of the organization, development and implementation of energy saving technologies.
1. Name of the discipline	**Computer technologies in thermal energy calculations**
2. Number of loans	5
3. Prerequisites:	Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems. Be able to use information and communication technologies, applied software in professional activities for Design, Modeling, Optimization of thermal power facilities.
6. Course author	Department of heat power engineering
7. Main literature	Компьютерные технологии при проектировании и эксплуатации технологического оборудования : учеб. пособие / Г. В. Алексеев [и др.]. - 3-е изд., испр. и доп. - СПб. : ГИОРД, 2012. - 256 с. Информационно-коммуникационные технологи: учеб. пособие / Т. Б. Нурпеисова, И. Н. Кайдаш ; М-во образования и науки РК. - Алматы : Бастау, 2017. - 544 с. Операционные системы, сети и интернет-технологии : учебник / С. А. Жданов [и др.] ; ред. В. Л. Матросов. - М. : Издательский центр "Академия", 2014. - 272 с.

8. Content of the discipline	Formation of students ' knowledge, skills and abilities in the use of computer programs and technologies for calculating thermal power facilities. Master the skills of using schematic software, modeling heat and power processes and heat and power equipment, using numerical methods to solve heat and technical problems, processing data and using applied programs for performing heat and technical calculations.
1. Name of the discipline	**Calculation of efficiency in Thermal Power Engineering**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	The ability to form competencies in the field of Economics and law, the basics of anti-corruption culture, ecology and life safety, as well as the skills of adopting innovations in solving entrepreneurial, leadership and professional tasks, apply knowledge about the main and auxiliary equipment of Energy Industries in accounting, design, experimental and research activities.
6. Course author	Department of heat power engineering
7. Main literature	1. Куратко Д.Ф. Кәсіпкерлік: теория, процесс, практика /Ағылшын тілінен аударма. - 10-басылым. - Алматы : Ұлттық аударма бюросы, 2018. - 480 б. / 57 экз. 2. Нұрғалиева А.А., Корабаев Б.С. Кәсіпкерлік: оқу құралы. - С. Торайғыров ат. Павлодар мемлекеттік ун-ті. - Алматы: Экономика, 2016. 3. Кондратьева И. В. Экономика предприятия: учебное пособие для вузов. – Лань, 2021. – 232с. 4. Управление организацией (предприятием): Учебное пособие для бакалавров. - Российский университет транспорта, 2020. – 167с.
8. Content of the discipline	The course" calculation of efficiency in thermal power engineering " is one of the disciplines of the professional cycle in the training of bachelors, introduced as a component discipline of a higher educational institution. With its content, it determines the professional training of specialists in the field of Organization of heat power production. The study of this discipline allows students to acquire knowledge and skills to solve economic problems, principles and methods of organization, production, production processes arising in the process of their engineering activity.
1. Name of the discipline	**Fuel and combustion theory**
2. Number of loans	6
3. Prerequisites:	Theoretical foundations of thermal power plants. Ecology and sustainable

	development. Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems. Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities..
6. Course author	Department of heat power engineering
7. Main literature	1. Алинов, М. Ш. Основы энергосбережения и энергоэффективности: учеб. пособие / М. Ш. Алинов ; М-во образования и науки Респ. Казахстан. - Алматы : Бастау, 2015. - 288 с. 2. Достияров, А. М. Методические указания к лабораторным работам по дисциплинам "Котельные установки и парогенераторы" и "Специальные вопросы сжигания топлива" для студентов специальности 5В071700 - "Теплоэнергетика" - Астана : КАТУ им. С.Сейфуллина, 2017. - 38 с. 3. Аскарова, А. С. Моделирование горения в камерах сгорания углесжигающих ТЭС - Алматы : Қазақ университеті, 2015. - 143 с.
8. Content of the discipline	Providing training in the field of Economics and Organization of heat power production, which allows future specialists to focus on technical and economic information, use economic principles, laws and methods, principles and methods of organization, production, production processes arising in the process of engineering activities for the effective solution of technological tasks.
1. Name of the discipline	**Technological bases for the preparation of water and fuel at thermal power plants and industrial enterprises**
2. Number of loans	5
3. Prerequisites:	Theoretical foundations of thermal power plants. Ecology and sustainable development. Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of heat power engineering
7. Main literature	Су дайындаудың технологиялық негіздері және жылу

	электрорталықтарындағы су жұмысының тәртібі: оқу құралы / А. М. Достияров, Р. А. Өмірзақов, А. М. Жақсылық ; - Астана : С.Сейфуллин атындағы ҚазАТУ, 2018. - 240 б. Гужулев Э.П. и др. Водоподготовка и вводно-химические режимы в теплоэнергетике: Омск: Изд-во ОмГТУ, 2005. – 384 с. Физико-химические методы подготовки воды : учеб. пособие / К. С. Идрисова ; М-во образования и науки Респ. Казахстан. - Алматы : АУЭС, 2011. - 82 с.
8. Content of the discipline	To study the quality requirements and methods of preparation of feed water for stations and heating networks. Mastering the skills of preparation, transportation of water, modes of operation of equipment and water treatment systems, 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.
1. Name of the discipline	**Heat exchange**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems. Understanding the general principles, structure and function of heating systems, knowledge of the basics of heat engineering, liquid and gas mechanics, thermal technical measurements, structural materials for solving engineering tasks in the professional field, setting and solving energy engineering tasks.
6. Course author	Department of heat power engineering
7. Main literature	1. Достияров А.М., Умирзаков Р.А., Калиева А.К. Техническая термодинамика и теплотехника// Учебник, Нур-Султан, КАТУ, 2020 г. 2. Жылутехника : учебное пособие / сост.: А. М. Достияров [и др.] // . - Астана : КазАТУ, 2019. - С. 165. 3. Теплотехника : учеб. пособие / Г. А. Круглов, Р. И. Булгакова, Е. С. Круглова. - СПб. : Лань, 2017. - 208 с. 4. Теплотехника и тепловая работа печей: учеб. пособие / В. Я. Дзюзер. - 2-е изд., испр. и доп. - СПб. : Лань, 2016. - 384 с. 5. Термодинамика және статистикалық механика: оқулық / Р. Харди, К. Бинек ; ауд.: Қ. М. Төреханова, Б. М. Саяқова ; ҚР Білім және ғылым минстрлігі; Ағылшын тілінен ауд. - Алматы : Қазақстан Республикасы Жоғары оқу

	орындарының қауымдастығы, 2016. - 514 б. 6. Основы гидравлики и теплотехники: учебник / Н. Н. Лапшев, Ю. Н. Леонтьева. - М. : Издательский центр "Академия", 2012. - 400 с.
8. Content of the discipline	The theoretical foundations of engineering methods for calculating thermal processes are studied; more complex tasks of convective heat exchange are considered, including methods for solving the problems of thermoconvection, melting – crystallization, evaporation – condensation, heat exchange. Students receive analytical solutions to simple problems, get acquainted with the methods of constructing automodel solutions, as well as numerical methods for solving nonlinear problems of convective heat exchange.
1. Name of the discipline	**Special fuel burning issues**
2. Number of loans	6
3. Prerequisites:	Theoretical foundations of thermal power plants. Ecology and sustainable development. Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems. Be able to apply knowledge about the main and auxiliary equipment of power industries in computational, design, experimental and research activities.
6. Course author	Department of heat power engineering
7. Main literature	1. Алинов, М. Ш. Основы энергосбережения и энергоэффективности: учеб. пособие / М. Ш. Алинов ; М-во образования и науки Респ. Казахстан. - Алматы : Бастау, 2015. - 288 с. 2. Достияров, А. М. Методические указания к лабораторным работам по дисциплинам "Котельные установки и парогенераторы" и "Специальные вопросы сжигания топлива" для студентов специальности 5В071700 - "Теплоэнергетика" - Астана : КАТУ им. С.Сейфуллина, 2017. - 38 с. 3. Аскарова, А. С. Моделирование горения в камерах сгорания углесжигающих ТЭС - Алматы : Қазақ университеті, 2015. - 143 с.
8. Content of the discipline	Formation of knowledge on: methods of fuel combustion and organization of combustion processes in boiler plants stations and small boilers; modern technology of fuel combustion great economic and environmental efficiency: the mechanism of education of harmful substances in the combustion process, depending on the temperature regime of education of nitrogen oxides organization; liquid and solid combustion can be in the boiler burner.

1. Name of the discipline	**Corrosion and conservation of power equipment**
2. Number of loans	3
3. Prerequisites:	Theoretical foundations of thermal power plants. Ecology and sustainable development. Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	To have knowledge of environmental laws in comprehensive engineering activities for the production and distribution of energy, where it is necessary to use: new efficient energy and resource-saving technologies in energy enterprises, renewable energy sources in the heat power industry. Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment, the basics of thermal engineering, liquid and gas mechanics, thermal technical criteria, structural materials for solving engineering tasks in the professional field with an understanding of the general principles, structure and functioning.
6. Course author	Department of heat power engineering
7. Main literature	Су дайындаудың технологиялық негіздері және жылу электрорталықтарындағы су жұмысының тәртібі: оқу құралы / А. М. Достияров, Р. А. Өмірзақов, А. М. Жақсылық ; - Астана : С.Сейфуллин атындағы ҚазАТУ, 2018. - 240 б. Гужулев Э.П. и др. Водоподготовка и вводно-химические режимы в теплоэнергетике: Омск: Изд-во ОмГТУ, 2005. – 384 с. Физико-химические методы подготовки воды : учеб. пособие / К. С. Идрисова ; М-во образования и науки Респ. Казахстан. - Алматы : АУЭС, 2011. - 82 с.
8. Content of the discipline	Familiarization with metal corrosion protection technologies to ensure reliable and efficient operation of thermal power equipment. Corrosion processes, technologies and circuit solutions in the protection of equipment from corrosion; the effect of impurities in water on metal corrosion; the effect of temperature and thermal loads on corrosion; corrosion inhibitors and stimulants; the formation of knowledge about technological modes of equipment storage.
1. Name of the discipline	**Energy efficiency and energy audit of energy enterprises**
2. Number of loans	5
3. Prerequisites:	Theoretical foundations of thermal power plants. Ecology and sustainable development. Physics. Chemistry. Theoretical foundations of heat engineering.

	Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	The ability to form competencies in the field of Economics and law, the basics of anti-corruption culture, ecology and life safety, as well as entrepreneurship, leadership and skills in adopting innovations in solving professional tasks. 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 the heat power industry, apply knowledge about the main and auxiliary equipment of Energy Industries in accounting, design, experimental and research activities.
6. Course author	Department of heat power engineering
7. Main literature	Диханбаев Б.И., Интенсивное ресурсоэнергосбережение в переработке минерального сырья, учебник, 2018 г. Основы энергосбережения и энергоэффективности: учеб. пособие / М. Ш. Алинов ; М-во образования и науки Респ. Казахстан. - Алматы : Бастау, 2015. - 288 с. Жасыл технологиялар = Зеленые технологии [Текст] : оқу құралы / М. Ш. Алинов ; Қазақстан Республикасы Білім және ғылым министрлігі. - Алматы : Бастау, 2020. - 192 б. Жылуэнергетика мен жылутехнологияларда энергияны үнемдеу: оқу құралы / И. Б. Бақытжанов ; Қазақстан Респ. Білім және ғылым министрлігі. - Алматы : АЭжБУ, 2011. - 86 б
8. Content of the discipline	Formation of knowledge on the legislative framework in the field of energy saving and energy audit, regulatory acts on energy saving and energy research, analysis of opportunities for energy saving and improving the efficiency of energy enterprises. Formation of skills: conducting an energy audit, drawing up an energy passport of an object, calculating heat losses of buildings and structures, calculating economic costs for energy-saving activities.
1. Name of the discipline	**Nuclear power plants**
2. Number of loans	5
3. Prerequisites:	Physics. Theoretical foundations of heat engineering
4. Post-requisites:	Master's disciplines
5. Competencies:	In a comprehensive engineering activity for the production and distribution of energy, it is necessary to have knowledge of environmental laws, where it is necessary to use: new efficient energy and resource - saving technologies in energy enterprises, renewable energy sources in the thermal power industry, basic

	mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrotechnical tasks. Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of heat power engineering
7. Main literature	НЕТРАДИЦИОННЫЕ ВОЗОБНОВЛЯЕМЫЕ ИСТОЧНИКИ ЭНЕРГИИ, учебное пособие, 2020 г. Ветроэнергетика [Текст] : справ. - метод. изд. / - М. : Теплоэнергетик ; М. : Интехэнерго-Издат, 2014. - 304 с. Использование солнечной энергии для производства тепловой энергии: справ. - метод. изд. - М. : Теплоэнергетик ; М. : Интехэнерго-Издат, 2015. - 304 с. Геотермальная энергетика [Текст] : справ. - метод. изд. / - М. : Теплоэнергетик ; М. : Интехэнерго-Издат, 2015. - 304 с. Жаңартылатын энергия көздері. Учебное пособие, Астана, 2016 г. Баламалы энергия көздері. Учебное пособие, Астана, 2017 г. Использование систем солнечного теплоснабжения в агропромышленном комплексе: рекомендации / М-во сельского хоз-ва РК ;; - Астана : КАТУ им. С. Сейфуллина, 2011. - 58 с.
8. Content of the discipline	To study the basic principles of obtaining and using nuclear energy, technological and thermal schemes of nuclear power plants, features of the operation of nuclear power plants, the basics of nuclear reactor design, the basics of control and management of Yeu. Formation of skills in the processing of spent fuel and waste disposal, prevention of environmental pollution by radioactive elements, nuclear fission products.
1. Name of the discipline	**Automatic control theory**
2. Number of loans	5
3. Prerequisites:	Theoretical foundations of thermal power plants. Ecology and sustainable development. Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Mastering basic mathematical, natural-scientific knowledge in an interdisciplinary context for solving thermal and electrical problems. Be able to use information and communication technologies, applied software in professional activities for the

	Design, Modeling, Optimization of thermal power facilities.
6. Course author	Department of heat power engineering
7. Main literature	Компьютерные технологии при проектировании и эксплуатации технологического оборудования : учеб. пособие / Г. В. Алексеев [и др.]. - 3-е изд., испр. и доп. - СПб. : ГИОРД, 2012. - 256 с. Информационно-коммуникационные технологи: учеб. пособие / Т. Б. Нурпеисова, И. Н. Кайдаш ; М-во образования и науки РК. - Алматы : Бастау, 2017. - 544 с. Операционные системы, сети и интернет-технологии : учебник / С. А. Жданов [и др.] ; ред. В. Л. Матросов. - М. : Издательский центр "Академия", 2014. - 272 с.
8. Content of the discipline	The purpose of teaching the discipline is to train a highly qualified specialist capable of independent creative work, capable of introducing new and progressive results of the scientific activity of world society into the production process; to form the knowledge and skills necessary for the study of special disciplines on automatic and automated means of control, protection and automation of thermal power systems.
1. Name of the discipline	**Installation of turbochargers and auxiliary equipment**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of heat power engineering
7. Main literature	Достияров А.М., Тютебаева Г.М. РЕМОНТ ОБОРУДОВАНИЯ ТЭС, учебное пособе, Нур-Султан, КАТУ, 2019 г. Ремонт тепломеханического оборудования: учебное пособие / В. Р. Ведрученко, А. С. Анисимов. - Москва : Учебно-методический центр по образованию на железнодорожном транспорте, 2015. - 160 с. Ремонт теплотехнического оборудования и тепловых сетей: учеб. / В. М. Боровков, А. А. Калютик, В. В. Сергеев. - 2-е изд., стер. - М. : Издательский

	центр "Академия", 2012. - 208 с.
8. Content of the discipline	The purpose of teaching the discipline: the purpose, construction of the main materials, tools and technical means used in the installation and operation of equipment and installations; modern methods of organizing and performing work on the installation, adjustment and maintenance of turbine installations necessary in practical activities; methods, types, scope, nature of installation work and use of equipment.
1. Name of the discipline	**Environmental protection technologies when burning fuel**
2. Number of loans	6
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	To have knowledge of environmental laws in comprehensive 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 the heat power industry. Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities.
6. Course author	Department of heat power engineering
7. Main literature	Г.М. Тютебаева. Учебно-методический комплекс по дисциплинам «Реализация технологических процессов и природоохран-ныхтехнологии при сжигании топлива», Астана: КазАТУ им. С. Сейфуллина, 2019.
8. Content of the discipline	Formation of students ' knowledge about harmful factors arising from the combustion of fuel in thermal power equipment, ways to reduce and suppress them; ability to apply methods for determining the characteristics of emissions of harmful substances and their impact on the environment; mastering practical skills in emission rationing, radiation safety and payment for harmful emissions.
1. Name of the discipline	**Repair and operation of thermal power equipment**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities.Knowledge of professional competencies in solving practical tasks in the field of operational, production, technological and installation and repair activities and the impact of the

	water-chemical regime on the operation characteristics of thermal energy engineering.
6. Course author	Department of heat power engineering
7. Main literature	Достияров А.М., Тютебаева Г.М. РЕМОНТ ОБОРУДОВАНИЯ ТЭС, учебное пособе, Нур-Султан, КАТУ, 2019 г. Ремонт тепломеханического оборудования: учебное пособие / В. Р. Ведрученко, А. С. Анисимов. - Москва : Учебно-методический центр по образованию на железнодорожном транспорте, 2015. - 160 с. Ремонт теплотехнического оборудования и тепловых сетей: учеб. / В. М. Боровков, А. А. Калютик, В. В. Сергеев. - 2-е изд., стер. - М. : Издательский центр "Академия", 2012. - 208 с.
8. Content of the discipline	To train students with theoretical and practical knowledge that allows them to assign optimal intermediate stages of repair of energy equipment with scientific validity and technical and economic feasibility and improve the system of technological maintenance and repair. Acquisition by students of knowledge and skills necessary for free orientation in the practice of operating basic and auxiliary thermal power equipment.
1. Name of the discipline	**Thermal power systems and energy use**
2. Number of loans	6
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of heat power engineering
7. Main literature	Мергалимова А.К., Айтмагамбетова М.Б., Теоретические основы тепловых и атомных электростанций. - Нур-Султан: КазАТУ им. С.Сейфуллина, 2020, учебное пособие Тугерова К.Б, Умирзаков Р.А, Бошман Л.А. Теплоэнергетические установки тепловых электростанций.// Учебник. Нур-Султан: Некоммерческое акционерное общество «Talap», 2020 г. Энергетикалық терминдер сөздігі = Словарь энергетических терминов =

	Dictionary of energetics terms (казахско - русско - английский) [Текст : Электронный ресурс] : словарь / Б. К. Алияров, Б. Н. Алияров, М. Б. Алиярова. - Алматы : Нур-Принт, 2017. Теплотехническое оборудование: учебник / В. М. Боровков, А. А. Калютик, В. В. Сергеев. - 3-е изд., стер. - М. : Издательский центр "Академия", 2015. - 192 с. : ил. - (Проф. образование. Энергетика). - Библиогр.: с. 190.
8. Content of the discipline	Formation of knowledge: to understand the general principles, structure and functioning of heat and power supply sources and systems; the basics of designing Heat Supply Systems of industrial enterprises and the municipal sector, the principles of building a thermal power system of an industrial enterprise, to apply the knowledge gained to calculate thermal schemes of heat sources, to determine the needs of industrial consumers and the municipal sector for Steam and hot water.
1. Name of the discipline	**Autonomous Heat Supply**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Cycles and installations of thermal processes
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of heat power engineering
7. Main literature	1Энергетикалық отындар: абразивтілік пен тозу [Текст] : оқулық / А. М. Достияров, Г. Ә. Әкімбек, Б. Т. Бахтияр ; Қазақстан Республикасы Білім және Ғылым министрлігі, "Алматы энергетикажәне байланыс университеті" коммерциялық емес акционерлік қоғамы. - Алматы : АЭжБУ, 2020. - 218 б. Достияров, А.М., Баубеков, К.Т., Саттинова, З.К. Картжанов, Н.Р. Отын жағудың арнаулы сұрақтары. Учебник. Астана, КАТУ, 2015 г. Исследование тепловых процессов и аэродинамических характеристик угольных теплостанций: моногр. / А. С. Аскарова, С. А. Болегенова, В. Ю. Максимов. - Алматы : Қазақ университеті, 2015. - 122 с. Б.И. Диханбаев. Учебно-методический комплексно дисциплине «Высокотемпературные процессы и установки», Астана: КазАТУ им. С. Сейфуллина, 2016.
8. Content of the discipline	The formation of the necessary skills to understand the processes and phenomena associated with the Heat Supply System. The acquisition by students of theoretical knowledge and practical skills on the basics of design, construction and operation of autonomous Heat Supply Systems, the use of the methodology for determining

	calculation indicators for the design of autonomous heat supply systems, knowledge of modern technological equipment of autonomous Heat Supply Systems.
1. Name of the discipline	**Management in Thermal Power Engineering**
2. Number of loans	5
3. Prerequisites:	Theoretical foundations of thermal power plants. Ecology and sustainable development. Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of heat power engineering
7. Main literature	1. Куратко Д.Ф. Кәсіпкерлік: теория, процесс, практика /Ағылшын тілінен аударма. - 10-басылым. - Алматы : Ұлттық аударма бюросы, 2018. - 480 б. / 57 экз. 2. Нұрғалиева А.А., Корабаев Б.С. Кәсіпкерлік: оқу құралы. - С. Торайғыров ат. Павлодар мемлекеттік ун-ті. - Алматы: Экономика, 2016. 3. Кондратьева И. В. Экономика предприятия: учебное пособие для вузов. – Лань, 2021. – 232с. 4. Управление организацией (предприятием): Учебное пособие для бакалавров. - Российский университет транспорта, 2020. – 167с.
8. Content of the discipline	The formation of skills of organizational and managerial work in the conditions of market relations, entrepreneurship, the introduction of innovative processes, new techniques and technologies in energy production in future Bachelors of energy production. Master the methodology for conducting economic analysis at energy enterprises in order to achieve the highest results of production and economic activity at the lowest costs of labor, material and financial resources.
1. Name of the discipline	**Pumps, fans and compressors in heat and gas supply and ventilation systems**
2. Number of loans	6
3. Prerequisites:	Theoretical foundations of thermal power plants. Ecology and sustainable development. Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines

5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of heat power engineering
7. Main literature	Бу және газ турбиналар : оқу құралы / И. Б. Бақытжанов ; Қазақстан Респ. Білім және ғылым министрлігі. - Алматы : АЭжБУ, 2011. - 83 б Достияров А.М., Сапаргалиева А.Н., Умирзаков Р.А. Бу және газ турбиналары, оқу құралы, 2017 ж. Достияров А.М., Яманбекова А.К., Катранова Г.С. Газтурбиналық қондырғылар: оқуқұралы. Алматы, 2020. Умирзаков Р.А, Ахмедьянов А.У, Айтмагамбетова М.Б. Парогазотурбинные установки. Нур-Султан Казахский агротехнический университет им. С.Сейфуллина, 2020
8. Content of the discipline	Formation of students ' knowledge, skills in the use of modern compressors, blowers, fans of various types used in heat and gas supply and ventilation systems. Familiarization with the hydrogazodynamic processes taking place in the machines under consideration, the methodology for calculating the main characteristics of machines and the selection of equipment, the principles of organizing economical, reliable and safe operating modes of equipment.
1. Name of the discipline	**Engineering systems of buildings and structures**
2. Number of loans	5
3. Prerequisites:	Physics. Chemistry. Theoretical foundations of heat engineering. Applied mechanics of liquid and gas.
4. Post-requisites:	Master's disciplines
5. Competencies:	Be able to apply knowledge about the main and auxiliary equipment of energy industries in computational, design, experimental and research activities. Knowledge of professional competencies in solving practical tasks in the field of operational, production-technological and installation-repair activities and the influence of the water-chemical regime on the operational characteristics of thermal power equipment.
6. Course author	Department of heat power engineering
7. Main literature	А.М. Достияров, А.А. Кибарин, Г.М.Тютебаева, Г.С. Катранова. Эксплуатация ТЭС, учебное пособие. Москва, ИД «Академия Естествознания», 2020. Жылуэнергетикалық қондырғыларды эксплуатациялау: оқу құралы / А. М. Достияров, Қ. Т. Баубеков, Н. Р. Картжанов ; - Астана : С.Сейфуллин атындағы ҚазАТУ, 2015. - 124 б А. М. Достияров. Жылу технологиясын және жылулық қондырғыларды

	өндірісте пайдалану. оқу құралы. Астана : С.Сейфуллин атындағы ҚазАТУ, 2015. - 254 б.
8. Content of the discipline	Formation of students ' foundations of theoretical knowledge and practical skills in the field of Water Supply, Sewerage, gas supply, heat supply of settlements, internal construction of Water Supply, Sewerage, gas pipeline, ventilation, heat supply, principles of operation of engineering equipment. Mastering the skills of calculation and design of engineering networks, systems and equipment, the use of special educational and methodological literature.