The list of academic disciplines of the university component

6B07 - Engineering, Manufacturing and Civil engineering
(Code and classification of the field of education)

6B071 - Engineering and engineering trades
(Code and classification of the direction of training)

0710
(Code in the International Standard Classification of Education)

B062 - Electrical engineering and power engineering
(Code and classification of the educational program group)

6B07103 - Power Engineering
(Code and name of the educational program)

bachelor
(Level of preparation)

set of 2023

Semey 2023

Developed
By the Academic Committee of the OP
The head of the AK Nurymkhan Gulnur
OP Manager Khazhidinova Akbota

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Chairman of the Commission on Quality Assurance Abdilova G.

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Approved
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Protocol № 1 "01" of September 2023
Chairman of the Academic Council of the University Orynbekov D.R.

Bases of economics, law and ecological knowledge

Discipline cycle	General educational disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The integrated discipline includes the main issues and principles in the field of fundamentals of law and anti- corruption culture, economics, entrepreneurship and leadership, ecology and life safety. Features of the use of regulatory legal acts, the ability to use the business, ethical, social, economic, entrepreneurial and environmental standards of society. Specifics of environmental-legal, economic, entrepreneurial relations, leadership qualities and principles of combating corruption.

Purpose of studying of the discipline

It consists in studying the basic patterns of the functioning of living organisms, the biosphere as a whole and the mechanisms of their sustainable development under the conditions of anthropogenic impact and emergency situations; in understanding the concept of corruption, the legitimacy of the fight against it, the content of the state penal policy; in the formation of students` basic fundamental stable knowledge on the basics of economic theory, in instilling the skills and abilities of economic thinking; in introducing students to the theory and practice of entrepreneurship, to the basics of creating their own business; in the formation of theoretical knowledge and practical skills for the development and improvement of leadership qualities.

Learning Outcomes

ON1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Learning outcomes by discipline

* analyzes the issues of safety and conservation of the natural environment as the most important priorities of life;*
* demonstrates knowledge of the fundamentals of nature management and sustainable development, assesses the impact of man-made systems on the environment;*
* shows knowledge of the main regulatory legal acts of the Republic of Kazakhstan, their understanding and application;*
* shows knowledge of the patterns of development of economic processes, clearly formulates his own position, finds and clearly sets out arguments in its defense;*
* is able to characterize the types of entrepreneurial activity and the entrepreneurial environment, draw up a business plan, create an entrepreneurial structure and organize its activities;*
* knows the fundamental provisions about the role of leadership in managing large and small social groups.*

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Mathematics

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The purpose of this course is to provide students with fundamental training in mathematics. The course is aimed at forming a sufficiently high culture of mathematical thinking among students and developing the ability to creatively approach problem solving. In addition to studying the fundamental foundations of higher mathematics (elements of analytical geometry, linear algebra, mathematical analysis, differential equations), the course assumes consideration of various applications of mathematics to solving production problems from the field of professional specialization.

Purpose of studying of the discipline

creation of the basis for the development of logical thinking and mathematical culture. Formation of basic knowledge and acquisition of basic skills of using mathematical apparatus for solving theoretical and applied problems, as well as the necessary level of mathematical training for mastering other applied disciplines studied within a specific profile; skills of working with special mathematical literature

Learning Outcomes

ON3 Apply basic knowledge in the field of mathematics and natural sciences, methods of mathematical analysis and modeling, theoretical and experimental research in the field of energy in cognitive and professional activities.

Learning outcomes by discipline

1) Selects methods of mathematical analysis and modeling, theoretical and experimental research of applied problems
2) Uses mathematical symbolism to express quantitative and qualitative relations of objects
3) Applies methods of visual graphical representation of research result

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Physics

Discipline cycle	Basic disciplines
Course	1
Credits count	3
Knowledge control form	Examination

Short description of discipline

In process of studying this discipline, students get acquainted with the basic laws, concepts of all sections of physics. Physics is an

area of experimental science, performing laboratory work and tasks, students are convinced of unity of the theory and practice of experiments. Students have the opportunity to gain knowledge on the subject in any area of their specialty.

Purpose of studying of the discipline

Formation of ideas about the role of experimental and theoretical methods of cognition of the surrounding world, development of skills for independent solving of physical problems, motivation to study modern scientific literature.

Learning Outcomes

ON3 Apply basic knowledge in the field of mathematics and natural sciences, methods of mathematical analysis and modeling, theoretical and experimental research in the field of energy in cognitive and professional activities.

Learning outcomes by discipline

1) Assesses the degree of reliability of the results obtained using experimental research methods;
2) Uses various physical concepts, laws, theories in practice;
3) Applies knowledge of the basic laws of physics in solving professional problems.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Application of USDD standards in the design of engineering documentation.

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at developing students` knowledge and skills of state standards in the field of text and engineering documentation, the rules for the design of text and scientific and technical documentation in accordance with general state standards, the design of drawings in accordance with USDD, the basics of descriptive geometry modeled in modern graphic systems. Skills of 3D modeling technologies in the interfaces of automatic design systems (CAD).

Purpose of studying of the discipline

Discipline is necessary for acquiring the skills and knowledge to make and read special drawings, as well as for the development of spatial imagination. Building Knowledge
images, design of text documentation, rules for drawing up and designing drawings. Graphic skills are widely used in the development of projects for thermal power and heat technology facilities.

Learning Outcomes

ON4 To apply in educational, scientific and professional activities the requirements for the graduate of the educational program of the rules, requirements and norms for the preparation of documentation.

Learning outcomes by discipline

1) own the main provisions of design, technological and other regulatory documentation.
2) apply the requirements of the standards of the Unified System for Design Documentation and the Unified System of Technological Documentation to the design and preparation of drawings and diagrams.
3) illustrate geometric constructions and rules for drawing technical details, methods for graphical representation of heat power, process equipment and implementation of process flow diagrams.

Prerequisites

School course

Postrequisites

Elements of machine graphics and CAD basics in thermal power engineering

Educational practice

Discipline cycle	Basic disciplines
Course	1
Credits count	2
Knowledge control form	Total mark on practice

Short description of discipline

Educational practice is a part of the educational activity of students, which is aimed at obtaining primary, professional knowledge, consolidating and deepening the theoretical knowledge gained in educational program «Heat power engineering», as well as mastering the necessary skills and abilities in the chosen specialty: skills research activities, business correspondence skills and work in accordance with the specialty of study. A broader idea of future professional activity.

Purpose of studying of the discipline

To study the issues of production, transmission and distribution of energy at a particular enterprise, to get acquainted with the main equipment of the enterprise - the basis of practice. Get the first idea about your specialty and possible places of your employment after graduation.

Learning Outcomes

ON4 To apply in educational, scientific and professional activities the requirements for the graduate of the educational program of the rules, requirements and norms for the preparation of documentation.

Learning outcomes by discipline

- to use modern and perspective directions of development of heat power and heat technology systems.
- carry out an independent analysis and review of the state of problems of heat power engineering.
- study technical documentation.

Prerequisites

Introduction to the specialty

Postrequisites

Manufacturing practice I

Theoretical and applied mechanics

Discipline cycle	Basic disciplines
Course	2
Credits count	3
Knowledge control form	Examination

Short description of discipline

The basic concepts and definitions of theoretical and applied mechanics are stated. The discipline includes the study of the main sections: theoretical mechanics (torque, trajectory and acceleration of the movement of a point, solid bodies, the concept of friction, the dynamics of the rotational motion of a body); resistance of materials (stress, deformation, compression, stretching, bending); theory of mechanisms and machines (basics of machines and mechanisms); machine parts (characteristics, types, calculation of axles, shafts, couplings).

Purpose of studying of the discipline

To form a system of knowledge about the laws of statics, kinematics and dynamics of mechanical systems, methods for calculating the parameters of their movement and interaction; methods for calculating the parameters of stress-deformed state of structures and parts; Develop practical skills in assessing the strength, rigidity and stability of structural elements and parts; To study the general issues of theory and calculation of parts of general application, which are widely used in engineering and technology; Develop practical skills in using methods for calculating elements of technological equipment, parts of machines and mechanisms according to performance and reliability criteria.

Learning Outcomes

ON5 Use the fundamental laws of mechanics, thermodynamics and heat and mass transfer and their practical applications in solving problems of heat power engineering and heat technology.

Learning outcomes by discipline

- analyze the problems of theoretical and applied mechanics, highlighting their basic components.
- solve the basic equations of the resistance of materials, kinematic diagrams of machines.
- draw up design schemes, design mechanical transmissions.

Prerequisites

Physics

Postrequisites

Fluid and gas mechanics

World of Abai

Discipline cycle	Basic disciplines
Course	2
Credits count	3
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at studying historical facts, the philosophical and artistic foundations of the works of Abay Kunanbaev, Shakarim Kudaiberdiev, which form worldview and aesthetic values, the student`s ability to express his opinion, practical skills and perception of such human qualities as morality, honesty, artistic character. The genius of the writers of Kazakh literature and the role of M. Auezov in the study and popularization of Abai`s heritage, the significance of his works for history, literature and science are determined.

Purpose of studying of the discipline

Formation of the meaning of philosophical and ideological being, understanding of the problems raised in the works of Abai Kunanbayuly, Shakarim Kudaiberdiuly, Mukhtar Auezov and application of the acquired knowledge in the practice of everyday life.

Learning Outcomes

ON1 Demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, apply information technology, taking into account modern trends in the development of society.

Learning outcomes by discipline

1) Analyzes the philosophical and artistic foundations of works, historical facts related to the creative heritage of Abai Kunanbayev, Shakarim Kudaiberdiyev, Mukhtar Auezov
2) Uses in practice the humanistic ideas of Abai`s philosophical and artistic works
3) Assesses the place and significance of Abai`s works in the history of literature and science

Prerequisites

The module of socio-political knowledge (sociology, political science, cultural studies, psychology)

Postrequisites

Basic and profile disciplines of the EP

Chemistry

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at studying the basic concepts and laws of chemistry, classical and quantum- mechanical ideas about the structure of the atom and chemical bonds; consideration of periodic laws and structure of the periodic system of chemical elements, types of chemical bonds; mastering the laws of thermodynamics, chemical kinetics and chemical equilibrium, corrosion of metals, ways of expressing the concentration of solutions; promote the ability to apply the knowledge gained in practice, to solve problems in professional training.

Purpose of studying of the discipline
Familiarization of students with modern ideas about the structure of substances, with the basic theories of chemical processes, with the properties of catalytic and complex systems, as well as with the properties of elements. Knowledge of the basic theory of chemical processes necessary in the study and deeper understanding of all subsequent special disciplines, also give students scientific and practical training in the basics of analytical chemistry.
Learning Outcomes
ON3 Apply basic knowledge in the field of mathematics and natural sciences, methods of mathematical analysis and modeling, theoretical and experimental research in the field of energy in cognitive and professional activities.
Learning outcomes by discipline
- possess fundamental chemical concepts, theories, laws and patterns.
- describe the main methods of scientific knowledge used in chemistry, such as observation, description, measurement, experiments.
- be able to give quantitative estimates and make calculations using chemical formulas and equations.
Prerequisites
School course
Postrequisites
Basic and profile disciplines of the EP

Fluid and gas mechanics

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying the laws of mechanics, the basic physical properties of liquids and gases. The study of the laws of hydrodynamics, hydrostatics, gas dynamics. Kinematics and fluid dynamics. Laminar and turbulent outflow of liquids. Bernoulli`s equation, Newton`s law Fundamentals of hydrodynamic similarity. Pipelines and hydraulic calculation of pipelines. The design and purpose of various hydraulic machines, hydraulic drives are outlined. The main processes occurring in hydraulic machines are described.
Purpose of studying of the discipline
Obtaining theoretical knowledge by students in the field of fluid and gas mechanics, hydraulic machines and other devices for processing and moving gaseous liquids, mastering methods for solving applied problems necessary for further study of special disciplines and practical activities in the specialty.
Learning Outcomes
ON5 Use the fundamental laws of mechanics, thermodynamics and heat and mass transfer and their practical applications in solving problems of heat power engineering and heat technology.
Learning outcomes by discipline
- reproduce the basic concepts of hydrostatics, hydrodynamics and aerodynamics, the operation of hydraulic machines.
- formulate basic definitions and prove the basic equations of fluid and gas mechanics.
- use the acquired knowledge to build mathematical models of real processes and phenomena.
Prerequisites
Physics
Postrequisites
The turbines of thermal and nuclear power stations

Manufacturing practice I

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Total mark on practice

Short description of discipline
Manufacturing practice I of students is an opportunity for real, practical acquisition and development of initial professional skills, knowledge and skills at specialized (according to the educational program) enterprises. Comparison of their expectations and the realities of future professional activity. Acquisition of knowledge and skills necessary for the development of general technical and special disciplines, future specialty and professional work. Acquaintance with the real practical work of the enterprise.
Purpose of studying of the discipline
The purpose of the practice is to increase the level of training of students, familiarize them with the future profession and inculcate certain primary skills.
Learning Outcomes
ON8 Describe the principles of operation and conduct of heat engineering calculations of developed and used heat power and heat technology installations and systems.
Learning outcomes by discipline
- demonstrate readiness for personal and professional self- improvement, self- development, and expansion of the boundaries of professional and practical knowledge.
- master the main legislative and regulatory documents and materials regulating and defining the activities of the organization.
- analyze modern and promising directions of development of thermal power and heat technology systems.
Prerequisites
Educational practice
Postrequisites
Manufacturing practice II

Manufacturing practice II

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Total mark on practice

Short description of discipline
This type of practice is aimed at deepening the students` professional experience, developing general and professional competencies. Expansion and consolidation of professional knowledge, and the formation of skills for independent work. Possession of the main technological processes at energy enterprises. Practical study of design, technology and organization of production processes, gaining experience in managing and organizing work in the structural divisions of heat generating enterprises.

Purpose of studying of the discipline
The purpose of the practice is to study the processes and equipment of the organization of production, the rules of technical operation, the rules for the construction of heat engineering installations and safety regulations.

Learning Outcomes
ON9 Perform calculations according to standard methods and design individual parts and assemblies using standard design automation tools in accordance with the terms of reference.

Learning outcomes by discipline
- perform qualitatively and safely the assigned tasks when performing experimental measurements.
- determine the parameters and characteristics of power plants.
- demonstrate the skills of measuring the parameters of thermal power equipment, working with technical documentation for power plants, devices for the production, transmission, distribution of thermal and electrical energy.

Prerequisites
Manufacturing practice I

Postrequisites
Undergraduate practice Manufacturing practice III

Economics of enterprise

Discipline cycle	Basic disciplines
Course	4
Credits count	3
Knowledge control form	Examination

Short description of discipline
At the present stage of economic reforms, significant changes are taking place in the economy, especially at the microeconomic level: the nature and methods of economic activity of enterprises are changing. This course studies in detail the resources of the enterprise, the efficiency of their use, profitability and the main technical and economic indicators of the functioning of the enterprise. In addition, methods of stimulating labor resources, in order to optimize the production capacity and capital of the enterprise.

Purpose of studying of the discipline
The purpose of studying the discipline "Enterprise Economics" is to develop students` economic thinking based on the study of the economic mechanism of the enterprise in market conditions, providing deep theoretical knowledge and practical experience in the field of economics and organization of the enterprise and the use of technological equipment.

Learning Outcomes
ON9 Perform calculations according to standard methods and design individual parts and assemblies using standard design automation tools in accordance with the terms of reference.

Learning outcomes by discipline
1) Demonstrates the ability to work effectively both individually and as a team member;
2) Assesses the feasibility study of design solutions;
3) Organizes activities related to the management of the actions of individual employees.

Prerequisites
Bases of economics, law and ecological knowledge

Postrequisites
Final examination

Design and research activity

Discipline cycle	Profiling discipline
Course	4
Credits count	3
Knowledge control form	Examination

Short description of discipline
The course "Project activity" discusses the methodology of research and design work. The role of the course in the formation of the competence of the bachelor of the educational program "Heat power engineering" is given. The stages of preparation and development of the project are shown, the importance of the correct choice of the topic, its relevance and issues is noted. Requirements for the design of the project, the establishment of deadlines and stages of work are formulated. The order of work with sources and observance of copyright is presented.

Purpose of studying of the discipline
Formation of basic skills for the development and maintenance of individual and group projects

Learning Outcomes
ON4 To apply in educational, scientific and professional activities the requirements for the graduate of the educational program of the rules, requirements and norms for the preparation of documentation.
ON9 Perform calculations according to standard methods and design individual parts and assemblies using standard design automation tools in accordance with the terms of reference.

Learning outcomes by discipline

- explain the technological schemes of thermal power plants;
- apply tools and techniques for working with engineering documentation;
- to design systems of thermal power stations.

Prerequisites

Elements of machine graphics and CAD basics in thermal power engineering Boiler installations and steam generators Thermal and nuclear power stations Application of USDD standards in the design of engineering documentation.

Postrequisites

Final examination