The list of academic disciplines of the university component

6B05 - Natural Sciences, Mathematics and Statistics
(Code and classification of the field of education)

6B053 - Physical and chemical sciences
(Code and classification of the direction of training)

0530
(Code in the International Standard Classification of Education)

B054 - Physics
(Code and classification of the educational program group)

6B05303 - Technical physics
(Code and name of the educational program)

Bachelor
(Level of preparation)

set of 2023

Семей 2023

Developed
By the Academic Committee of the OP
The head of the AK Nurymkhan Gulnur
OP Manager Aldazhumanov Zhan

Reviewed
at the meeting of the Quality Assurance Commission of the Faculty of Engineering and Technology
Recommended for approval by the Academic Council of the University
Protocol № 4.6 "10" April 2023
Chairman of the Commission on Quality Assurance Abdilova G.

Approved at the meeting of the Academic Council of the University Protocol No. 8 "25" April 2023.

Approved
at the meeting of the Academic Council of the University
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 To apply in cognitive and professional activities basic knowledge in the field of mathematics and physics, methods of mathematical analysis and modeling, theoretical and experimental research.

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 To apply in cognitive and professional activities basic knowledge in the field of mathematics and physics, methods of mathematical analysis and modeling, theoretical and experimental research.
ON5 Use the fundamental laws of mechanics, thermodynamics, heat and mass transfer and their practical applications.

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 Apply in the educational, scientific and professional activities the requirements of the rules and standards 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 computer graphics and CAD bases in technical physics

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 «Technical physics », 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

Mastering the necessary basic knowledge and skills in the chosen field of study.

Learning Outcomes

ON4 Apply in the educational, scientific and professional activities the requirements of the rules and standards of documentation.

Learning outcomes by discipline

1) work together with colleagues to achieve the set goal
2) use normative legal documents in their professional activities;
3) analyze information, technical data, indicators and results of work.

Prerequisites

Introduction to Specialty

Postrequisites

Manufacturing practice I

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

Technical Mechanics

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

Short description of discipline
The discipline "Technical Mechanics" studies the following theoretical sections: Technical Mechanics: Statics. Kinematics of a point and a rigid body. Dynamics of a material point and theorems. Resistance of materials: strength and deformation; bending and twisting; thin-walled shells; fatigue strength; endurance in bending and torsion; stability of compressed rods, pipes and shells. Machine parts: shafts and axles; bearings, couplings, drives; calculation and design.

Purpose of studying of the discipline
Study of mechanical phenomena, general principles of design and construction, building models and algorithms for calculating typical mechanical engineering products, taking into account their main performance criteria.

Learning Outcomes
ON3 To apply in cognitive and professional activities basic knowledge in the field of mathematics and physics, methods of mathematical analysis and modeling, theoretical and experimental research.
ON5 Use the fundamental laws of mechanics, thermodynamics, heat and mass transfer and their practical applications.

Learning outcomes by discipline
1) uses the basic equations of the strength of materials;
2) designs mechanical transmissions.
3) calculates parts and components of mechanisms and machines.

Prerequisites
Mathematics

Postrequisites
Bases for design and construction of refrigerating machines with elements of CAD Controlled thermonuclear fusion

Fluid Dynamics

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

Short description of discipline
The discipline " Fluid Dynamics " provides an in-depth study of hydraulic machines and other devices for processing and moving gaseous liquids, fluid and gas mechanics. And includes the following theoretical sections: Dynamics and statics of liquids and gases. Influence of traffic flow parameters. Elements of the theory of similarity and its application in the study of transfer processes. Calculations of the movement of liquids and gases in pipes, channels and boundary layers.

Purpose of studying of the discipline
Students gaining theoretical knowledge 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
ON3 To apply in cognitive and professional activities basic knowledge in the field of mathematics and physics, methods of mathematical analysis and modeling, theoretical and experimental research.
ON5 Use the fundamental laws of mechanics, thermodynamics, heat and mass transfer and their practical applications.

Learning outcomes by discipline
1) present the concepts and patterns of movement of liquid and gas calculation methods
2) calculate aerodynamic and gas-dynamic characteristics;
3) use the laws of hydrostatics, hydrodynamics and aerodynamics and the principles of operation of hydraulic machines for theoretical and practical purposes
Prerequisites
Physics
Postrequisites
Energyequipment NEI Air conditioning and ventilation

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 Use the rules of work organization with compliance with safety requirements on the basis of the relevant legislative and regulatory framework in the field of labor protection, radiation safety, fire safety in the energy sector.
Learning outcomes by discipline
1) performs design and information services using computer technology, communications and communications;
2) prepares technical and methodological documentation using applied software;
3) analyzes information, technical data, indicators and results of work;
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 To substantiate the methods of calculation and selection of equipment for the nuclear industry, alternative and renewable energy for the production of cold, ventilation and air conditioning systems based on the achievements of science and technology.
Learning outcomes by discipline
1) performs, using computer technology, communications and communications, work in the field of scientific and technical activities on design and information services;
2) formulates rules and regulations for the design, construction, installation and operation of energy systems and installations
3) carries out operation and adjustment of power and technological equipment of industrial enterprises;
Prerequisites
Manufacturing practice I
Postrequisites
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

ON10 Проводить технико-экономические обоснования эффективности работы энергетических систем в области высоких и низких температур, энергосберегающего оборудования с использованием необходимых материалов действующих производств.

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

Introduction to scientific activity

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

Short description of discipline

In modern conditions, the training of competitive and highly professional specialists in the market of intellectual labor in the scientific field is of particular relevance. Further activities will be determined by how much he will be able to realize his potential in practice, systematically develop his scientific abilities. The student must be able to master the skills of working with various sources of information, offer the most effective solutions to emerging problems, analyze the real situation, and find the best ways to improve it.

Purpose of studying of the discipline

To prepare students for research work in the process of studying at the university and future professional activities.

Learning Outcomes

ON3 To apply in cognitive and professional activities basic knowledge in the field of mathematics and physics, methods of mathematical analysis and modeling, theoretical and experimental research.
ON4 Apply in the educational, scientific and professional activities the requirements of the rules and standards of documentation.
ON7 Apply laws describing the flow of physical processes in the microworld, the mathematical apparatus of non-relativistic quantum mechanics, methods for calculating the physical properties of materials, assessing the applicability of approximations in educational, research and practical activities.
ON9 To substantiate the methods of calculation and selection of equipment for the nuclear industry, alternative and renewable energy for the production of cold, ventilation and air conditioning systems based on the achievements of science and technology.
ON10 Проводить технико-экономические обоснования эффективности работы энергетических систем в области высоких и низких температур, энергосберегающего оборудования с использованием необходимых материалов действующих производств.

Learning outcomes by discipline

- collect, study and process information, select from the literature and independently develop methods for conducting research;
- generalize best practices and organize their own research (experimental - experimental, experimental and practical work);
- define the object of research, formulate the goal, draw up a plan for the implementation of the study, formulate conclusions and make generalizations.

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Final examination