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)

B064 - Mechanics and metal working
(Code and classification of the educational program group)

6B07106 - Mechanical 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 Dukenbayev Damir

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 technologies taking into account current 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

Introduction to the profession

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

Short description of discipline

This course covers the basics of creating machines, technical preparation of production. mechanical engineering technology is the science of machine manufacturing; machine tools and ways of its development. instrumental production; the tasks of modern industrial production, types of industrial enterprises, the place and role of mechanical engineering in modern production, the history of the development of mechanical engineering, the contribution of scientists to the formation of the mechanical engineering industry, the prospects for the development of mechanical engineering the role of an engineer at the current stage of the development of mechanical engineering.

Purpose of studying of the discipline

to ensure the orientation of students in the condi-tions corresponding to the specifics of the university, as well as general fami-liarity with the fundamentals of engineering and specialty

Learning Outcomes

ON3 Use GOSTs, ESKDs when making working drawings of parts, using modern automated programs.

Learning outcomes by discipline

1) apply the knowledge gained when mastering the educational material of subsequent disciplines
2) analyze information in the library fund, reference literature or on the Internet
3) distinguish the basic concepts and definitions used in mechanical engineering

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

ON2 Own the skills of applying physical and mathematical knowledge, basic laws of natural science

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

Interchangeability bases Theoretical mechanics Theoretical Foundations of Mechanics Theoretical mechanics

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

ON2 Own the skills of applying physical and mathematical knowledge, basic laws of natural science

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

Interchangeability bases Theoretical mechanics Theoretical Foundations of Mechanics Theoretical mechanics

Training practice

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

Short description of discipline

Familiarization with the production; modern equipment of engineering enterprises; the deepening and consolidation of theoretical knowledge obtained at the university with the tool and tooling used; familiarization with the structure of procurement, assembly, mechanical processing and maintenance workshops at the enterprise; transport devices: rail network, track devices, garage for road transport, suspended tracks, lifting and transport devices. Practice is a form of cognitive and practical activity of the student aimed at consolidating and testing the knowledge of the student

Purpose of studying of the discipline

The purpose of educational practice is ac¬quaintance with production; modern equipment of machine-building enter-prises; deepening and fixing of the theoretical knowledge gained at the university; acquaintance with structure of the machining enterprises; I.e. prac-tice is a form of cognitive and practical activities of the student directed to fixing and an examination of the stu-dent

Learning Outcomes

ON3 Use GOSTs, ESKDs when making working drawings of parts, using modern automated programs.

Learning outcomes by discipline

1. Describe the main equipment of the machine-building enterprise
2. classify production structure
3. Distinguish between the main methods of material processing

Prerequisites

Introduction to the profession

Postrequisites

Production practice I

Constructional materials and heat treatment

Discipline cycle	Basic disciplines
Course	2

Credits count	5
Knowledge control form	Examination

Short description of discipline
In this course, the theoretical foundations of materials science, metal corrosion, the main methods of heat treatment of materials are examined. metal structural materials are described: steels, cast iron, aluminum, copper and other alloys, as well as corrosion-resistant heat-resistant steels and alloys, tool steels and alloys, steels and alloys with special physical properties, non-metallic materials (rubber, composite materials, plastics, ceramic metal materials). characteristics of the main equipment for heat treatment of materials are given

Purpose of studying of the discipline
To teach the student, modern progressive methods of metal production, new construction materials. To provide knowledge about the structure, physical, mechanical and technological properties of metals and non-metallic materials, as well as about the possibility of controlling the properties of materials using heat treatment

Learning Outcomes
ON5 Own the basis of strength calculations, selection of structural materials of billets
ON6 Own the basis of design and design of parts and assemblies of engineering structures in accordance with the terms of reference

Learning outcomes by discipline
1. assimilation and labeling of carbon and alloyed steels, non-ferrous metals, non-metallic materials; structure and physical, mechanical, chemical and technological properties of metals and non-metals;
2. select a material and assign heat treatment in order to obtain a given structure and properties that ensure high reliability and durability of machine parts;
3. have an idea of the main processes occurring in metals: polymorphic transformations, crystallization processes;

Prerequisites
Mathematics Physics

Postrequisites
Technological processes of machine-building production

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 technologies taking into account current 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
Kazakh language The module of socio-political knowledge (sociology, political science, cultural studies, psychology)

Postrequisites
Basic and profile disciplines of the EP

Interchangeability bases

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination and term work/Project

Short description of discipline
This course examines the methods of ensuring interchangeability and its methodological foundations in relation to modern products of mechanical engineering and instrument making. Discipline gives the minimum of knowledge, on the basis of which the future specialist will be able to independently and fruitfully solve new problems in the course of further development of science and technology, expands his scientific horizons, contributes to the development of thinking, increases the general culture and competence

Purpose of studying of the discipline
familiarization of students with methods of ensuring interchangeability and its methodological foundations in relation to modern products of mechanical engineering and instrument making. The study of the discipline will allow future bachelors to provide the necessary level of machine design

Learning Outcomes
ON4 Make a reasonable choice for the specified conditions and ensure the quality indicators of the products.

Learning outcomes by discipline
1 assign bearing fits, smooth cylindrical, threaded, key, splined joints, gear gears;

2. assign appropriate control methods during the development of the technological process of castings, stamping, forgings
3. analyze the influence of input parameters on the functional indicators of the product and its parts, as well as assign accuracy of input parameters

Prerequisites
Mathematics Physics

Postrequisites
Fundamentals of design and machine parts

Innovative materials

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

Short description of discipline
The course studies the main aspects of replacing traditional materials in mechanical engineering with innovative polymer, composite, nanostructured materials; features of the choice of components for polymer composite materials; Methods for predicting the properties of new materials. to navigate a wide range of materials, to study the choice in order to ensure a range of quality and accuracy of products; to use digital technologies in the design, manufacture and testing of polymer composite materials in mechanical engineering and related fields.

Purpose of studying of the discipline
Formation of professional competencies in the field of knowledge of new materials and technologies for their production, as well as the formation of ideas about nanomaterials and composite materials, methods of their research and application.

Learning Outcomes
ON5 Own the basis of strength calculations, selection of structural materials of billets
ON6 Own the basis of design and design of parts and assemblies of engineering structures in accordance with the terms of reference

Learning outcomes by discipline
1. study of the classification of materials, their structures and properties, structural features, properties and applications of modern materials and nanomaterials, the basics of designing materials with desired properties,
2. formation of ideas about the technologies for the manufacture and processing of materials, the main methods for studying the composition, structure, physical properties of materials,
3. acquisition of practical skills in research and description of the properties of various groups of materials.

Prerequisites
Constructional materials and heat treatment

Postrequisites
Bases of technology of mechanical engineering Key elements of manufacturing preparation in mechanical engineering Bases of production of machines

Production practice I

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

Short description of discipline
Production practice is aimed at consolidating the theoretical knowledge gained at the university; to solve production problems directly in workshops and departments of engineering enterprises, as well as practical study of the forms and methods of organization of production, technological and labor processes adopted at the enterprise in terms of their efficiency; identification of advanced technological methods of machining parts; acquisition of work skills directly at the workplaces of process engineers.

Purpose of studying of the discipline
identification of progressive technolo-gical ways of machining of details, as-semblies of knots, units, machines; ac-quisition of labor skills of performance of work directly in workplaces of process engineers. Acquaintance with all complex of technological process of production of cars, economies, organi-zation and planning of production, mastering skills of the independent so-lution of engineering, economic and administrative problems

Learning Outcomes
ON4 Make a reasonable choice for the specified conditions and ensure the quality indicators of the products.

Learning outcomes by discipline
1. Describe the principle of operation of universal and special devices used in machining
2. explain the purpose, design, principle of operation and method of using auxiliary, cutting and measuring tools used in machining
3. analyze the technological process of mechanical processing of the main typical parts on metal-working machines using technological documentation

Prerequisites
Training practice

Postrequisites
Manufacturing practice II

Technological processes of machine-building production

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

Short description of discipline
This course discusses the basics of metallurgical production of ferrous and non-ferrous metals; main methods of materials processing (pressure treatment, cutting treatment, welding, soldering), main equipment for materials processing by pressure, welding, soldering, cutting; foundry bases casting equipment and methods of metal forming, welding, casting and cutting; technology of production of blanks and machine parts from non-metallic materials
Purpose of studying of the discipline
Teach the student, future engineer to choose technological methods for obtaining and processing workpieces and parts of machines that ensure high quality of products, saving material, high labor productivity. He must know the main methods of processing materials (by pressure, casting, cutting, welding, soldering)
Learning Outcomes
ON4 Make a reasonable choice for the specified conditions and ensure the quality indicators of the products.
Learning outcomes by discipline
1. have an idea of the prospects for the development of the foundryas, production of workpieces by methods of pressure treatment, welding production and metal processing on metal cutting machines
2. select the technology for manufacturing the workpiece and its mechanical processing depending on the design features of the parts, material and working conditions, determine a rational method of welding structures;
3. describe the essence of the processes of producing metals and alloys, the peculiarities of forming workpieces by various methods, the principles of obtaining permanent joints by welding and soldering, the physical foundations of methods of processing workpieces by cutting products used in mechanical engineering
Prerequisites
Constructional materials and heat treatment
Postrequisites
Bases of technology of mechanical engineering Key elements of manufacturing preparation in mechanical engineering Bases of production of machines

Fundamentals of design and machine parts

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination and term work/Project

Short description of discipline
This course covers mechanical gears (gear, worm, chain, belt, friction, planetary, wave); couplings, rolling and sliding bearings; theoretical basis of design, calculation and design of parts and assemblies of all technological machines, ensures the quality of manufactured products by selecting structural materials of blanks, designs parts and assemblies of machine building structures in accordance with the technical assignment used in various branches of the national economy
Purpose of studying of the discipline
The purpose of this course is to form the bachelor`s knowledge and ability to independently solve the calculation and design of general-purpose parts with the implementation of the necessary drawings.
Learning Outcomes
ON5 Own the basis of strength calculations, selection of structural materials of billets
ON6 Own the basis of design and design of parts and assemblies of engineering structures in accordance with the terms of reference
Learning outcomes by discipline
1) Compare machines and mechanisms, structures and methods for calculating the drive, and the main components of the machines.
2) Study the basic concepts and definitions.
3) Apply the knowledge gained to build mathematical models of real processes and phenomena
Prerequisites
Theoretical mechanics Theoretical Foundations of Mechanics Theoretical mechanics Strength of materials Mechanics of Materials Analytical dynamics and vibration theory Information and communication technology
Postrequisites
Metal-cutting machine tools Principles of machine desiqn Machine equipment of tool production

Manufacturing practice II

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

Short description of discipline
Production practice 2 is aimed at studying the tasks, functions and structure of the service of the chief designer and design bureau; Department of the Chief Technologist and with the work of the Process Engineer; study of the system of design preparation of production; with organization of metrological control of design documentation; with the tasks, functions and structure of the standardization service, with the system of the Unified Design Documentation System, with the occupational health and safety system
Purpose of studying of the discipline
The purpose of practice is similar acquaintance with tasks and content of work of the design engineer. Mastering skills of the independent solution of engineering, economic and administrative problems, deepening and fixing of the theoretical knowledge gained at the university to the solution of production tasks directly in shops and departments of machine-building enterprises and also practical studying of the forms taken at the enterprise and methods of the organization of production, technological and labor processes in terms of their efficiency; identification of progressive technological ways of machining of details, assemblies of knots, units, machines; acquisition of labor skills
Learning Outcomes
ON5 Own the basis of strength calculations, selection of structural materials of billets

ON6 Own the basis of design and design of parts and assemblies of engineering structures in accordance with the terms of reference

Learning outcomes by discipline

1. Master the skills of independent solution of engineering, economic and administrative issues
2. study the organization of metrological control of design documentation
3. Study the occupational safety and health system

Prerequisites

Production practice I

Postrequisites

Manufacturing practice II

Fundamentals of scientific activity

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course studies the basic principles, methodology, features of organization and conduct, provisions, content of scientific research. Allows to master the skills of conducting scientific research, applying special research methods, processing, analyzing and interpreting the data obtained as a result of scientific work, testing and implementing the results in practice. Promotes the study of the main standards and regulatory documents for the design of the results obtained during scientific research.

Purpose of studying of the discipline

The purpose of the discipline is to ensure the formation of students` theoretical knowledge in the field of systemic vision of the role and place of science in modern society and understanding of the directions for the development of scientific research in the field of their profile orientation.

Learning Outcomes

ON8 Perform the necessary calculations during the design of engineering enterprises of their technical equipment, arrangement of equipment, automation means, control, control in modern conditions of the market economy

Learning outcomes by discipline

1.mastering by students the main provisions on the methodology, methods and techniques of scientific research;
2. instilling skills in students in the implementation of educational-research and research work;
3.mastering the skills in working with scientific literature and information resources necessary for conducting scientific research.

Prerequisites

Manufacturing engineering Fundamentals of design of machine manufacturing engineering processes Manufacturing technology and machining methods of standard parts in mechanical engineering industry

Postrequisites

Final examination