CATALOG OF ELECTIVE DISCIPLINES

6B07 - Engineering, manufacturing and construction industries
(Code and classification of the field of education)

6B071 - Engineering and Engineering affairs
(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)

6B07108 - Digital technologies in mechanical engineering
(Code and name of the educational program)

bachelor
(Level of preparation)

set of 2024

Semey 2024

Developed
By the Academic Committee of the OP
The head of the AK
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Reviewed
at a meeting of the Commission on Academic Quality of the Faculty of Engineering and Technology
Protocol No. 3 of January 15, 2024
at a meeting of the Commission on Academic Quality of the Higher School of Artificial Intelligence and construction
Recommended for approval by the University Academic Council
Protocol No. 1, “6” June 2024

Approved
at a meeting of the University Academic Council by protocol No. 3 of January 16, 2024.

at a meeting of the University Academic Council by protocol No. 6 of June 18, 2024.

Engineering graphics

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

Short description of discipline
The discipline studies the theoretical foundations of constructing images of spatial objects on a plane, with solutions to problems on the mutual belonging and mutual intersection of geometric figures, as well as on determining the true size of individual geometric figures, the main provisions of the USDD standards. Students studying this discipline gain skills in reading and making images of parts using views, sections and sections, making sketches and working drawings, assembly drawings; applying dimensions and item numbers, drawing up specifications.

Purpose of studying of the discipline
the basic rules of execution and registration of design documentation are studied. Full mastery of the drawing as a means of expressing technical thought and
production documents, as well as the acquisition of stable drawing skills are achieved as a result of mastering the entire complex of technical disciplines of the relevant profile, supported by the practice of course and diploma design

Learning Outcomes
ON3 To use SS, USDD when making working drawings of parts, using modern software

Learning outcomes by discipline
1)know the types of regulatory, technical and production documentation;
2)perform sketches, technical drawings and drawings of parts, their elements, nodes;
3)read working, assembly, construction drawings and diagrams in the profile of the specialty

Prerequisites
School course

Postrequisites
Final examination Prediploma practice

Mechanical engineering drawing

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

Short description of discipline
The course is part of technical drawing, which studies the methods and symbols of drawing machines, their components, parts, fixtures, metal structures, etc. Studying the mechanical engineering drawing course is aimed at the ability
understand and execute any mechanical engineering drawings; read all technical documentation, basic requirements of standards for the execution of working drawings, drawings of assembly units. The course is aimed at developing students` ability for spatial imagination, consolidating and expanding knowledge in the field of drawing on a fundamentally new platform - using modern graphics packages.

Purpose of studying of the discipline
the knowledge required to perform and read drawings of geometric objects based on an orthogonal projection, making drawings of engineering skills profile in accordance with the standards ESKD.

Learning Outcomes
ON3 To use SS, USDD when making working drawings of parts, using modern software

Learning outcomes by discipline
1) Show the correct drawing design.
2) Build the correct image of the part of any configuration.
3) Draw using drawing tools.

Prerequisites
School course

Postrequisites
Computer programs and equipment Bases of computer modeling

Descriptive geometry

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

Short description of discipline
In this course, we study the theoretical foundations of constructing images of spatial objects on a plane. Discusses methods for specifying a point, line, plane and polyhedra in a complex Monge drawing; positional tasks; metric problems; methods for converting a drawing; polyhedra; curved lines; surfaces; surfaces of rotation; construction of surface developments; tangent lines and planes to the surface; axonometric projections. The course is focused on developing the knowledge and skills students need to complete and read technical drawings and sketch parts.

Purpose of studying of the discipline
development of knowledge and skills necessary for students to complete and read technical drawings, make sketches
parts, preparation of design and technical documentation for production.

Learning Outcomes
ON3 To use SS, USDD when making working drawings of parts, using modern software

Learning outcomes by discipline
1) Applies projection drawing methods to depict parts and assemblies of technological machines
2) Performs images, sections and sections on drawings, detailing assembly drawings
3) Develops and reads drawings of various objects taking into account the requirements of international standards ISO and ESKD
Prerequisites
School course
Postrequisites
Computer programs and equipment Bases of computer modeling

Theoretical mechanics

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

Short description of discipline
In this course, the sections statics, kinematics and dynamics are studied. Vector, coordinate and natural methods of specifying the movement of a point, determining the trajectory and acceleration of a point. Translational and rotational motion of a rigid body. The knowledge gained during the course will allow students to calculate the trajectories of movement, speed and acceleration of the main working bodies of technological machines and equipment during the design and development of their new samples.
Purpose of studying of the discipline
The purpose of studying the discipline "Theoretical Mechanics" is to study the general laws that govern the movement and equilibrium of material bodies and the resulting interactions between bodies.
Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products
Learning outcomes by discipline
1) Determines the dynamic loads that occur in machine parts
2) Performs kinematic analysis of the machine mechanism
3) Makes kinematic calculation schemes of machines

Prerequisites
Mathematics Physics
Postrequisites
Strength of materials Analytical dynamics and vibration theory Fundamentals of design and machine parts Mechanicsof Materials

Theoretical foundations of mechanics

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

Short description of discipline
Theoretical foundations of mechanics is one of the most important general technical disciplines, which studies the kinematic and dynamic characteristics for various links of mechanisms, the stability of elastic rod systems, support reactions, equilibrium with friction, velocities and accelerations of points and links, dynamic methods for determining the kinematic characteristics of links; law on kinetic energy, work and power. The discipline is aimed at developing knowledge in the field of theoretical foundations of mechanics and their application in solving practical problems.
Purpose of studying of the discipline
the theoretical foundations of Knowing of the mechanics allows to calculate the support reactions to determine the velocity and acceleration of points, to conduct dynamic calculations.
Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products
Learning outcomes by discipline
1)formulate the tasks to be solved in terms of theoretical mechanics;
2)to develop mechanical and mathematical models that adequately reflect the basic properties of the phenomena under consideration;
3)to carry out research of mathematical models of mechanical phenomena using modern information technologies.
Prerequisites
Mathematics Physics
Postrequisites
Strength of materials Analytical dynamics and vibration theory Fundamentals of design and machine parts Mechanicsof Materials

Theoretical mechanics

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

Short description of discipline
In this discipline, calculation schemes, hypotheses are studied; section method; tension- compression; laboratory tests of materials, calculations for tensile and compression strength and stiffness, shear; geometric characteristics of flat shapes, simple types of loading of the beam (bending, torsion), strength calculations at dynamic loading. mechanical vibrations, stress and strain theory. stability of elastic rod systems; methods of determining: loads in engineering structures.

Purpose of studying of the discipline
The acquisition of theoretical Knowing and develop practical skills in the preparation of design models of simple mechanisms and structures; mastering the methods for calculating the strength and stiffness of typical structural elements and joints under static and dynamic loading.
Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products
Learning outcomes by discipline
1) Determine the internal force factors using the section method.
2) Calculate the tensile and compressive strength of the rod.
3) Find the center of gravity of any shape.
Prerequisites
School course
Postrequisites
Basic and profile disciplines of the EP

Computer programs and equipment

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

Short description of discipline
This course discusses computer technologies, their role and importance of computer technology in modern society, application of the possibility of packages of application programs for solving problems of engineering technology, systems for supporting the life cycle of products, project management systems, program 1C Production enterprise management, Compass-3D program, paperless document flow in machine building, aspects of application of electronic-digital signature in corporate document flow.
Purpose of studying of the discipline
Development of terminology, applied during the work on the personal computer; the purposes and problems of bases of computer technologies, a role and value of computer facilities in modern society, application of a possibility of packages of application programs for the solution of problems of technology of mechanical engineering
Learning Outcomes
ON3 To use SS, USDD when making working drawings of parts, using modern software
Learning outcomes by discipline
1) Use information and communication technologies in professional activities
2) acquire practical skills in drawing up design documentation on a computer, working with databases;
3) Take part in the design and editing of graphic technical documentation of systems and means of operation of process machines and equipment in accordance with the terms of reference and normally technical documentation
Prerequisites
School course
Postrequisites
Machine graphics basics Machine graphics Engineering graphics in AutoCAD environment

Bases of computer modeling

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

Short description of discipline
This course discusses graphic editors, menu types; execution of computer models of parts, preparation of design and technical documentation, formation of techniques and construction skills, drawing design; selection and methods of hatching, editing of the hatching performed; geometrical forms of simple parts by their images and execution of these images, both from nature and from the drawing of the assembly unit; sketches, detail drawings, assembly drawings and general view.
Purpose of studying of the discipline
development of Knowing and skills necessary for students for performance is computer models of details, drawing up design and technical documentation of production, formation of receptions and skills of construction.
Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products
Learning outcomes by discipline
1) apply a systematic approach and mathematical methods in formalizing the solution of applied problems,
2) to implement a computer experiment in solving problems where there is a need for computer mathematical modeling.
3) apply methods of computer mathematical modeling in theoretical and experimental studies.
Prerequisites
School course
Postrequisites
Machine graphics basics Machine graphics Engineering graphics in AutoCAD environment

Design and modeling in the KOMPAS-3D system

Discipline cycle	Basic disciplines
Course	1
Credits count	5

Knowledge control form	Examination

Short description of discipline
The course program examines the possibilities of creating in KOMPAS-3D drawings of parts of varying degrees of complexity in accordance with the requirements of SS and USDD, using all the capabilities of automated software; preparation of accompanying technical documentation; automation of the project creation process using 3D solid and surface modeling components. The course is aimed at developing knowledge and skills in using KOMPAS-3D software in the design and modeling of various parts and assemblies in mechanical engineering.

Purpose of studying of the discipline
The purpose of studying the discipline is to develop fundamental and applied knowledge in the field of three-dimensional computer graphics and practical skills in three-dimensional modeling of production objects to solve engineering and design problems using modern application software packages.

Learning Outcomes
ON3 To use SS, USDD when making working drawings of parts, using modern software

Learning outcomes by discipline
1)need to know how to navigate the interface, configure the workspace, use toolbars and menus
2)The ability to work with two-dimensional and three-dimensional drawings, including the creation of lines, circles, rectangles and other basic objects
3)Creating 3D objects

Prerequisites
Engineering graphics Descriptive geometry Mechanical engineering drawing

Postrequisites
Basic and profile disciplines of the EP

Strength of materials

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

Short description of discipline
This course covers the stretching and compression of a straight rod, the construction of normal force curves, the mechanical properties of materials during expansion-compression, calculations for strength and rigidity under stretching-compression, under torsion and bending; the theory of stressed and deformed states of statistically indeterminate systems; calculation of thin-walled rods and shells; calculation of thick-walled pipes; equilibrium stability of deformable systems, fatigue strength calculations at alternating stresses; dynamic load.

Purpose of studying of the discipline
students with basic Knowing in the field of calculations on strength, stiffness and stability, and optimal methods of calculation, promoting the combination of reliable performance with its low cost of construction and minimal weight

Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products

Learning outcomes by discipline
1) Determination of internal forces and construction of their diagrams.
2) Calculate the strength of the rods in tension (compression), shear, torsion, flat bending.
3) Calculation of shaft fatigue under cyclic-alternating stress.

Prerequisites
Theoretical mechanics

Postrequisites
Fundamentals of design and machine parts

The analysis and synthesis of mechanisms

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

Short description of discipline
This discipline covers the tasks of position analysis and linkage movement analysis; analytical kinematics; classification of flat levers according to Assur; analytical kinetostatics and dynamics of flat and spatial lever mechanisms; assembly of positions and movements; approximation synthesis of mechanisms, problem of "branch defect"; modular synthesis and automation of draft design of transfer, guide and moving mechanisms.

Purpose of studying of the discipline
acquisition by students of initial knowledge in the field of calculations and main stages of designing machines, optimal calculation methods that contribute to a combination of reliable operation of mechanisms and machines.

Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products

Learning outcomes by discipline
1. Describe the principle of formation of mechanisms and their classification system;
2. use software products for calculating mechanisms on computers;
3 perform calculations of kinetostatics and dynamics of mechanisms and machines

Prerequisites
Theoretical mechanics

Postrequisites

Fundamentals of design and machine parts

Analytical dynamics and vibration theory

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

Short description of discipline
The theory of oscillations of various linear and nonlinear systems with one, two and a finite number of degrees of freedom is considered; natural and forced vibrations of rods, plates; parametric oscillations; geometric characteristics of planar sections; shear and torsion, construction of epures of torques, stress and deformation; bending; construction of transverse forces and bending moments; normal and tangential bending stresses; strength and bending stiffness calculations.

Purpose of studying of the discipline
students with basic Knowing in a variety of analytical methods for the integration and differential equations of motion of mechanical systems. Lagrange, Hamilton, Jacobi, Routh, variational principles

Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products

Learning outcomes by discipline
1) Determine natural and forced frequencies.
2) Calculate parametric oscillations.
3) Calculate the strength and rigidity of the plates in flat bending

Prerequisites
Theoretical mechanics

Postrequisites
Fundamentals of design and machine parts

Engineering graphics in AutoCAD environment

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

Short description of discipline
This course examines the use of the AutoCAD computer program when performing graphic work, methods for creating two-dimensional objects and three-dimensional models in the AutoCAD environment, the processes of parameterization, annotation and visualization, teamwork tools using cloud resources; a scheme for the transition from flat elements to a three-dimensional representation is outlined, tools for generating views, sections and extension elements using a solid model are described, and drawings are made according to the standards of a USDD. The course is focused on developing skills in automating engineering, graphic and design work, making working drawings in the AutoCAD environment.

Purpose of studying of the discipline
studying modern methods and means of creating and processing images using software and hardware computing systems.

Learning Outcomes
ON3 To use SS, USDD when making working drawings of parts, using modern software

Learning outcomes by discipline
1) navigate extensive classes of vector and bitmap editors.
2) be able to execute simple drawings in a raster editor and simple drawings in an AutoCAD vector editor.
3) classify the main methods of working with computer graphics using the example of creating graphic applications.

Prerequisites
Computer programs and equipment

Postrequisites
Basic and profile disciplines of the EP

Engineering creativity in mechanical engineering

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

Short description of discipline
This course describes the general principles and methods of engineering creativity, ways to form the effectiveness of creative methods for solving design and technical problems, the conditions necessary for engineering creativity, the development of abilities for engineering creativity; development work, features of structural optimization, selection of the type of workpiece and methods of its manufacture, structural analysis of the choice of a typical route for processing parts, the number and sequence of transitions in the operation, a rational system of machine tools; design and technological support of wear resistance of parts.

Purpose of studying of the discipline
Getting students of the basics of knowledge in the field of engineering creativity and using the information received in engineering work

Learning Outcomes
ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline
1) Determine the geometric characteristics of an arbitrary section
2) Calculate mechanical constants and material properties during testing.
3) Calculate the stability of centrally compressed rods
Prerequisites
Introduction to Digital Engineering
Postrequisites
Metal-cutting machine tools Machine equipment of tool production Fundamentals of machine design

Machine graphics

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

Short description of discipline
The discipline includes the following sections: familiarization with the AutoCAD program and existing computer-aided design systems; consider graphic primitives and working with them, blocks and external links; custom coordinate system; learn how to work with drawing design, drawing editing commands, and working with layers. The types of products and design documents are considered; carry out in practice the creation of solid models and their editing, dimensional styles and tolerances, isometric images of the part; three-dimensional modeling.The discipline is aimed at developing knowledge and skills in using SS, USDD when preparing working drawings of parts using modern software.
Purpose of studying of the discipline
The mastering by students of the universal automation environment of engineering and graphic works; computer graphics for obtaining design documentation, both in terms of the quality of the execution of documents, satisfying ESKD standards, and compliance with the standards; solid-state spatial modeling capabilities.
Learning Outcomes
ON3 To use SS, USDD when making working drawings of parts, using modern software
Learning outcomes by discipline
1) studying the modern principles of working with graphic information in the field of information technology.
2) the study in practice of modern algorithms for the input, processing, storage and output of graphic information, which underlie the most popular software products for working with graphic information
3) have an idea of the means for creating and processing raster graphics and vector images.
Prerequisites
Computer programs and equipment
Postrequisites
Basic and profile disciplines of the EP

Mechanicsof Materials

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

Short description of discipline
This course examines the strength of materials; geometric characteristics of cross sections of rods; external and internal loads; section method; stress, deformation, concepts of strength, rigidity and stability; mechanical characteristics of materials under tension and compression, bending, shear (shear) and crushing; torsion, complex resistance, stability of centrally compressed rods, inertial and impact loads; strength under stresses that change cyclically over time; calculation of strength, rigidity and stability. The course is focused on the ability to conduct strength calculations for given conditions and ensure quality indicators of products.
Purpose of studying of the discipline
the desire for a combination of the reliability of the entire structure with its sufficient rigidity, stability and low cost, while achieving maximum capacity with the least material consumption
Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products
Learning outcomes by discipline
1) Determine the geometric characteristics of an arbitrary section
2) Calculate mechanical constants and material properties during testing.
3) Calculate the stability of centrally compressed rods
Prerequisites
Theoretical mechanics
Postrequisites
Fundamentals of machine design

Key elements of manufacturing preparation in mechanical engineering

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

Short description of discipline
This course covers the main types of production, characteristics and calculations of machine tools, allowable design loads, tools,

machining modes, design, calculation and technology for the manufacture of blanks and parts, layout of the mechanical assembly area for production; principles of calculation and ways of ensuring accuracy in the development of technological processes, as well as ways of ensuring the quality of machines, methods of increasing labor productivity and ways of reducing the cost of products.

Purpose of studying of the discipline

The acquisition by students of knowledge of the basics of mechanical engineering technology, about modern progressive methods of production, about the creation of technological processes of mechanical processing and assembly

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1. analyze the technological features of the parts
2. Describe the regularities of ensuring the required properties of the material and the formation of dimensional links of the part during its manufacture, time links and economic indicators of the production process,
3. Know the methodology for developing the technological process of machine manufacturing, the principles of constructing the production process of machine manufacturing;

Prerequisites

Technological processes of machine-building production

Postrequisites

Manufacturing engineering Fundamentals of design of machine manufacturing engineering processes Production technology and processing methods for standard parts in mechanical engineering

Machine graphics basics

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

Short description of discipline

This course contains basic theoretical information, concepts, basic functions; mathematical and algorithmic foundations of machine graphics, features of raster and vector graphics, basic raster algorithms, computer geometry, algorithms for removing hidden lines and surfaces, methods for painting surfaces, working with graphic standards and libraries, machine graphics hardware; graphic primitives, creating an isometric image of a part, drawing, three-dimensional modeling.

Purpose of studying of the discipline

The mastering by students of the universal automation environment of engineering and graphic works; computer graphics for obtaining design documentation, both in terms of the quality of the execution of documents, satisfying ESKD standards, and compliance with the standards; solid-state spatial modeling capabilities.

Learning Outcomes

ON3 To use SS, USDD when making working drawings of parts, using modern software

Learning outcomes by discipline

1) studying the modern principles of working with graphic information in the field of information technology.
2) the study in practice of modern algorithms for the input, processing, storage and output of graphic information, which underlie the most popular software products for working with graphic information
3) have an idea of the means for creating and processing raster graphics and vector images.

Prerequisites

Computer programs and equipment

Postrequisites

Basic and profile disciplines of the EP

Fundamentals of scientific and technical creativity

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

Short description of discipline

This course outlines the general characteristics of constructive and technological creative activity and the process of invention, general ways of developing the effectiveness of creative methods for solving constructive and technical problems; student research work: development of standard organizational and technical projects; selection of parameters for optimized processing processes; formulation of the problem of calculating optimal conditions for processing materials; objective functions for optimizing machining modes. The course is aimed at developing students' skills in conducting research work, designing and publishing student research works, and working together on a project in a team.

Purpose of studying of the discipline

Students obtain basic knowledge in the field of engineering creativity and use the information received in engineering work

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1) Calculate the parameters of the optimized processing processes.
2) Determine objective functions for optimizing machining modes.
3) Solve optimization of processing modes for discrete and continuous values of parameters v and s

Prerequisites
Introduction to Digital Engineering
Postrequisites
Metal-cutting machine tools Machine equipment of tool production Fundamentals of machine design

Basics of machine manufacturing

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

Short description of discipline
This course examines the product, its quality, types of production, preparation for production of the product, the influence of mechanical processing on the condition of the surface of parts and on their operational properties; allowances for machining, rationing of material consumption; bases and basing of parts during machining; time standards for machining operations, labor intensity of the product, ways to reduce labor intensity; manufacturability of parts and products; rules for the development of technological processes. The course provides an opportunity to apply the acquired knowledge in the manufacture of parts and assembly units of mechanical engineering products
Purpose of studying of the discipline
Endow students with knowledge on physical and mechanical phenomena that arise during the manufacture of parts and assembly units of products and are the basis for the development of technical processes in any engineering industry.
Learning Outcomes
ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference
Learning outcomes by discipline
1. Know the basics of basing in mechanical engineering, the basic principles of designing technological processes for the manufacture of machines and their components and parts
2. Calculate the manufacturability of the part
3. Describe the main criteria for qualitative and quantitative assessment of the manufacturability of the design of parts, assembly units, products
Prerequisites
Technological processes of machine-building production
Postrequisites
Manufacturing engineering Fundamentals of design of machine manufacturing engineering processes Production technology and processing methods for standard parts in mechanical engineering

Bases of cutting of metals

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

Short description of discipline
This course examines the history of the development of materials processing by cutting, basic concepts, terms and definitions of cutting theory; Cutting types physical foundations of the cutting process. operability and failure of blade tools. features of various cutting methods; lubricating and cooling process media. machining of different materials; abrasion theory; physicochemical processing methods; groups and brands of tools and lubricating and cooling fluids.
Purpose of studying of the discipline
Acquisition by students of data on the modern technology equipment and instruments, practical skills of operation with equipment iinstrument.
Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products
Learning outcomes by discipline
1. use the basic concepts and terms of metal cutting;
2. apply optimization and intensification of the cutting process to improve the reliability of cutting tools.
3. Select the required mass motions
Prerequisites
Introduction to Digital Engineering
Postrequisites
Planning of instrument Design and calculation of metal-cutting tools Cutting tool

Bases of technology of mechanical engineering

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

Short description of discipline
This course discusses the main provisions and concepts of mechanical engineering technology; basing theory and dimensional chain theory as a means of achieving product quality; a method of developing a technological process for manufacturing a machine, ensuring achievement of its quality, required productivity and economic efficiency; allowances for machining. procedure for designing the process

of manufacturing a part (single process); execution (documentation) of machining processes.

Purpose of studying of the discipline

formation of scientific and professional Knowing and skills in the field of processing of metals cutting.

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1. perform a manufacturability analysis of the part
2. Justify procurement selection.
3. apply methods of quality control of products and objects in the field of professional activity, analyze the causes of violations of technological processes in mechanical engineering and develop measures to prevent them.

Prerequisites

Technological processes of machine-building production

Postrequisites

Manufacturing engineering Fundamentals of design of machine manufacturing engineering processes Production technology and processing methods for standard parts in mechanical engineering

Theory of inventive problem solving

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

Short description of discipline

This course describes the general characteristics of constructive and technological creative activity and the process of inventions; general principles and methods of engineering creativity; common ways of creating the effectiveness of creative methods for solving structural and technical problems; the conditions required for engineering creativity; development of abilities for engineering creativity; research work of students. development work; method of branches and boundaries for solving the traveling salesman problem, optimization of operations for multi-operation CNC machines.

Purpose of studying of the discipline

Studentterdin engineer shygarmashylyk salasyndagy bilim negizdern aluy zhune alynkan akparatty engineer zhumysta paidalanu.

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1) Determine the characteristics of constructive and technological creative activity and the process of inventions.
2) Development works.
3) Calculate operation optimization for multi-operation CNC machines.

Prerequisites

Introduction to Digital Engineering

Postrequisites

Metal-cutting machine tools Machine equipment of tool production Fundamentals of machine design

Theory of mechanisms and machines

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

Short description of discipline

This course discusses kinematic pairs and their classification, kinematic chain and their types; number of degrees of freedom and generalized coordinates; structural analysis and synthesis of mechanisms; analytical and graphical methods of force analysis; synthesis of lever mechanisms, general methods of their synthesis, condition of crank existence, synthesis of gear mechanisms, types and fields of their application; Complex motion of the point and solid the theorem of adding velocities and accelerations in complex motion.

Purpose of studying of the discipline

students with basic Knowing in the field of payments and the basic stages of designing cars, optimal calculation methods to facilitate the combination of reliable operation of mechanisms and machines.

Learning Outcomes

ON4 To make an informed choice for the specified conditions and ensure the quality of products

Learning outcomes by discipline

1. perform structural, kinematic and dynamic analysis of mechanisms and machines
2. determine internal stresses in machine parts and structural elements;
3. design structural, kinematic and dynamic diagrams of the mechanism

Prerequisites

Theoretical mechanics

Postrequisites

Fundamentals of design and machine parts

Theory of cutting

Discipline cycle	Basic disciplines

Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course examines cutting kinematics, geometry of the tool cutting part, cutting modes; resistance, force, operation and cutting power; cutting temperature and methods of its determination; stress in the tool; types of destruction of the tool, roughness of the treated by the top. residual deformations and stresses in the surface layer, requirements for tool materials; areas of tool materials application, purpose of tool geometry and optimal cutting modes during turning, drilling, milling; grinding process.

Purpose of studying of the discipline
Acquisition by students of data on the modern progressive methods of production of metals, new constructional materials.

Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products

Learning outcomes by discipline
1. Calculate the cutting force and cutting power.
2. Select the geometry of the cutting tools and material, depending on the material being machined
3. Describe the main patterns of chip formation, deformation of the treated surface

Prerequisites
Introduction to Digital Engineering

Postrequisites
Planning of instrument Design and calculation of metal-cutting tools Cutting tool

The theory of cutting with thermophysics elements

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

Short description of discipline
This course covers the basics of metal cutting, thermal processes in a technological machine tool system; aging of the technological machine system; thermal balance of the cutting process, temperature measurement in the cutting zone, temperature in the cutting zone, ways to reduce the temperature on the cutter blade; cutting process: tool, purpose of cutting modes; gear cutting process: tool, purpose of cutting modes; abrasive processing of metals; methods for increasing the machinability of metal by cutting.

Purpose of studying of the discipline
formation of scientific and professional Knowing and skills in the field of processing of metals cutting.

Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products

Learning outcomes by discipline
1. learn practical skills in calculating and assigning cutting modes;
2. assign and measure geometric parameters of the cutting part of tools
3. conduct research on cutting processes.

Prerequisites
Introduction to Digital Engineering

Postrequisites
Planning of instrument Design and calculation of metal-cutting tools Cutting tool

Stability of Mechanical Systems

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

Short description of discipline
This discipline considers the forms of equilibrium and movement of mechanical systems, signs of stability of elastic systems, methods for solving elastic stability problems, basic concepts of the theory of stability of movement; kinematic pairs and their classification; kinematic chain and their views; number of degrees of freedom and generalized coordinates; structural analysis and mechanism synthesis, kinematic analysis; ordinary and stepped mechanisms; planetary mechanisms; differential mechanisms.

Purpose of studying of the discipline
obtaining by students of initial knowledge in the field of calculations and main stages of designing machines, shape of equilibrium and movement of mechanical systems, signs of stability of elastic systems, methods of solving elastic stability problems, stability of straight rods which contribute to combination of reliable operation of mechanisms and machines.

Learning Outcomes
ON4 To make an informed choice for the specified conditions and ensure the quality of products

Learning outcomes by discipline
1. Perform computational and experimental works in the field of calculations for stability of mechanical systems using modern computational methods
2. analyze and process the results obtained,
3. summarize data on the number of degrees of freedom and generalized coordinates

Prerequisites
Theoretical mechanics

Postrequisites
Fundamentals of design and machine parts

Selection of blanks in mechanical engineering

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

Short description of discipline

This discipline provides the basis for the classification of machine parts blanks, methods for selecting the type of workpiece for various types of production, methods of designing and producing blanks; gives information about technological equipment and basic principles for choosing equipment used in the production of workpieces in various types of production; studies the design of workpieces using special software; provides information about the mechanization and automation of the production of blanks, low-waste and resource-saving technology for their production. The discipline is aimed at developing skills in selection, design, use of methods and methods of modern production of machine parts blanks.

Purpose of studying of the discipline

To acquaint students with variety of methods and methods of the modern production of preparations for manufacture of details the subsequent machining.

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1. Solve the main scientific and technical problems and prospects for the development of procurement production in mechanical engineering
2. select materials, equipment of technological equipment and automation for the implementation of production and technological processes
3. Describe modern methods for the development of low-waste, energy-saving and environmentally friendly engineering technologies

Prerequisites

Technological processes of machine- building production Bases of cutting of metals Theory of cutting The theory of cutting with thermophysics elements

Postrequisites

Manufacturing technology of standard parts Design of technological processes of machine manufacturing Machine production technology, reverse engineering

Hydraulics and hydraulic pneumatic drive

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

Short description of discipline

This discipline provides the basic concepts and definitions of hydraulics, basic information about hydraulic drives and their working fluids; the principle of operation of hydraulic drives is given; the characteristics of the working fluid are given; pumps, positive displacement hydraulic motors, hydraulic cylinders, rotary hydraulic motors, hydraulic motors are considered; valve and spool valves, check valves are shown; pressure valves, throttles, flow regulators; auxiliary devices and pipelines are considered; methods for regulating, stabilizing and synchronizing the speeds of movement of the working parts of equipment are given; information about tracking systems and hydraulic circuits is provided; The basics of calculation and operation of equipment hydraulic drives are considered. The discipline is aimed at developing skills in the field of hydraulics, hydraulic machines and other devices for processing, feeding and movement of gaseous liquids used in hydraulic drives of mechanical engineering equipment.

Purpose of studying of the discipline

Obtaining by students the basics of knowledge in the field of hydraulics, hydraulic machines and other devices for processing, supplying and moving gaseous liquids, necessary for further study of special disciplines and practical activities in the specialty.

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1. Describe the basics of hydrostatic, hydrodynamics and operation of hydraulic machines and hydraulic drives, formulations and proofs of basic hydraulic equations
2. Apply the basic equations of hydraulics to specific problems.
3. Use knowledge to build mathematical models of real processes and phenomena.

Prerequisites

Fundamentals of design and machine parts

Postrequisites

Final examination

Optimization of calculations at design

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

Short description of discipline

This course covers programs for calculating, executing drawings, using modern computer equipment capabilities; theory of construction of technical drawings; basic methods of constructing and reading drawings and sketches of technical objects of various levels of complexity and purpose; rules for drawing dimensions of elements, parts and assemblies; characterization of criteria for optimality of machining processes.

Purpose of studying of the discipline

Studying of modes of designing of various geometrical spatial objects, modes of obtaining their drawings at the level of graphic models and ability to solve these problems, using various modes of optimization of calculations at design.

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1) Develop programs for calculation, execution of drawings, using computer equipment.
2) Calculate the characteristics of the criteria for the optimality of technological processes.
3) Optimize machining processes.

Prerequisites

Fundamentals of design and machine parts

Postrequisites

Final examination

Design and manufacture of preparations

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

Short description of discipline

This course discusses the main production processes of billets; cast preforms, features of use and design of cast preforms; types of production of blanks by pressure; blanks from long and special rolled products, free forging, volume hot stamping, peculiarities of stamping and stamping design; production of blanks from powder materials, powder materials, forming methods, equipment, tooling, field of application; welded workpieces, prospects for low-waste new technologies for production of workpieces.

Purpose of studying of the discipline

Mastering of Knowing of new, most economic methods of receiving preparations of details of machines.

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1. choose the most rational method of obtaining blanks in specific production conditions;
2. analyze traditional and latest methods of obtaining blanks, their technological capabilities, field of application.
3. Describe the impact of structural material properties on resource saving and process reliability

Prerequisites

Technological processes of machine- building production Bases of cutting of metals Theory of cutting The theory of cutting with thermophysics elements

Postrequisites

Manufacturing technology of standard parts Design of technological processes of machine manufacturing Machine production technology, reverse engineering

Design and production of preparations in mechanical engineering

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

Short description of discipline

This course discusses the concept of procurement; designing and manufacturing cast billets in various ways; their advantages and disadvantages, the equipment used; design and production of billets by plastic deformation, their advantages and disadvantages, equipment used. selection of initial rolled metal and production of blanks from it by various methods; selection of the method and method of production of workpieces for machining depending on the technical requirements of the part drawing, on the type of production, on the conditions of a particular enterprise

Purpose of studying of the discipline

To acquaint students with variety of methods and methods of the modern production of preparations for manufacture of details the subsequent machining.

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1. Assign process bases when designing initial billets
2. Compare modern methods of production of billets, their technical capabilities, rational field of application
3. make drawings of blanks with dimensioning and tolerances taking into account the basing scheme;

Prerequisites

Technological processes of machine- building production Bases of cutting of metals Theory of cutting The theory of cutting with thermophysics elements

Postrequisites

Manufacturing technology of standard parts Design of technological processes of machine manufacturing Machine production technology, reverse engineering

Design and calculation of metal-cutting tools

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

Short description of discipline

This course provides knowledge about the structural elements of cutting tools; instrumental materials; methodology for designing metal-cutting tools, according to specified operating conditions. Cutters, broaches, milling cutters, tools for machining holes, abrasive tools, taps, dies, tools for machining gears are considered. The course is aimed at developing knowledge and skills in selecting and performing calculations of metal-cutting tools for various types of production.

Purpose of studying of the discipline

Knowledge and skills in calculating various types of metal-cutting tools.

Learning Outcomes

ON7 To calculate the main machine tools of machine-building production, tooling, tools, drives of machine tools and hydraulic systems

Learning outcomes by discipline

1. prepare the terms of reference for the design of the cutting tool;
2. Develop a working drawing of the designed tool.
3. Know the skills of creative generalization of the knowledge gained, specific and objective presentation of your knowledge in writing and orally

Prerequisites

Bases of cutting of metals Theory of cutting The theory of cutting with thermophysics elements

Postrequisites

Manufacturing technology of standard parts Fundamentals of design of machine manufacturing engineering processes Machine production technology, reverse engineering

Planning of instrument

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

Short description of discipline

This course covers the purpose and classification of cutting tools, general- purpose cutting tools, basic provisions for their design, information on the design methodology of cutting and deforming tools for hot and cold stamping processes, on the selection of materials for die parts, the purpose of thermal treatment, the role of the deforming tool in the implementation of designed forging and stamping processes, ensuring high-performance operation of forging and stamping equipment.

Purpose of studying of the discipline

To instill in students the amount of necessary knowledge, skills and abilities on the theory and methods of designing and operating a deforming tool for the implementation of technological processes of metal processing by pressure of cutting tools, to choose competently

Learning Outcomes

ON7 To calculate the main machine tools of machine-building production, tooling, tools, drives of machine tools and hydraulic systems

Learning outcomes by discipline

1. Describe the nomenclature of the main types of cutting and auxiliary tools;
2. Calculate the geometric parameters of the cutting tool;
3. Select grading techniques for rolling tools and tools for machining complex surfaces

Prerequisites

Bases of cutting of metals Theory of cutting The theory of cutting with thermophysics elements

Postrequisites

Manufacturing technology of standard parts Design of technological processes of machine manufacturing Machine production technology, reverse engineering

Cutting tool

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

Short description of discipline

This course examines the purpose and classification of cutting tools; development and current state of the tool industry; requirements for cutting tools; quality indicators of cutting tools and technical requirements established by standards, cutting tools of automated production; general structural elements of cutting tools; instrumental materials; basic provisions for the design of cutting tools. The course is focused on achieving the required level of professional training, practical skills and abilities in the field of operation, mechanization and automation of production processes using modern cutting tools.

Purpose of studying of the discipline

Acquisition of the required level of professional training, practical skills and abilities by students in the field of operation, mechanization and automation of production processes using modern cutting tools, as well as instilling skills in the field of their design. In addition, students must understand the relationship between various branches of science and their impact on the current state, teach students to correctly design and rationally operate modern metal-cutting tools.

Learning Outcomes

ON7 To calculate the main machine tools of machine-building production, tooling, tools, drives of machine tools and hydraulic systems

Learning outcomes by discipline

1. Describe the main types of cutting and auxiliary tools;
2. Describe the structural elements of the cutting tool, know the methods for calculating the geometric characteristics of the tool;
3. Select the correct tool material

Prerequisites

Bases of cutting of metals Theory of cutting The theory of cutting with thermophysics elements

Postrequisites

Manufacturing technology of standard parts Design of technological processes of machine manufacturing Machine production technology, reverse engineering

Ergonomics

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

Short description of discipline

This course discusses ergonomics and its place in the system of other sciences; brief history, principles and methods of ergonomics development; classification of working professions and consideration of ergonomics requirements when designing equipment; ergonomics of the working space; ergonomic requirements for the design of workplaces. Optimization of information display tools and systems; preparation of employees for types of labor activity; standardization of ergonomic standards and requirements and ergonomic assessment of the quality of industrial products.

Purpose of studying of the discipline

Formation of future specialists: ideas about the essence of the human dimension of technology, technology, software products; understanding of a human-centered ergonomic approach to the design of such working conditions that are able to reveal the creative resources of a person in unity with the technical resources of a machine, ensuring their effective working interaction; conviction that a safe connection of a person with the modern world of technology can be carried out only with the support of a high culture of thinking and responsibility; practical skills in designing ergonomic solutions in the workplace

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1. Use ergonomics in the organization of the workspace.
2. Design workplaces according to ergonomic requirements.
3. Develop measures to improve ergonomics of the operating system

Prerequisites

Fundamentals of design and machine parts

Postrequisites

Final examination

Fundamentals of design of machine manufacturing engineering processes

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course describes the basics of designing machining processes by cutting machine parts based on the general principles and regularities of the engineering technology, the accepted requirements for the manufacture of high-quality products in the context of creating modern production processes and innovative technologies, with an established production program at the lowest cost of materials, minimum cost and high labor productivity.

Purpose of studying of the discipline

studying of bases of design of technological processes, production of cars of the required quality at the minimum expenses of human and energy resources; training of methodology of development of technological processes in the conditions of modern production

Learning Outcomes

ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline

1. select methods to achieve accuracy when processing machine parts;
2. use the basic requirements for technical documentation, materials and products
3. design new technological processes using economic indicators of production and cost indicators

Prerequisites

Fundamentals of design and machine parts

Postrequisites

Final examination

Basics of repair of armored weapons and equipment

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course outlines the basics of repairing armored weapons and equipment, which consists of performing a set of works in order to bring failed combat vehicles into serviceable condition by replacing (repairing) their damaged or worn-out assembly units; studying the basic principles of organizing and carrying out repairs of armored weapons and equipment using the technological capabilities of enterprises of the military-industrial complex. The course is aimed at developing skills in using the basic laws of mechanical engineering technology when carrying out repairs of armored weapons and equipment.

Purpose of studying of the discipline
studying the basics of repairing armored weapons and equipment

Learning Outcomes
ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline
1)knowledge of the specifics of working with various systems and components of armored vehicles
2)the ability to work with technical data sheets, drawings and repair manuals for a specific model of armored vehicles.
3)knowledge of standards and norms for performing repair work, including requirements for safety and environmental standards

Prerequisites
Fundamentals of design and machine parts

Postrequisites
Final examination

Technology of overhaul of armored weapons and equipment

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course describes the methods of restoration of serviceability and full restoration of the machine life with restoration of any of their components, including basic ones, in which the machine is completely dismantled and defective, as well as replacement and repair of all faulty units, units, devices and parts, assembly and testing in accordance with the technical specifications; planning, accounting and reporting for the repair of armored vehicles

Purpose of studying of the discipline
Study of the technology of overhaul of armored weapons and equipment

Learning Outcomes
ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline
1. Plan, record and report on the repair of armored vehicles
2. Describe the process of tank overhaul
3. Develop capital repair process

Prerequisites
Fundamentals of design and machine parts

Postrequisites
Final examination

Manufacturing engineering

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course describes the basic concepts and provisions of mechanical engineering technology, the principles of designing high-performance technological processes for mechanical processing of machine parts; issues of basing and installation of parts during machining, selection of workpieces, manufacturability of parts and machines, quality assurance in manufacturing of parts, accuracy of machining; development of machining processes for typical parts: shafts, gears, body parts, connecting rods, pistons.

Purpose of studying of the discipline
Acquaintance of trainees with the theoretical foundations of production technology, training of students to the conscious application of methods for developing technological processes for assembling machines and technological processes for manufacturing parts of any type in conditions of single, mass and mass production

Learning Outcomes
ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline
1. select tools, equipment according to the specified technical specifications

2. Describe the methods of machining parts
3. use the method of developing a technological process for manufacturing a machine when designing technological processes for assembling a machine and manufacturing parts of any type in single, serial and mass production

Prerequisites

Bases of technology of mechanical engineering Key elements of manufacturing preparation in mechanical engineering Basics of machine manufacturing

Postrequisites

Manufacturing technology of standard parts Design of technological processes of machine manufacturing Machine production technology, reverse engineering

Production technology and processing methods for standard parts in mechanical engineering

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course provides general information about the mechanical processing of materials by cutting on metal- cutting machines: equipment, fixtures, tools and methods for processing the main types of surfaces; processing on turning, drilling, milling and grinding metal-cutting machines; tasks and main directions of production automation; issues of designing modern technological processes for manufacturing mechanical engineering parts; Typical technological processes for parts of the main classes are given.The course is aimed at developing skills in using the basic laws of mechanical engineering technology that operate in the process of manufacturing engineering products, choosing a rational technology for obtaining products, and rationally using technological equipment, including program-controlled ones.

Purpose of studying of the discipline

studying of bases of design of technological processes, production of cars of the required quality at the minimum expenses of human and energy resources; training of methodology of development of technological processes in the conditions of modern production

Learning Outcomes

ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline

1. Select machining process
2. Analyze the selection of the method of production of billets
3. Prepare process documentation

Prerequisites

Bases of technology of mechanical engineering Key elements of manufacturing preparation in mechanical engineering Basics of machine manufacturing

Postrequisites

Manufacturing technology of standard parts Design of technological processes of machine manufacturing Machine production technology, reverse engineering

Digitalization of assembly production

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at studying the theoretical foundations of machine assembly and equipment of assembly plants, the formation of skills and abilities to design effective technological processes for machine assembly in machine-building production, the features of machine assembly processes in serial and mass production. Shows the calculation methods performed during assembly operations. Describes solutions for digitalization of assembly production and reduction of manual labor during assembly through the use of modern software technologies.

Purpose of studying of the discipline

The purpose of studying the discipline is to study the basic provisions and concepts of the theory of machine assembly, the main stages of preparation and equipment of assembly production; developing skills in using various solutions for digitalization of machine assembly in order to improve product quality and labor productivity.

Learning Outcomes

ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline

1)automation of processes and the use of digital technologies allows you to speed up assembly and improve the use of resources.
2)automation of processes and reduction of equipment downtime reduce operating costs
3)digitalization allows faster response to changes in orders and requirements, improving the ability of the production system to adapt.

Prerequisites

Technological processes of machine-building production Bases of technology of mechanical engineering

Postrequisites

Final examination

Automation and mechanization of technological processes in mechanical engineering

Discipline cycle	Profiling discipline
Course	3

Credits count	5
Knowledge control form	Examination

Short description of discipline
This course describes the main provisions of automation and mechanization in mechanical engineering; cost-effectiveness of production automation; automated production process; features of tools and devices used in automated production; automatic control systems; elements and devices of automatic control systems; automation of equipment loading and workpiece processing; optimal control of processing accuracy automate the assembly process comprehensive automation of serial production

Purpose of studying of the discipline
Providing of complex organizational, methodical and rich in content help to the students in mastering of necessary volume and quality of knowledge on automation of technological processes in an engineer, as one of constituents of machine-building production.

Learning Outcomes
ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline
1. Describe the principles of process design and technology
2. Apply methods and theoretical provisions for the design, development of mathematical models and control systems.
3. perform adjustment, adjustment and operation of process automation systems

Prerequisites
Manufacturing engineering Fundamentals of design of machine manufacturing engineering processes Production technology and processing methods for standard parts in mechanical engineering

Postrequisites
Final examination

Metal-cutting machine tools

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

Short description of discipline
This course covers technical and economic indicators and performance criteria; forming the surface on the machines; kinematic structure of machines; arrangement of machine tools, main components and mechanisms of machine tools; the concept of machine control. lathe group machines; milling and multipurpose machines for processing body parts; drilling, boring, drawing machines; machines with electrochemical and electrophysical processing methods; abrasive machines; toothworking machines; capillary, grinding machines.

Purpose of studying of the discipline
to Acquaint future engineers- mechanics with the major types of technological equipment of the automated механосборочного production, to instil skills in area of their planning and realization of research works in an enginee

Learning Outcomes
ON7 To calculate the main machine tools of machine-building production, tooling, tools, drives of machine tools and hydraulic systems

Learning outcomes by discipline
1. Describe the design of metal-cutting equipment and its main components, the rules for designating accuracy standards in design and process documentation.
2. select the necessary metal cutting equipment, accessories and accessories.
3. Perform calculation of parameters and adjustment of machining machines specified surfaces;

Prerequisites
Planning of instrument Design and calculation of metal-cutting tools Cutting tool

Postrequisites
Final examination

Organization and planning of modern engineering production

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline forms the basis of knowledge on planning, design, organization and layout of modern mechanical assembly plants and sites in various forms of production. Examples of organizational and planning calculations for creating production sites and planning the work of main and support personnel are given. The methodology for calculating the labor intensity and machine intensity of production, methods of lean improvements and reasonable organization of the workspace are considered. The course is focused on developing knowledge and skills in performing basic calculations necessary for the design and layout of mechanical assembly shops.

Purpose of studying of the discipline
Demonstrates basic knowledge of the basic calculations required for the design and layout of machine assembly shops, in the application of capital equipment, tools, and fixtures.

Learning Outcomes
ON3 To use SS, USDD when making working drawings of parts, using modern software

Learning outcomes by discipline
1)defining long-term production goals, such as increasing volumes, developing new types of products, and entering new markets
2)assessment of the market situation, customer needs, as well as internal resources (technologies, personnel, capacities).
3)formation of a production development strategy, including the choice of technologies, strategic partnerships, and investment programs

Prerequisites
Fundamentals of design of machine manufacturing engineering processes Production technology and processing methods for standard parts in mechanical engineering
Postrequisites
Final examination

Fundamentals of machine design

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course examines the kinematic fundamentals and classification of metal-cutting machines and automatic machines, the degree of automation, design features of various types of machines; requirements for machine tools. The design stages of machine tools, the methodology for calculating the kinematic diagram of the gearbox and gearbox are studied; calculation and design of machine spindles, design of drives, machine feeds, machine support systems; methods for ensuring the choice of modern standard solutions for mechanisms and components, and machine tool layouts are provided. The course is aimed at developing skills in selecting and designing metal-cutting machines for various types of processing.
Purpose of studying of the discipline
To impart to stu-dents the practical skills necessary at calculation and designing of mecha-nisms, knots of machines on the basis of technical and economic requirements. To provide choice of modern standard solutions of mechanisms and knots, configurations of machines.
Learning Outcomes
ON7 To calculate the main machine tools of machine-building production, tooling, tools, drives of machine tools and hydraulic systems
Learning outcomes by discipline
1. select the necessary metal cutting equipment, accessories and accessories.
2. Design metal cutting machine units
3. Test machines for accuracy
Prerequisites
Planning of instrument Design and calculation of metal-cutting tools Cutting tool
Postrequisites
Final examination

Bases of planning of toolrooms

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course covers general information on the design of tool shops; procedure for designing tool shops; composition and quantity of the main equipment; principle and structure of construction of the main production processes; design of the system of repair and maintenance of tool production, quality control of products, labor protection of personnel; design of the production process preparation and control system; determination of the composition and number of personnel, layout planning solutions of workshops, business justification of the project
Purpose of studying of the discipline
to Teach a student to bases of planning, planning of workshops of instrumental production.
Learning Outcomes
ON8 To make the necessary calculations in the design of machine-building enterprises, their technical equipment, equipment placement, automation, management, control in modern conditions of a market economy
Learning outcomes by discipline
1. Describe the composition, purpose, functions and structure of all services of the auxiliary system
2. calculate the labor intensity of annual processing of all products
in the workshop, depending on the serial production
3. calculate the required amount of equipment, workshop area
Prerequisites
Technological processes of machine-building production
Postrequisites
Final examination

Fundamentals of design of sites

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course discusses the main methods and sequence of design of structural divisions of modern machine- building production: mechanical assembly, instrumental, repair and mechanical workshops and small enterprises, production areas, auxiliary services, sanitary and sanitary and administrative premises; composition and quantity of the main process equipment, principles and structure of construction of the main production processes; warehouse, transport systems; system of instrumental support, repair and maintenance

of areas, quality control of products; business case for the project.

Purpose of studying of the discipline

to teach students the methodology and practice of designing machine shops, sites for different types of production, planning of production and service areas through the implementation of the site planning

Learning Outcomes

ON7 To calculate the main machine tools of machine-building production, tooling, tools, drives of machine tools and hydraulic systems

Learning outcomes by discipline

1. calculate the required amount of equipment, area of areas
2. Describe the basic principles of the formation of production sites
3. Own equipment planning skills

Prerequisites

Technological processes of machine-building production

Postrequisites

Final examination

Basics of CAD/CAM/CAE

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course is the basis of theoretical training at the undergraduate level and the basis of engineering and technical activities of graduates. The course is presented in sections: technology of automation of work in mechanical engineering, the use of automation tools for the main types of design and technological work in mechanical engineering. The course is focused on the formation of knowledge and skills of three-dimensional modeling of objects, their processing on CNC machines and computer engineering analysis.

Purpose of studying of the discipline

developing students` ideas about the automation of work in mechanical engineering, the use of automation tools for the main types of design and technological work in mechanical engineering.

Learning Outcomes

ON3 To use SS, USDD when making working drawings of parts, using modern software

Learning outcomes by discipline

1)creation, editing and optimization of digital product models
2)integrate the processes of product development, production and testing using computer technology
3)Using various methods to display models in 3D

Prerequisites

Machine graphics Engineering graphics in AutoCAD environment

Postrequisites

Final examination

Preparation of machine-building production

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course describes the basics of preparing production to solve the problems of designing and manufacturing machine parts and units, mastering the methods of calculation and critical assessment of the results obtained; main types of production, characteristics and calculations of machine tools, allowable design loads, tools, processing modes, design and technology of workpieces and parts manufacturing, layout of mechanical assembly section for production; organization of maintenance and repair

Purpose of studying of the discipline

the basis of preparation of production to solve the problems of designing and manufacturing machine parts and units, mastering the methods of calculation and critical assessment of the obtained results.

Learning Outcomes

ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline

1. Describe the principles of operation of machines and mechanisms, structures and methods of calculation, assimilation of basic concepts and definitions.
2. Apply the knowledge gained to specific tasks.
3. Master the techniques of using knowledge for theoretical and practical purposes, acquiring skills in solving typical problems of the course.

Prerequisites

Manufacturing engineering Fundamentals of design of machine manufacturing engineering processes Production technology and processing methods for standard parts in mechanical engineering

Postrequisites

Final examination

Design of technological processes of machine manufacturing

Discipline cycle	Profiling discipline
Course	3

Credits count	6
Knowledge control form	Examination and term work/Project

Short description of discipline
This course presents the technologies of machine parts machining, technological quality assurance of parts, methodology of technological processes development; methods of processing parts are given: cutting, abrasive, electric erosion, electrochemical, laser and electron beam, ultrasonic, combined methods, hardening methods, etc.; described are means of technological equipment for machining parts: machines, accessories, cutting and measuring tools and other accessories; the basics of typing of technological processes and group processing are described.

Purpose of studying of the discipline
Introduce students into the circle of knowledge that forms the basis of professional engineering training in the field of machine production technology.

Learning Outcomes
ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline
1. perform constructability analyses of parts design;
2. Develop technological operations for processing parts; calculation of allowances, cutting modes, technical time limits, tool selection, technical equipment, equipment according to the specified technical specifications
3. conduct research to improve machining and assembly processes in order to improve the quality of products

Prerequisites
Manufacturing engineering Fundamentals of design of machine manufacturing engineering processes Production technology and processing methods for standard parts in mechanical engineering

Postrequisites
Final examination

Design of technological equipment

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course discusses the classification of devices according to their purpose; universal and special devices; installation of workpieces and installation elements of devices; requirements for installation devices; calculation of screw, eccentric, wedge, electromagnetic, vacuum devices; devices for guiding and monitoring the position of the tool, types and design features of housings and auxiliary devices of devices, methods for designing special machine tools, control devices and their main types, devices for fixing fastenings of cutting tools. The course is aimed at developing skills in designing equipment for technological processes of machining and assembly.

Purpose of studying of the discipline
to Teach a student to planning of rigging for the technological processes of tooling and assembling.

Learning Outcomes
ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline
1. Have the skills to select the standard tooling required to implement the developed process
2. Analyze workpiece fastening schemes
3. select clamping elements of devices for installation of blanks

Prerequisites
Technological processes of machine-building production

Postrequisites
Final examination

Calculation and design of machine accessories in mechanical engineering industry

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course covers the technological equipment, its role in modern production, the classification and scope of use of machine tools, their classification and requirements for the design of control and measuring devices, their classification and requirements for the design; general procedures for designing devices; procedure for designing machine tools; procedure of instrumentation design; general requirements for assembly drawings of machine tools and control devices

Purpose of studying of the discipline
To teach students to choose equipment for technological processes of machining and Assembly

Learning Outcomes
ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline
1. Design tools for installation of blanks.
2. design control equipment.

3. develop structural diagrams of devices for basing billets.

Prerequisites

Technological processes of machine-building production

Postrequisites

Final examination

SAPR in mechanical engineering

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course describes the prerequisites for creating a computer-aided design system; requirements for the design process, principles for building a computer- aided design system, formalization of the CAD process, CAD composition, mathematical, methodological and technical support of CAD. Technological preparation of production in modern conditions. Basics of computer- aided design of technological processes. Composition and structure, types of support, tasks and organization of CAD implementation of technological processes, development directions.

Purpose of studying of the discipline

consists in expanding the worldview of students and mastering the general principles and means necessary to automate design and research work using ICT

Learning Outcomes

ON8 To make the necessary calculations in the design of machine-building enterprises, their technical equipment, equipment placement, automation, management, control in modern conditions of a market economy

Learning outcomes by discipline

1. ability to search, critically analyze, generalize and systematize scientific information, to set research goals and choose optimal ways and methods of achieving them

2. use advanced CAD development and operation methods

3. use a set of automation tools to solve design problems

Prerequisites

Technology of overhaul of armored weapons and equipment Basics of repair of armored weapons and equipment

Postrequisites

Final examination

Machine equipment of tool production

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

Short description of discipline

This course discusses general information about machines; technical and economic display of machine tools; Designing and investigating machines layout of machines. main motion drive; spindle assemblies of machines; electromechanical transmission drives; Base parts and guides manipulating devices; dynamics of machines, testing and examination of machines, operation and repair of machines; machine tool control system, hardware numerical control systems, design features of rational structures of metal cutting machines.

Purpose of studying of the discipline

To acquaint future mechanical engineers with the most important types of processing equipment of the automated machine-assembling production.

Learning Outcomes

ON7 To calculate the main machine tools of machine-building production, tooling, tools, drives of machine tools and hydraulic systems

Learning outcomes by discipline

1. Describe the design of metal-cutting equipment and its main components, the rules for designating accuracy standards in design and process documentation.

2. select the necessary metal cutting equipment, accessories and accessories.

3. solve the problems of designing machine tools

Prerequisites

Planning of instrument Design and calculation of metal-cutting tools Cutting tool

Postrequisites

Final examination

Planning of the technological rigging

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course covers universal and special devices; installation of blanks and installation elements of accessories. requirements for installation devices; classification of devices by their purpose; calculation of required fastening force; selection and calculation of clamping devices and power drives. calculation of the machine tool for accuracy; error of installation on the machine and its determination; procedures for performing precision calculations of devices. development of the design of the body of the accessory

calculation of the parts of the accessory for strength

Purpose of studying of the discipline

To teach the student to choose equipment for technological processes of machining and assembly.

Learning Outcomes

ON5 To have the basics of strength calculations, including using modern software systems, selection of harvesting structural materials
ON6 To have the basics of designing and designing parts and assemblies of machine-building structures in accordance with the terms of reference

Learning outcomes by discipline

1. make up design power diagrams of devices for installation of blanks.
2. Describe the technological reasons that cause errors in the manufacture of products
3. analyze the capabilities of technological equipment.

Prerequisites

Technological processes of machine-building production

Postrequisites

Final examination

Preproduction planning of machining processes on computer controlled machines

Discipline cycle	Profiling discipline
Course	3
Credits count	6
Knowledge control form	Examination and term work/Project

Short description of discipline

This course discusses the range of parts processed on various types of numerically controlled machines; features of design of operational technological processes on machines with numerical program control; recommendations on selection of cutting modes on machines with numerical program control structure and stages of technological preparation of production or use of machines with numerical program control.

Purpose of studying of the discipline

To acquaint students with the types of technological equipment of automated mechanical assembly production. With the basics of technology for the production of parts on CNC machines in mechanical engineering.

Learning Outcomes

ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline

1) He is able to describe the types and nature of work on technological preparation of production using CNC machines.
2) He is able to apply the acquired knowledge in practical activities, to illustrate knowledge on the technology of manufacturing parts on CNC machines.
3) Analyzes the basic knowledge in the compilation of technological processes in mechanical engineering, calculation and design of equipment.

Prerequisites

Technological processes of machine-building production

Postrequisites

Final examination

Manufacturing technology of standard parts

Discipline cycle	Profiling discipline
Course	3
Credits count	6
Knowledge control form	Examination and term work/Project

Short description of discipline

This course describes the design of modern technological processes for the manufacture of machine building parts; typical technological processes for parts of the main classes, information on machining by cutting structural materials are given; machining on metal cutting machines: turning, drilling, milling, grinding, drawing, cutting, etc., accessories, tools and methods of processing the main types of surfaces; tasks and main directions of production automation.

Purpose of studying of the discipline

Formation of professional knowledge, skills and skills in the field of the basics of engineering technology, technology of processing typical parts and assembly

Learning Outcomes

ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline

1. Describe the technology of manufacturing typical parts of machines;
2. Choose progressive methods of manufacturing machine parts;
3. Analyze the methods to achieve the specified accuracy used in the assembly.

Prerequisites

Manufacturing engineering Fundamentals of design of machine manufacturing engineering processes Production technology and processing methods for standard parts in mechanical engineering

Postrequisites

Final examination

Technology of overhaul of electrical equipment, instrumentation and equipment of armored

weapons and equipment

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course outlines the technology for overhauling electrical equipment, instrumentation and automation of armored weapons and equipment. The course is presented in the following sections: ways to ensure the operability of armored weapons and equipment during operation; the essence and scope of work performed during the overhaul of electrical and automation units; safety measures when performing work on the operation, maintenance and repair of special electrical equipment systems for armored weapons and equipment. The discipline is aimed at developing knowledge and skills in the field of repair of armored vehicles.

Purpose of studying of the discipline

study of the technology of overhaul of electrical equipment and instrumentation and control equipment of armored vehicles

Learning Outcomes

ON8 To make the necessary calculations in the design of machine-building enterprises, their technical equipment, equipment placement, automation, management, control in modern conditions of a market economy

Learning outcomes by discipline

1 Use safety measures during operation, maintenance and repair of electrical equipment systems of armored weapons and equipment
2. Check outdoor and indoor lighting and alarm devices, auxiliary electrical equipment
3. Design the technological process and technical specifications for the repair of electrical equipment units and devices

Prerequisites

Technology of overhaul of armored weapons and equipment Basics of repair of armored weapons and equipment

Postrequisites

Final examination

Machining technology and programming on numerically programmed machines

Discipline cycle	Profiling discipline
Course	3
Credits count	6
Knowledge control form	Examination

Short description of discipline

The discipline develops knowledge in the field of computer-aided design. The course is presented in the following sections: description of initial technological information; development of technological routes for processing parts on CNC equipment and modeling of their processing processes using specialized CAM applications. The course is focused on the ability to program technological operations and transitions in the G-cod programming language, develop individual tasks of the technological process of manufacturing parts and plan their automated system support.

Purpose of studying of the discipline

Formation of highly qualified future bachelors in the field of automated engineering production, which presupposes the possession of knowledge and skills in the development of processing technology on machine tools with numerical control, knowledge of the basics of the functioning of CNC systems, the ability to develop control programs, modeling the processing of parts and correction of technological processes on CNC machines with using CAM applications

Learning Outcomes

ON3 To use SS, USDD when making working drawings of parts, using modern software

Learning outcomes by discipline

1)they allow you to automate the process of processing materials, improve accuracy, increase productivity
2)of methods and procedures used to perform various operations on machines with automatic control
3)the exact coordinates of tool movement, processing speed, cutting parameters and other technological parameters are set

Prerequisites

Technology of overhaul of armored weapons and equipment Basics of repair of armored weapons and equipment

Postrequisites

Final examination

Manufacturing technology of parts on CNC machines

Discipline cycle	Profiling discipline
Course	3
Credits count	6
Knowledge control form	Examination and term work/Project

Short description of discipline

This course describes the basics of the technological processes for processing materials by cutting; general programming issues and computer simulation programs compatible with numerical control machines; structure of metal cutting machines with numerical program control (turning, milling, engraving); preparation of control programs for machine tools of turning and milling groups;. route technological processes and cutting of parts on machine tools with numerical program control.

Purpose of studying of the discipline

To acquaint students with the types of technological equipment of automated machine-assembly production. With the basics of the production technology of parts on CNC machines in mechanical engineering.

Learning Outcomes

ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline

1) He is able to describe the types and nature of work on technological preparation of production using CNC machines.
2) It is able to analyze the processed information with the compilation of programs for CNC machines.
3) He is able to apply the methodology of choosing the means of technological equipment of CNC machines for various types of production.

Prerequisites
Technological processes of machine-building production

Postrequisites
Final examination

Machine production technology, reverse engineering

Discipline cycle	Profiling discipline
Course	3
Credits count	6
Knowledge control form	Examination

Short description of discipline
The discipline develops the knowledge and skills necessary for the analysis, research and development of a number of technical processes and equipment. Learns the basic principles of reverse-engineering; use of modern tools and software for analysis, calculations and modeling. Forms practical experience in working with various types of equipment and technological processes, teaches how to propose improvements and innovative solutions. The discipline is aimed at developing skills in the application of methods and technologies of reverse-engineering of parts and machines for the development of the mechanical engineering industry.

Purpose of studying of the discipline
Purpose of the discipline/module: study of methods, technologies and features of reverse engineering of parts and machines and its application for the development of the mechanical engineering industry

Learning Outcomes
ON3 To use SS, USDD when making working drawings of parts, using modern software

Learning outcomes by discipline
1)design, development, manufacture, assembly and testing of machines.
2)a set of methods, processes and tools used to create machines and equipment
3)using automation, digital technologies and flexible production systems to increase efficiency, quality and reduce costs

Prerequisites
Design and manufacture of preparations Design and production of preparations in mechanical engineering Selection of blanks in mechanical engineering

Postrequisites
Final examination

Mechanical engineering enterprise's economics

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course covers the law of the Republic of Kazakhstan on the enterprise; development and placement of enterprises in industries; Enterprise resources and results fixed assets at the enterprise; working capital, production program and production capacity; personnel, labor productivity and wages, production costs, cost of production, accounting, maintenance and calculation of calculation items; peculiarity of cost accounting in market conditions; profit and profitability, calculation of technical and economic efficiency of machine-building production.

Purpose of studying of the discipline
Explore ways to create various estimates and business plans, taking into account the efficiency and profitability of the technological processes being developed. The formation of primary skills in the pectoring of technical and cost-effective projects among students.

Learning Outcomes
ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline
1. Use the theoretical foundations and patterns of building and drawing up business plans and estimates in accordance with the standards in engineering production.
2. Perform and read general estimates of medium complexity.
3. Summarize information in the library fund, reference literature or on the Internet when solving problematic tasks

Prerequisites
Manufacturing engineering Fundamentals of design of machine manufacturing engineering processes Production technology and processing methods for standard parts in mechanical engineering

Postrequisites
Final examination

Prediploma practice

Discipline cycle	Profiling discipline
Course	3
Credits count	15
Knowledge control form	Total mark on practice

Short description of discipline

Pre-diploma practice prepares students for the implementation of the diploma project, which consists in the study and analysis of the industrial and technological, design and research activities of the enterprise, the study, analysis and systematization of issues of economics, organization, planning and management of production, issues of environmental protection and labor protection directly related to the topic of the diploma project "Selection of the necessary initial materials for diploma design and justification of new technical proposals.

Purpose of studying of the discipline

The purpose of practice is the training of students for implementation of the degree project consisting in studying and the analysis of production and technological, design and research activity of the enterprise according to a subject of the degree project

Learning Outcomes

ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline

1. Study the organizational structure of the mechanical assembly shop and the forms of construction of production areas, the principles of their specialization;
2. Study the labor intensity of production in the mechanical assembly shop
3 Analyze existing information and offer new solutions

Prerequisites

Production practice III

Postrequisites

Final examination

Production practice III

Discipline cycle	Profiling discipline
Course	3
Credits count	15
Knowledge control form	Total mark on practice

Short description of discipline

The practice allows students to gain a clearer and more complete understanding of mechanical engineering; on the structure of the modern machine- building enterprise; economy, organization and management of production. They study modern technology and equipment, instrumentation, measures to improve labor productivity, safety and health at work. Formation of practical skills of design, technology of production of machine-building products and in mastering the functional duties of officials on the profile of future work

Purpose of studying of the discipline

The purpose of the practice is to study and analyze the production, technological, design and research activities of the enterprise in accordance with the topic of the diploma project

Learning Outcomes

ON9 To use the main laws of engineering technology, which are effective in the process of manufacturing engineering products, the choice of a rational technology for obtaining products, technological equipment with software control.

Learning outcomes by discipline

1. Describe technological methods for improving the quality, reliability and durability of machines;
2. Analyze existing machining and machine assembly processes
3. Design new machining and machine assembly processes

Prerequisites

Manufacturing practice II

Postrequisites

Final examination