

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РЕСПУБЛИКИ КАЗАХСТАН
РГП на ПХВ «ЮЖНО-КАЗАХСТАНСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ ИМ.М.АУЭЗОВА» МОН РК



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UNIVERSITY
1943



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THE MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF
KAZAKHSTAN

M.Auezov SOUTH KAZAKHSTAN STATE UNIVERSITY

« APPROVED BY »

The Rector

d.h.s., academician Kozhamzharova D.P

« 28 »

20 2020



EDUCATION PROGRAMME

6B07121 «Machine Engineering Technology»

Registration number	6B07100015
Code and classification of the field of education	6B07 Engineering, Processing and construction branches
Code and classification of training areas	6B071 Engineering and Engineering business
Group of educational programs	B064 – Mechanics and Metalworking
Type of EP	New
ISCE level	6
NQF level	6
SQF of education level	6, Machine Engineering
Language of learning	Kazakh, Russian, English
Typical duration of study	4 years
Form of study	Full time
The complexity of the EP, not less	244 credits
Distinctive features of EP	Dual form of study
University Partner (JEP)	-
University Partner (TDEP)	-
Social Partner (DE)	KARLSKRONA LC/AB

Shymkent, 2020

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Education Programme was considered by the Methodological Commission of the Faculty «Mechanical and petroleum engineering», Protocol № 7 from «18» 06 2020.

Chairman of MC Dosmakanbetova A.A.
sign

Considered and recommended for approval at the meeting of Educational and Methodical Council of M. Auezov SKSU, protocol № 4 from «16» 02 2020.

Approved by the decision of the Academic Council of the University, protocol № 10 from «11» 02 2020.

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Introduction

1. Scope

Designed for the implementation of bachelors training by educational program (hereinafter - EP) 6B07121 «Machine Engineering Technology» in RSE on right of economic management M. Auezov South Kazakhstan State University" of RK MES.

2. Regulatory documents

Education Act of the Republic of Kazakhstan (as amended and supplemented on 04/07/2018);

Standard rules for the operation of educational organizations implementing educational programs of higher and (or) postgraduate education, approved by order of the Minister of Education and Science of the Republic of Kazakhstan from October 30, 2018 No. 595 (registered with the Ministry of Justice of the Republic of Kazakhstan on October 31, 2018 No. 17657);

State obligatory standards of higher and postgraduate education, approved by order of the Minister of Education and Science of the Republic of Kazakhstan, October 31, 2018 No. 604;

The rules for the organization of educational process on credit technology education, approved by order of the Minister of Education and Science of the Republic of Kazakhstan on April 20, 2011 No. 152 as amended and supplemented of October 12, 2018 No. 563

The sectoral qualifications framework for the “Mechanical engineering”, (Approved by the Protocol Meetings of sectoral commissions on social partnership and regulation of social and labor relations for mining and metallurgical, chemical, building industry and woodworking, light industry and mechanical engineering from August 16, 2016, protocol No. 1).

Professional standards "mechanical engineering and Metalworking" (Appendices No. 13, 39, 42 to the order of the Deputy Chairman of the Board of the National chamber of entrepreneurs of the Republic of Kazakhstan "Atameken" dated 30.12.2019 No. 269).

3. Educational programs concept

The goal of the educational program is coordinated with the mission of university and is aimed at preparing the intellectual elite of the country with advanced entrepreneurial skills, fluent in three languages, demonstrating conceptual, analytical and logical thinking skills, creative approach in professional activities, being able to work in national and international teams obtaining the lifelong strategy.

The educational program is harmonized with the 6th level of the National Qualifications Framework of the Republic of Kazakhstan, with Dublin descriptors, 1 cycle of the Framework for Qualification of the European Higher Education Area, also with Level 6 of the European Qualification Framework for Lifelong Learning.

The educational program is focused on professional and social order through the formation of professional competencies associated with the necessary types of research, practical and business activities, adjusted to meet the requirements of stakeholders.

The uniqueness of EP 6B07121 «*Machine Engineering Technology*» is the training of specialists with conceptual knowledge in the field of engineering, metalworking technologies, who are able to independently set and solve problems, using adequate methods and means of achieving them, to carry out professional, scientific and entrepreneurial activities.

The educational program aims to achieve learning outcomes through the organization of educational process using the principles of Bologna process, student-centered learning, accessibility and inclusion.

Program learning outcomes are achieved through the following training events:

- classroom training: lectures, seminars, practical and laboratory classes - held in view of innovative teaching technologies, the use of the latest achievements of science, technology and information systems;

- extracurricular training: the independent work of the student, including under the guidance of a teacher, individual counseling;

- conducting professional practices, implementation of course and diploma works (projects).

The university has taken measures to maintain academic integrity and academic freedom, protection from any kind of intolerance and discrimination against students.

The quality of EP is ensured by the involvement of stakeholders in its development and evaluation, systematic monitoring and review of its content.

4. Entry Requirements

Established according to the Model Rules for admission to studies in educational organizations that implement educational programs of higher and postgraduate education by order MES RK №600 on 10.31.2018

1. EDUCATION PROGRAMME PASSPORT

1.1 The purpose and objectives of education program

EP objectives: Training of specialists with conceptual knowledge in the field of engineering and technology, capable of carrying out production and innovation activities in obtaining new knowledge and their application in professional activities, fluent in national and foreign languages, demonstrating analytical and logical thinking skills, able to determine the strategy and plan the organization's activities, make decisions and take responsibility at the unit level.

EP tasks:

- the formation of socially responsible behavior in society, an understanding of the significance of professional ethical norms and adherence to these norms;
- providing basic undergraduate training that allows you to continue learning throughout life, to successfully adapt to changing conditions throughout their professional careers;
- ensuring the conditions for acquiring a high general intellectual level of development, mastering literate and developed speech, a culture of thinking and the skills of scientific organization of labor in the field of machine engineering, mechanics and metalworking;
- creation of conditions for intellectual, physical, spiritual, aesthetic development to ensure the possibility of their employment in the specialty or continuing education at subsequent levels of education.
- the formation of competitiveness of graduates in the field of higher education and modern mechanical engineering and mechanical assembly production, for their quickest employment in the specialty or continuing education in the magistracy.

1.2 List of qualifications and positions

The graduate of this EP is awarded with degree of "Technique and Technology bachelor"

Bachelors by EP 6B07121 «Machine Engineering Technology» can hold primary positions a specialist in mechanical engineering, head of production, engineer, process engineer, design engineer, chief mechanic, process engineer for mechanical processing, mechanical engineer, radio engineer, radio engineer, industrial robotics designer, electronic equipment engineer, commissioning and testing engineer technician-operator for servicing industrial robots, site master, head of the tool Department, head of the shop for automation and mechanization of production processes in (research institutions, design and design organizations), teacher in technical institutions without making requirements for work experience in accordance with the qualification requirements of the Qualification directory of positions of managers, specialists and other employees, approved by order of the Minister of Labor and Social Protection of the Republic of Kazakhstan from May 21, 2012 No. 201.

1.3 Qualification characteristics of the educational program graduate

1.3.1 Scope of professional activity

The scope of professional activity is educational, industrial, commercial and financial business, determining the need for specialists in training, planning the creation and reconstruction of production, ensuring the production process in enterprises for the design, construction and manufacture of competitive engineering products.

1.3.2 Objects of professional activity

The objects of professional activity of graduates are machine building enterprises, the metallurgical and machining industry, as well as government bodies, universities and research institutions, state and non-state institutions, including industry, agriculture and utilities, the military-industrial complex, production and consumption spheres.

1.3.3 Subjects of professional activity

Subjects of professional activity of the bachelor by EP 6B07121 «Machine Engineering Technology» are the production and technological processes of machine-building enterprises, as well as enterprises working with equipment in various sectors of the economy, production and technological processes of enterprises related to ensuring continuous production

1.3.4 Types of professional activity

A bachelor by EP 6B07121 «Machine Engineering Technology» can do the following types of professional activity:

- design and technological;
- project;
- production and technology;
- organizational - managerial;
- educational.

2. EP learning outcomes

LO1 Communicate freely in a professional environment and society in Kazakh, Russian and English.

LO2 Demonstrate natural science, mathematical, social, socio-economic and engineering knowledge in professional activities, methods of mathematical data processing, theoretical and experimental research, regulatory documents and elements of economic analysis.

LO3 Possess information and computational literacy, the ability to generalize, analyze and perceive information, set goals and choose ways to achieve it.

LO4 Have the skills to build images and drawings of geometric objects; the rules of drawing on drawings of the sizes of elements, parts and components; rules for design documentation in accordance with ISO, USCD/USTD

LO5 Demonstrate skills in modeling technological processes using standard packages and tools for computer-aided design, performing calculations, designing and graphical representation of information about processes and objects.

LO6 Make requests for technological equipment and spare parts; prepare technical documentation for technological equipment of medium complexity; Enter the control program into the numerical control system (CNC); Organize the work of small teams of performers to set up technological equipment of medium complexity; Analyze production and non-production costs to ensure the required product quality.

LO7 To solve problems in professional activity in the field of metalworking machines, to conduct a qualitative analysis; apply knowledge in the field of the basics of the design of technological tooling, methods of basing the workpieces, the use of universal assemblies, to provide principled work patterns of the basic equipment, tools, accessories.

LO8 Design technological processes for the manufacture of welded structures; own modern types of welding and understand the processes occurring on the surface of the processed material; independently choose the optimal technology and equipment for the production of welded structures.

LO9 Design mechanical assembly shops; master the terminology, basic concepts and definitions, solutions on the drawings of basic metric and positional tasks and layout solutions.

LO10 Plan engineering activities, conduct a comprehensive analysis of the state of the mechanical engineering industry. understand the features of materials and technological processes; choose the required materials and technologies in practice.

LO11 Maintain technical documentation during installation, commissioning and testing; monitor compliance with established requirements, current norms, rules and standards; perform quality control of work, make necessary adjustments to the methods and methods of

commissioning; develop methodological and regulatory documents, technical documentation; Issue technical documentation.

LO12 Work effectively individually and as a member of the team, correctly defend your point of view, adjust your actions and use different methods.

3 COMPETENCES OF EP GRADUATE

3.1 Successful completion of training in EP contribute to the formation of the following competences of a graduate the following key and professional competencies:

Core competencies:

(CC1) in the field of *native language*

- the ability to express and understand concepts, thoughts, feelings, facts and opinions in the field of music education in written and oral forms (listening, speaking, reading and writing), as well as interact linguistically and creatively in a variety of social and cultural contexts: during study, at work, at home and at leisure;

(CC2) in the field of *foreign languages*

- ability to master basic communication skills in a foreign language - understanding, expressing and interpreting concepts, facts and opinions in the professional field, both verbally and in writing (listening, speaking, reading, writing) in the relevant range of social and cultural contexts, mastering skills mediation and intercultural understanding;

(CC3) *fundamental mathematical, scientific and technical training*

- the ability and willingness to apply educational potential, experience and personal qualities acquired during the study of mathematical, natural science, technical disciplines at the university, to determine ways of monitoring and evaluating the solution of professional problems, the development of mathematical and natural science thinking;

(CC4) *computer*

- the ability to confidently and critically use modern information and digital technologies for work, leisure and communications, mastering the skills of using, restoring, evaluating, storing, producing, presenting and exchanging information through a computer, communicating and participating in collaborating networks using the Internet for professional activities;

CC5 social

- the ability to own social and ethical values based on public opinion, traditions, customs, norms and to be guided by them in their professional activities; know the cultures of the peoples of Kazakhstan and abide by their traditions; observe the basics of the legal system and legislation of Kazakhstan, know the trends of social development of society; be able to adequately navigate in various social situations; be able to find compromises, relate your opinion with the opinion of the team; own business ethics, ethical and legal standards of conduct; strive for professional and personal growth; work in a team, correctly defend their point of view, propose new solutions; demonstrate tolerance towards other individuals;

CC6 economic, managerial and entrepreneurial

- the ability to know and understand the goals and methods of state regulation of the economy, the role of the public sector in the economy; master the basics of economic knowledge; possess the skills of critical thinking, interpretation, creativity analysis, drawing conclusions, evaluation; manage projects to achieve professional goals, manage staff, demonstrate entrepreneurial skills.

CC7 cultural training

- the ability to know and understand the traditions and culture of the peoples of Kazakhstan, tolerance to the traditions and culture of other nations of the world, aware of the

attitudes of tolerant behavior; not subject to prejudice, has high spiritual qualities, formed as an intelligent person

CC8 additional competencies

- ability to master the skills of critical thinking, interpretation, creativity analysis, drawing conclusions, evaluation; have creativity and an active lifestyle; make professional decisions under conditions of uncertainty and risk.

PC1

- ability to know and understand the principles of construction of images and drawings of geometric objects; rules of design documentation in accordance with ISO, USDD/USTD standards. Be able to perform calculations, design and graphically present information about processes and objects.

PC2

- ability to model technological processes using standard packages and computer-aided design tools, perform design development and justify selected technological solutions.

PC3

-ability to solve problems in professional activity in the field of metal processing, to conduct a qualitative analysis; to apply knowledge in the field of design of technological equipment, methods of basing blanks, the use of universal prefabricated devices, to present the schematic diagrams of the main equipment, tools, equipment.

PC4

- the ability to design processes for the manufacture of welded structures; understand the processes occurring in the welding of processed workpieces; independently choose the optimal technology and equipment for the production of welded structures.

PC5

- ability to design mechanical, mechanical-assembly shops; to own methods of justification of the choice of blanks, development of technological processes of mechanical and heat treatment, to solve on drawings the main metric and position tasks and to make layout decisions.

3.2 Matrix of correlation of EP learning outcomes in general with modules formed by competencies

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12
CC1	+	+			+	+			+	+	+	+
CC 2		+	+		+	+				+	+	
CC 3	+	+	+					+	+		+	+
CC 4		+	+	+		+	+			+	+	
CC 5	+			+	+		+	+	+	+	+	
CC 6		+	+		+	+	+		+			
CC 7	+		+	+		+			+	+	+	+
CC 8		+		+	+		+	+	+	+		+
PC 1		+		+		+		+			+	+
PC 2	+	+		+		+			+	+	+	+
PC 3	+		+	+	+	+	+	+		+		+
PC 4		+			+	+	+		+		+	
PC 5	+	+		+	+	+	+	+	+	+		+

4. SUMMARY TABLE REFLECTING THE VOLUME ASSIMILATED CREDITS OF EDUCATION PROGRAM MODULES

Course of Study	Semester	The number of mastered modules	The number of studied disciplines			Number of KZ credits					Total hours	Total KZ credits	The number of	
			OC	HSC	EC	Theoretical training	Physical training	Training Practic	Practical Training for Students	Final examination			exam	Cr. test
1	1	2	2	4	1	29	2	-	-	-	990	31	7	1
	2	2	5	1	-	27	2	1	-	-	900	30	6	2
2	3	3	1	4	2	28	2	-	-	-	900	30	6	2
	4	3	1	2	3	25	2	-	3	-	900	30	6	2
3	5	2	-	2	4	30	-	-	-	-	900	30	6	-
	6	3	-	1	3	24	-	-	6	-	900	30	3	2
4	7	2	-	1	3	20	-	-	-	-	600	20	4	-
	8	2	-	1	3	20	-	-	-	-	600	20	4	-
	9	1	-	-	-	-	-	-	8	12	600	20	-	-
Total		9	9	16	19	203	8	1	17	12	7230	241	42	9

5. Information about disciplines

Module name	CYCLE	OC/HS C/EC	Component Name	Brief course description (in 30-50 word)	Number of credits	Formed LO (codes)
Module of the social science	GED	OC	Contemporary History of Kazakhstan	Allows you to classify the conceptual foundations of national history, interpret the origins, continuity of the Kazakh state and current problems of the history of modern Kazakhstan. Analyzes the activities of the national intelligentsia in the formation of the ideology of the liberation movement and the stages of socio-economic modernization of Kazakhstan. Describes the creation of a democratic state governed by the rule of law.	5	LO1 LO2 LO12
	GED	OC	Philosophy	Examines the fundamentals of philosophy, reveals the features of a culture of thinking, revealing the concept of "philosophy" worldview, the nature and content of the concepts "existence", "consciousness". Examines the relationship between the concepts of "knowledge" and "creativity", reveals the essence and content of the category of philosophy of freedom. Develops the skills of identifying the essence of a philosophical problem, critical thinking, research skills of philosophical aspects, problems of practice and cognition.	5	LO1 LO2 LO7 LO12
Module of socio- political knowledge	GED	OC	Social and Political Studies	Studies the theories of sociology, social structure and stratification of society, explains the role and place of politics in society, examines the main stages of formation and development of political science, including youth policy, the role of	4	LO1 LO2 LO7 LO12

				politics in the system of public life, reveals the essence of the state, reveals the relationship between the state and civil society. Develops skills of sociological research, analysis of socio-political information.		
	GED	HSC	Ecology and Fundamentals of Life Safety	Examines the basic laws of ecology, sources and characteristics of pollution in various areas, ways to solve environmental problems. Studies the basics of life safety in industrial enterprises. Applies management tools and methods in the field of environmental safety, human protection in emergency situations, identifies harmful and dangerous factors in production activities.	3	LO2 LO9 LO11
	GED	EC	Fundamentals of Economics and Law	Considers the role of the state in the development of the market, competition, demand, supply. Instills skills in calculating costs, income, turnover and capital turnover indicators. Allows you to critically explore the markets of factors of production, factor income. Forms knowledge of law. Instills the skills of analyzing the legality of events, the ability to refer to regulations. Increases the level of legal awareness and legal culture.	3	LO3 LO7 LO8 LO9
	GED	EC	Fundamentals of Entrepreneurship Skills and Anti-corruption Culture	Forms knowledge about the organization of the company, conducting business. Develops skills in business planning of production and sale of products, market analysis, calculation of profit, income, profitability, solvency, and liquidity of the company. Examines the nature and factors of corruption. Forms an anti-corruption worldview and culture.		LO1 LO2 LO12

				Develops a civil attitude to corruption, implements the values of moral awareness of anti-corruption. Instills skills of critical analysis of corruption phenomena.		
	GED	OC	Cultural Studies and Psychology	Studies the basics of cultural morphology, gives characteristics of the anatomy of culture and reveals its semiotic nature, gives an idea of archaic culture on the territory of ancient Kazakhstan, examines the main stages of the formation of Kazakh culture, reveals the essence of Kazakh culture in the context of modern world processes and gives an idea of the basics of cultural policy of Kazakhstan.	4	LO2 LO3 LO12
Module of communicative mobility	GED	OC	Kazakh (Russian) language	Develops cognitive and communicative activities in the Russian (Kazakh) language in the areas of interpersonal, social, and intercultural communication. Instills the skills of discussing ethical, cultural, and socially significant norms in discussions, the ability to work in a team, interact in a team, and have flexibility and creativity. Develops practical skills in interpreting text information, explains their style and genre specifics in various areas of communication.	10	LO1 LO2
	BD	HSC	Professional Kazakh (Russian) Language	Forms the needs for physical self - improvement, attitudes to a healthy lifestyle and maintaining a high level of health through the conscious and creative use of physical education tools and organizational and methodological forms of physical culture and sports activities for the purpose of subsequent life and professional achievements.	3	LO1 LO3 LO5 LO9

	GED	OC	Foreign Language	Develops students ' ability to communicate cross-cultural in English and develop skills to carry out professional communication in English, which allows the bachelor to work successfully in their chosen field of activity, broadens their horizons, improves professional skills that help increase their competitiveness in the labor market.	10	LO1 LO2 LO7
	BD	HSC	Professionally Oriented Foreign Language	Represents the practice of teaching a professional foreign language. Instills skills and patterns of building the educational process in oral and written professionally – oriented communication. Considers language education: structure, functions and main components, training in types of foreign language speech activity in the field of professional and technical communication.	3	LO1 LO2 LO12
	GED	OC	Physical Training	Forms the needs for physical self - improvement, attitudes to a healthy lifestyle and maintaining a high level of health through the conscious and creative use of physical education tools and organizational and methodological forms of physical culture and sports activities for the purpose of subsequent life and professional achievements.	8	LO11 LO12
	BD	HSC	Mukhtar studies	Дисциплина изучает жизнь и творчество М.О.Ауэзова; анализируется творческая лаборатория писателя, его биография в контексте с творчеством; как создателя науки Абаеведения; исследователя жыра «Манас». Знакомство с М.Ауэзовым как видным общественным деятелем.	3	PO1 PO2

				Развиваются навыки анализа литературного наследия М.Ауэзова в мировой и восточной литературе. Прививаются чувства патриотизма и любви к родине.		
	ChD	EC	Kazakh Alphabet Based on Latin Graphics	Forms the pronunciation of Kazakh sounds, taking into account their features. Studies phonetic features of Kazakh words and phrases based on Latin graphics. Develops the skills of literate writing based on the Latin alphabet. Instills the ability to read texts in the Kazakh language using Latin graphics. Develops communication and speech skills.		LO1 LO2
	BD	HSC	Actual Problems and Modernization of Public	Forms the knowledge of the main theoretical aspects of the formation of national consciousness in the XXI century. Ability to analyze the situation in the country, independently select information, clearly formulate thoughts, draw conclusions and generalizations, using spiritual and moral potential. Mastering the skills of civil and political balanced behavior, correcting their political views and actions.		PO1 PO2
	BD	HSC	Abay studies	The life and work of Abay is studied. Abay is a classic of Kazakh literature. Abay is the founder of the national written literature. Abai traditions and its role in the development of national literature. Feelings of patriotism and love for the Motherland, poetry are instilled.		PO1 PO2
	BD	HSC	Academic Writing	Studies language competencies, the possession of which allows the researcher to read, understand and write scientific texts. The discipline develops skills in the		PO1 PO2

				preparation, writing and publication of scientific texts, reports and publications.		
	GED	OC	Information and Communication Technologies (in English)	Instills knowledge of computer systems and software. Develops skills in using information resources to search and store information, works with spreadsheets and databases. Familiarizes with the use of methods and means of information security; design and creation of websites, multimedia presentations. Instills skills in the use of e-government and e-textbooks, various cloud-based mobile technologies, and SMART technology management.	5	LO2 LO3 LO12
Fundamentals of engineering and technical sciences	BD	HSC	Higher Mathematics	Considers methods for solving matrices and determinants, elements of vector algebra, the ability to perform actions on complex numbers, apply elements of analytical geometry, and be able to distinguish between types of equations of a straight line and a plane. Familiarizes with second-order curves, skills in applying formulas and methods of differential calculus by a function of one variable, solving the integral of various functions, and applying the Newton-Leibniz formula.	4	LO3 LO5 LO10
	BD	HSC	Physics	Examines the basic physical theories and principles, physical research methods, basic laws and limits of their applicability, applies theoretical knowledge to solve specific physical problems and situations, analyzes the results of a physical experiment. Instills the skills of conducting a physical experiment, working with measuring devices, calculating and processing the data	4	LO2 LO3

				obtained individually and in a team.		
	BD	HSC	Basics of Interchangeability	Examines the basic principles of functional interchangeability, interchangeability and control of smooth cylindrical joints, and operational requirements. Familiarizes the calculation and selection of: clearance landings; tight landings, scope of application; rolling bearings. describe the gauges for smooth cylindrical parts, their classification and design, interchangeability, methods and controls for conical joints.	4	LO4 LO5 LO6
	BD	HSC	Machine Graphics	Allows you to use three-dimensional modeling tools. Solid modeling. The creation of the drawing. Applies graphical primitives and work with them. Edit drawings. Work in layers. Create new text styles. Standardization of drawings. Use templates. Solid-state design. Allows you to create a model of volume bodies. Modifying objects in three-dimensional space.	6	LO2 LO4
	BD	HSC	Engineering Computer Graphics	Considers methods of forming spatial representations and improving the graphic skills of displaying objects in working drawings, forming the quality of drawing literacy, has methods and methods for constructing shadows, plans, facades, sections, drawings in projections with numerical marks, simple parts and nodes.	4	LO2 LO4
	BD	EC	Chemistry	Considers modern ideas about the structure, properties of chemical substances, the laws of chemical processes, which will allow you to master the system of chemical concepts on this basis. Studies modern concepts of chemical thermodynamics and reaction	4	LO2 LO5

				kinetics. Solutions. Electrochemical processes in metals and nonmetals. Main sections of organic chemistry, polymer materials. Chemical identification. Physical and chemical methods of analysis.		
	BD	EC	Theoretical Foundations of Inorganic Chemistry	Knows and understands basic chemical concepts and laws. Understand the structure of the atom, quantum numbers. Periodic table of elements by D. I. Mendeleev. Explain the chemical bond, the valence. Understand the laws of thermodynamics, elements of thermochemistry. The rate of chemical reactions. Chemical equilibrium. Describe solutions, solubility, and concentration of solutions. Electrolytes, non-electrolytes. Hydrogen index. Buffer solution. Hydrolysis of salts. Complex compound. To make a redox reaction. To understand the electrode processes.	4	LO2 LO5
	BD	EC	Standartization and certification	Knows and understands systems of technical regulation, standardization, ensuring the uniformity of measurements, legislative and regulatory documents, types and categories of standards. Applies standardization methods, certification schemes, requirements of technical regulations of the CU/Evraes. Analyzes compliance with the requirements for standardization, certification, metrological norms and rules by market participants. Evaluates the economic efficiency of work on interstate and international standardization, certification, and Metrology.	4	LO3 LO5
	BD	EC	Systems of Technical	Knowledge of legislative and legal		LO3

			Regulation and Ensuring Uniformity of Measurement	documents in the field of technical regulation and ensuring the uniformity of measurements, understanding of regulatory requirements for compliance with metrological norms and rules at enterprises, the ability to work with regulatory documentation, measuring and testing equipment to control technological parameters of production, skills in classifying measuring instruments, calculating measurement errors, metrological support of production.		LO5 LO6
Fundamentals of mechanics and technology of structural materials	BD	EC	Theoretical Mechanics	Explain the motion of bodies from a geometric point of view. Describe ways to set motion and kinematics methods. Tell the simplest and most complex movements of a solid body. Formulate the main theorems of statics, the laws of friction. Describe the conditions of equilibrium of convergent, flat and spatial systems of forces, types of connections. Tell the basic laws of dynamics, consider the movement of mechanical systems, taking into account the acting forces.	4	LO2 LO7
	BD	EC	Technical Mechanics	Name the equilibrium conditions for systems of converging and parallel forces. Describe the translational and rotational motion of a solid. Describe the basic concepts and definitions of point dynamics, mechanical systems and solids, and methods of kinetostatic study of solids. Solve the problems of adding two and many parallel forces, a pair of forces, and adding pairs.		LO2 LO7 LO8
	BD	EC	Strength of Materials	Name the external forces and their	5	LO7

				classification, the main properties of a solid deformable body. Talk about the cross-section method, tension and compression, Hooke's law, the basic concepts of reliability and durability of the structure, modern ideas about the strength of materials under stress, fatigue failure and stability of systems. To solve the problem of the calculation of statically determinate frames, the calculations of bending and torsion.		LO8
	BD	EC	Mechanical Engineering	Name the axioms of statics and equilibrium conditions, the main hypotheses of material resistance, Hooke's law, Poisson's ratio, and young's modulus. Explain the construction of diagrams for tension and compression, torsion and bending, the position and equation of the zero line, the strength conditions of trusses, arches and basic theorems of construction mechanics, the concept of complex resistance and stability.		LO2 LO5 LO9
	BD	HSC	Design Basics and Machine Parts	Considers the basics of design and construction of machines and mechanisms, taking into account the set of requirements for mechanical engineering products. Represents engineering calculations of machine parts and assemblies based on performance criteria. It instills the skills of finding optimal parameters of designed machines and mechanisms using modern computer technology and determining economically feasible and reliable dimensions of parts.	5	LO2 LO5 LO6
	BD	EC	Theory of Machines and Mechanisms	Name the main elements of the structural scheme, kinematic pairs and their	5	LO3 LO5

				classification, the main types of mechanisms, the principle of formation of lever mechanisms, Assur structural groups and their classification. Tell about methods of structural, kinematic and dynamic research of machine mechanisms, basic theories of automatic machines, industrial robots. Explain the problems and methods of synthesis, design of mechanisms and devices of machines.		LO7
	BD	EC	Machine Mechanics	Describe the problems of kinematics, methods for setting the motion of a point and a solid, and laws of dynamic study of solids. Name the strain under tension and compression, determine the stress in dangerous sections. Perform structural-kinematic and dynamic analysis and synthesis of flat - lever mechanisms. Identify differences between static and dynamic balancing of rotating links. Tell the classification of industrial robots.		LO2 LO5 LO9
	BD	HSC	Structural Materials and Heat Treatment	Explain the classification of structural materials. Know the stages of obtaining blanks and machine parts, the theory of alloys. Describe and explain diagrams of the state of iron-carbon alloys. Know cast iron, steel and alloys with special properties, non-ferrous metals and their alloys. New material. Explain the purpose of thermal and chemical heat treatment, their application in solving practical problems and performing laboratory work.	4	LO2 LO7 LO9
Fundamentals of machine engineering	BD	EC	Introduction to mechanical engineering	Theoretical foundations of the technology of subject-language integrated learning.	3	LO5 LO7

			technology	Formation and development of the technology of subject-language integrated learning within the competence approach to language teaching. Model of the situation of using a foreign language as a tool for solving a professional problem. Principles and basic elements of training. Application of the technology of subject-language integrated learning in practice.		LO8
	BD	EC	Content and Language Integrated Learning	Considers the stages of formation of engineering technology as a science. Technological process of machine-building production, its structure. Types of technological processes: production of blanks, mechanical and heat treatment. Creation of technologies in the conditions of automated production. Improving the methods of manufacturing parts and machines. Machine-tool construction is the basis of mechanical engineering. History and prospects of machine-tool construction development. Examines the types of modern machines. Tool production at the present stage. The role of science in creating new materials and improving tools.		LO1 LO2
	BD	HSC	Technological Processes of Machine Engineering Production	Present ways of forming parts and workpieces. Know: technology of metal processing by pressure; technology of foundry production; technology of welding production; technology of metal processing by cutting. Present and describe the production technology of blanks and machine parts made of non-metallic materials. Know the technological methods	5	LO7 LO8 LO9

				of various types of processing and their application in solving practical problems and performing laboratory work.		
	BD	EC	Machine Engineering Technology	Know the basics of mechanical engineering technology. The concept of production and technological processes. Know the factors that affect the accuracy of processing. Determine the sequence of surface treatment. Evaluate the surface quality of machine parts. Select the method for getting blanks. Have an idea of allowances and operating sizes. Show the main universal metal cutting, special machines and tools. Create route and operational maps.	5	LO5 LO7 LO8
	BD	EC	Specialized Machine Engineering Technology	Studies the main directions of development of engineering and engineering technology at the present stage. Defines the concept of "Technical system". The production process of making the machine. Fundamentals of the production process and its components. Considers the production structure of a machine-building plant. Service purpose of the car. The quality of the machine. Structural material.		LO5 LO7 LO9
	ChD	EC	Technology of Processing on Machine Tools with Numerical Control	Know General information about CNC machines. Features of processing parts on CNC machines. Cutting tools for CNC machines. Processing on CNC machines. The choice of cutting data. Features of the appointment of modes of cutting for processing on CNC machines. Dependence of the cutting speed on tool wear. Brittle fracture.	4	LO7 LO10
	ChD	EC	Device Machines with	Studies the device of CNC machines -		LO8

			Numerical Control	cutting tools. Tooling and auxiliary tools. Processing on CNC milling machines. Cutting tools and accessories. Processing on drilling and boring machines with CNC. Considers processing on multi-operation machines. Teaches skills in ways of improving CNC machine tools. Types of software management systems.		LO10
Fundamentals of machining and CAD systems	ChD	HSC	Organization of Preparatory Section	Consider the essence of the metal cutting process, the classification of machines. Classification of movements in metal-cutting machines. Main parts of metal-cutting machines. Studies the device of a screw-cutting machine. Installation and fixing of workpieces and tools on the machine. Processing of external cylindrical surfaces. Cutting tools, their classification, geometry, materials. Processing of parts consisting of two stages.	4	LO6 LO7 LO9
	BD	HSC	Training Practic	The main goal of the training practice is the initial formation of professional adaptation and professional competence in extracurricular activities. Students should understand the connection between theoretical knowledge and specific tasks that they themselves perform during the training practice. Acquisition of skills in working with literature and research activities in the laboratories of the University and the Department.	1	LO2 LO3
	BD	EC	Systems of the Computer Aided Design	Studies ways to graphically display graphic information. CAD and electronic documents. Drawing using a computer.	5	LO4 LO5

				Simulation modeling. Computer-based production integration (CIM). Considering the structure of the CAD. Introduces the varieties of CAD. Studies the types of basic CAD software. Characteristics of CAE/CAD/CAM systems. End-to-end design. The acquisition of the units of the CAD professional staff.		
	BD	EC	Systems of the Computer Aided Design of Technological Processes	Studies the main tasks of designing technological processes. Knows and understands the structure of the discipline, the purpose and objectives, the relevance of the problem of computer-aided design of technological processes. Explains the place of CAD TP in the automated pre-production system. Features of technological preparation of production (CCI) in modern conditions. Part of the tasks of the CCI.		LO4 LO5 LO8
	BD	HSC	Practical Training for Students I	Industrial practice of students aims to consolidate the knowledge gained by students in the process of theoretical training in higher education, based on a deep study of the company's work. In the course of practical training, students gain experience in organizational and technical work, learn modern methods of organizing production and equipment; master production skills and advanced labor methods.	3	LO6 LO7 LO8
Machining and Culting Tools	ChD	HSC	Fundamentals of the Theory of Cutting and Cutting Tolls	Considers cutting as a technological method of processing. Cutting properties of metal-cutting tools; geometric parameters of the cutting part of the cutter and the cut layer; cutting kinematics; chip formation process,	6	LO5 LO6

				shape and dimensions. Experimental study of the cutting process. Plastic deformation in the chip formation zone. Regularities of build-up. Cutting force. Determination of the cutting force. Measurement of cutting force components by dynamometers.		
	ChD	EC	Design and Production of Pumps and Valves	Reviews the General characteristics of pumps and shut-off valves. Basics of their safe operation. Technologies for obtaining billets for pumps and shut-off valves. Pump and blower designs. Allows you to solve General design issues of pumps and shut-off valves. General design, operating principle and main characteristics of pumps. Classification of valves: shut-off, regulating, safety, control. Principles of equipment placement in the design and production of pumps and valves.	5	LO2 LO8 LO9
	ChD	EC	Production of Welded Constructions	Develops skills to determine a rational way of assembling and welding a structure, optimal technologies for joining or processing a specific structure or material; Considers standard methods for selecting parameters of welding processes; - welding modes; - selection of the method and welding units for hull structures, their designation in working drawings; - selection of modes, equipment, welding materials and welding sequence using manual, automatic and semi-automatic welding.		LO2 LO6 LO7
	BD	EC	Computer Modeling in Machine Engineering	Examines the main concepts and definitions related to production; the main tasks of design; the role of modeling in science and technology and professional activities.	5	LO4 LO5

				Distinguishes features of computer modeling; principles of model construction. Classification of models. mathematical modeling; methods of model research. Communications and database types. CAD/CAE/CAM systems and their role in product design and manufacturing.		
	BD	EC	Calculation and Design of Welded Structures	General information about welded structures. Classification of welded structures. Materials used for welded structures. Studies the basics of calculating welded structures. Calculation of structural strength and fatigue. Welded joint. Operation of welded joints under various loads and impacts. Instills the calculation, the construction of welded joints. Rational design, adaptability to manufactured welded structures. Pipelines. Sheet construction. Welded parts and machine components.		LO6 LO8
	ChD	HSC	Practical Training for Students II	Students should familiarize themselves with the technology of manufacturing mechanical engineering products; - organization and management of production; -equipment, computer equipment, control and measuring devices, tools; -mechanization and automation of production processes; - experience of engineers and workers; - results of research conducted in the field of creating new equipment and technologies; -organization of research, design, innovation and inventive work.	6	LO6 LO7 LO8 LO9

	ChD	EC	Fundamentals of the Theory of Foundry and Equipment	Studies the basics of foundry production and equipment. Theoretical foundations of foundry production. Describes The casting properties of alloys and their influence on the properties and design of castings. Selection of structural materials for castings. Introduces the features of melting ferrous and non-ferrous metal alloys, Melting furnaces for producing foundry alloys, their characteristics, design, feasibility study and application areas.	3	LO2 LO6 LO7
	ChD	EC	Computer-Aided Design of Welding Production	Examines the role of computer-aided design systems in modern production; Studies - computer-aided design methodology; - classification of computer-aided design systems; - provision of computer-aided design systems; - modern concepts of production automation; - possibilities of using computer-aided design systems in welding production.		LO5 LO6 LO9
	BD	EC	Welding Production and Technological Equipments	Instills the concept of welding and its essence. Main types of welding. Studies the classification of welding types. The main types of arc welding. Electric arc and its properties. Welded joints, seams, materials. Filler materials for welding. Arc welding electrodes, welding fluxes. Protective gas. Welding transformers and rectifiers,converters and aggregates. power supply devices. Automatic arc welding.	5	LO6 LO7 LO9
	BD	EC	Theory of Welding Processes	Considers information about the main sources of energy during welding,		LO2 LO8

				physical, chemical and metallurgical processes; performing calculations of thermal fields during welding, determining the weldability of steels, cooling rates during welding; fundamentals of metallurgical processes during welding, the mechanism of formation of welded joints and the formation of primary and secondary structures, seam metal and weldability.		
	ChD	EC	Designing of Production workpieces	Examines the basic concepts of workpieces and their characteristics. Allowances, allowances. Quality and accuracy of workpieces. Evaluates the quality of the surface layer of workpieces. Basic concepts and indicators of manufacturability. Basic principles and factors for selecting workpieces. Allows you to know the metal consumption rates and factors that affect the cost of production of the workpiece. Requirements for workpieces in terms of post-processing.	5	LO6 LO7 LO9
	ChD	EC	Control Systems and Organization of Welding Production	Studies the production technology of various types of welded structures in the conditions of single small-scale, large-scale and mass production, the principle of operation of mechanical equipment and technological lines in welding production. Considers development of technological processes of welding production, ways of improvement of production operations and introduction of new progressive technology of procurement, Assembly and welding production.		LO2 LO8 LO9
	ChD	EC	Fundamentals of Design of Mechanical	Considers the design of mechanical Assembly production. Studies the economic	5	LO7 LO9

			Assembly Plants	feasibility of the project. Assesses occupational safety and life safety of the enterprise. Sub-branch offices. Inter-shop and intra-shop transport Lifting devices. Separation of cooling and lubricating fluids (coolant).		LO10
	ChD	EC	Designing and Organization of Assembly and Welding Complexes	Considers the role of technological design in the organization of the production process of manufacturing welded structures. Studies the main directions of optimization of production design processes. Specialization and cooperation in the production of welded structures. Spatial location of the production process. Allows you to study the design features of auxiliary workshops and services of a machine-building plant.		LO7 LO9 LO10
	ChD	EC	Design of technological equipment	Considers the concept of adaptations. Varieties of devices for the intended purpose. Studies the principles of installing workpieces in devices. Fixing of workpieces, clamping devices of devices. The method of calculation of the clamping force. Introduces the classification of clamping devices. Power elements of devices – drives. Devices that coordinate the position of the cutting tool. Conductor plate, the conductor sleeve. Accessories for drilling, turning, and milling machines. Methods of designing and designing devices for machine tools.	4	LO6 LO7 LO9
	ChD	EC	Quality Management Systems for Welding Production	Studies technical control of product quality compliance with established standards. Qualimetric assessment of welded joints,		LO6 LO7 LO10

				measures to prevent defects in welded structures and the choice of the optimal technology for their elimination. Examines methods, equipment, equipment and devices for monitoring metals and welded joints. Documentation on welding quality control.		
	BD	HSC	Structure and Purpose Metallgehaese Machines	Examines General-purpose lathes, automatic and semi-automatic machines; milling, planing and slotting machines; drilling and boring machines and their capabilities; gear processing machines, purpose and technological capabilities; grinding machines and their purpose; aggregate machines and their main components; design features of software-controlled machines. Multi-purpose CNC machines, layout and design features.	6	LO6 LO7 LO9
	ChD	EC	Technological Equipment of Machine-Building Production	Studies the main equipment, classification and technical and economic indicators of machine-building production. Complex automation based on flexible production systems, multi-purpose machines and automatic lines. Equipment of procurement workshops for cutting materials. Equipment for cutting materials with mechanical hacksaws. Classification, performance, efficiency and reliability, types of machine failures. Safety, ease of management and maintenance.	4	LO5 LO9 LO10
	ChD	EC	Special Technologies and Equipment in the Production of Welded Structures	Studies the basics of the theory of welding processes (concepts: welding thermal cycle, welding deformations and stresses); - the need for heating during welding; - classification and General understanding of		LO6 LO7 LO9 LO10

				welding methods and methods; -device of auxiliary equipment, purpose, rules of its operation and scope of application; -classification of welding equipment and materials; -basic principles of operation of power sources for welding.		
	BD	HSC	Technology Materials Processing on Machine Tools	Considering modern manufacturing and technological processes of processing of materials on machine-tools. Studies requirements, methodology, and automation of technological processes. considers dimensional analysis of technological processes. Typical and group technological processes. Studies modular technology for manufacturing parts. Evaluates the selection of cutting modes for various materials in reference books, types of cutting tools, technology of sharpening. Feasibility study of the effectiveness of the assigned type of treatment.	5	LO6 LO7
Module acquisition of new professional competencies	BD	EC	Minor Program	Protocol No. 563 of 31.10.2018 Additional educational program (Minor) – a set of disciplines and (or) modules and other types of educational work, defined by the student for study in order to form additional competencies	12	PO11 PO12
	ChD	HSC	Predegree Practice	Students must: - understand technological processes; - analyze the equipment of the shop, Department, their purpose, principles of operation; - to collect data for the calculation and design of equipment; - develop an original technical design	8	LO2 LO5 LO6

				<p>solution;</p> <ul style="list-style-type: none"> - study the engineering and technical personnel of the mechanical service of the shop and enterprise; -explain methods of protecting the environment from the effects of production factors. 		
Module of final certification	ChD	HSC	Writing and Defence of Degree Work (Project) or Preparing and A Graded Exam	<p>Examines the features of the basic organization, regulatory documentation that regulates the organization's activities. Illustrate the graphic part by adding new design elements to equipment, tooling, and tools. To review the existing technologies. Develop a new processing technology for this object. Give a comparative description. Predict the technical and economic indicators of the project. Allow the used of modern literature, to show the application (tables, charts, policy documents). Apply new and information technologies to machine-building enterprises. Protect the project.</p>	12	LO2 LO5 LO6
				Total	241	

AGREEMENT SHEET

by Education Program 6B07121 «Machine Engineering Technology»

Director DAQ _____ Omasheva G.Sh.
sign

Director SRD _____ Nazarbek U.B.
sign

Director DSandI _____ Khodzhibergenov D.T.
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