NJSC SHAKARIM UNIVERSITY OF SEMEY

EDUCATIONAL PROGRAM

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)

Semey

Educational program

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(Code and classification of the field of education)

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bachelor
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Semey 2024

PREFACE

Developed

The educational program 6B07108 - Digital technologies in mechanical engineering in the direction of preparation 6B071 - Engineering and Engineering affairs on the basis of the State Compulsory Standards of Higher and Postgraduate Education approved by the Order of the Ministry of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No 2 (as amended by the order) was developed by the Academic Committee dated 20.02.2023 No 66).

Members of the Academic Committee	Full name	Academic degree, academic title, position
Head of the Academic Committee	Kozhakhmetova Dinara	Dean of the Higher School of Artificial Intelligence and Construction, PhD
Educational program manager	Shayakhmetova Aigerim Kanatovna	teacher
Member of the AC	Sovetbaev Rail	Head of the department "Digital technologies and logistics in machine building"
Member of the AC	Erzhan Shayakhmetov	Department of Science and Technology "Technical technologies in machine building", PhD
Member of the AC	Turagulov Rasul	Deputy General Director for Production of JSC Semey Engineering
Member of the AC	Kuzbayev Kanat	Head of Technical Control Department, Semey Engineering JSC
Member of the AC	Toktarbekov Daulet	Head of the workshop of PKFSemeyStalsErvice LLP
Member of the AC	Ernar Alshinbekov	6B07106-Mashinajasau University of Technology, student of MSh-101 group
Member of the AC	Bilyalov Altair	6B07106-Mashinajasau University of Technology, student of MSh-101 group

Reviewing

Full name of the reviewer	Position, place of work
Nurlan Otarov	Deputy head of the production and technical workshop, Joint Stock Company "Semey Engineering"
Turymbekov Azamat	Acting Head of Localization and Industrial Assembly Department

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. 6/1 of January 19, 2024.

at a meeting of the University Academic Council by protocol No. 11 of June 28, 2024.

Content

1.Introduction

1.1.General data

Training in the educational program 6B07108“Digital Technologies in Mechanical Engineering” is carried out by the Higher School of Artificial Intelligence and Construction, Department of “Digital Technologies in Mechanical Engineering and Logistics”. The educational program implemented by Shakarim University is developed taking into account the needs of the regional labor market. The Abai region is one of the industrial regions of Kazakhstan, which contains all branches of machine-building production, including the military- industrial industry, transport and communications, agriculture and utilities. In the region there are such enterprises as Joint Stock Company "Semipalatinsk Machine-Building Plant", Joint Stock Company "Semey Engineering", Limited Liability Partnership "SemAZ", Limited Liability Partnership "KazNII PPP", Limited Liability Partnership "PKF Semey Steel Service", Limited Liability Partnership "SEYVUR LTD", Partnership with Limited Liability Company "Kazelectromash", Limited Liability Partnership "Daewoo Bus Kazakhstan", Limited Liability Partnership "PC "Semey Cement Plant" Joint Stock Company "ASIA AUTO", Limited Liability Partnership "Kazzinkmash".

These enterprises need specialists with professional competencies in the field of science and technology, including a set of means, methods and methods of human activity related to the research, development, creation and operation of new materials, technologies, devices and devices

When implementing the educational program, it is planned to use artificial intelligence tools in the educational process, thereby developing digital competencies among students in a rapidly changing technological environment.

The educational program provides for the education of a student with special educational needs in the conditions of a higher educational institution, as well as his socialization and integration into society.

1.2.Completion criteria

The main criterion for the completion of the educational process for the preparation of bachelors is the mastering by students of at least 205 credits of theoretical training, as well as at least 27 credits of practical training, 8 credits of final certification. A total of 240 credits.

1.3.Typical study duration: 3 years.

2.PASSPORT OF THE EDUCATIONAL PROGRAM

2.1.EP purpose	Training of specialists for the implementation of design and technological security of production, who can successfully apply modern digital technologies in the design and manufacture of machines, are able to quickly adapt to changing socio-economic conditions, as well as meeting the needs of the individual in comprehensive professional and intellectual development
2.2.Map of the training profile within the educational program	
Code and classification of the field of education	6B07 - Engineering, manufacturing and construction industries
Code and classification of the direction of training	6B071 - Engineering and Engineering affairs
Code in the International Standard Classification of Education	0710
Code and classification of the educational program group	B064 - Mechanics and metal working
Code and name of the educational program	6B07108 - Digital technologies in mechanical engineering
2.3.Distinctive features of the OP (double degree/joint, OVPO-partner, Double major, innovative)	-
2.4.Qualification characteristics of the graduate	
Degree awarded / qualification	Bachelor of Engineering and Technology in educational program 6B07107 “Digital technologies in mechanical engineering”
Name of professional standard	1. Repair of technological equipment" 2. “Conducting tests” 3. “Metrological support and process control in mechanical engineering” 4. “Metrological support and process control in mechanical engineering”
Atlas of new professions	-
Regional standard	-
Name of the profession / list of positions of a specialist	a) Positions of managers: Production manager; Shop Manager (Site); Site Wizard; Head of Production Department; Shift Supervisor; Manufacturer of works. b) Specialist positions: Dispatcher, Engineer, Design Engineer (designer), Laboratory Engineer, Tool Engineer, Production Preparation Engineer, Process Engineer (technologist), Laboratory Assistant, Professional Consultant. c) Positions of other employees (technical executors): Codifier. d) Positions of leading, scientific and technical workers common to research, design, technological, design and survey organizations: Engineer, Laboratory Assistant. e) Positions of the leading and technical employees of the design, design, technological and prospecting organizations: Design engineer.
OQF qualification level (industry qualification framework)	6-level

Area of professional activity	engineering production, all industries, including military-industrial, industry, transport and communications, agriculture and utilities, enterprises with mechanical repair services, enterprises engaged in the design, production or marketing of products requiring technical education education and consumption
Object of professional activity	government bodies, enterprises, organizations of state and non-state form of ownership, including industry, agriculture and communal services, military-industrial complex, production and consumption areas. government bodies, enterprises, organizations of state and non-state form of ownership, including industry, agriculture and communal services, military-industrial complex, production and consumption areas.
Types of professional activity	organizational and management - organization at various levels of machine-building production management, preparation of the necessary documentation; production and technological - implementation of the technological activity of the enterprise, i.e. ensuring the production of products in accordance with the technological process; design and design - design of structures of machine-building production and means of their technological equipment; scientific research - the implementation of scientific research related to machine-building production, implemented through organization and direct execution, as well as the development of the necessary design documentation for scientific research activities of a non-machine-building enterprise; operational - development of the necessary design Documentation for proper operation of machinery. In accordance with the requests of interested employers, the bachelor`s degree in the digital technologies in mechanical engineering training profile is prepared for quite diverse types of activities, but the production, technological and operational activities are still the predominant guideline for it.
2.5.Graduate Model	- Collection and preliminary analysis of the initial data for the design; - calculation and design of parts and assemblies in accordance with the terms of reference using standard design automation tools taking into account manufacturing technology; - preparation of initial data for the selection and justification of technical solutions; - the use of design documentation in the development of technological processes for the manufacture of parts; - study of scientific and technical information, domestic and foreign experience on the subject of research; - carrying out calculations and numerical experiments according to the developed methods using standard

	software; - participation in conducting experimental studies according to the approved methodology, preparation of a description of the research, analysis and generalization of the results.

3.Modules and content of the educational program

Module 1. Fundamentals of social and humanitarian knowledge

Brief description of the module content

This module reveals such aspects as: socio-cultural, economic-legal, environmental knowledge, communication skills, the use of information technology taking into account modern trends in the development of society.

Module disciplines
Foreign language

Kazakh(Russian) language (1)

Bases of economics, law and ecological knowledge

Physical Culture

Foreign language

History of Kazakhstan

Kazakh(Russian) language (2)

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

Physical Culture

Physical Culture

World of Abai

Information and communication technology

Physical Culture

Philosophy

Brief description of the module content

Module 2. Physical and mathematical foundations

Module disciplines
Mathematics

Physics

Module 3. General technical training

Brief description of the module content

Training includes the acquisition of technical skills and knowledge necessary to successfully perform tasks within a professional career.

Module disciplines
Introduction to Digital Engineering

Engineering graphics

Mechanical engineering drawing

Descriptive geometry

Training practice

Computer programs and equipment

Bases of computer modeling

Engineering graphics in AutoCAD environment

Machine graphics

Machine graphics basics

Fundamentals of scientific activity

Module 4. Basic engineering training

Brief description of the module content

Basic engineering training establishes basic knowledge and skills in the field of engineering. Students will learn the basics of design and calculation of engineering systems, and gain skills in using specialized programs to carry out design work.

Module disciplines

Theoretical mechanics

Theoretical foundations of mechanics

Theoretical mechanics

Construction materials and heat treatment

Interchangeability basics

Design and modeling in the KOMPAS-3D system

Production practice I

Strength of materials

The analysis and synthesis of mechanisms

Analytical dynamics and vibration theory

Innovative materials

Mechanicsof Materials

Key elements of manufacturing preparation in mechanical engineering

Bases of cutting of metals

Theory of mechanisms and machines

Theory of cutting

The theory of cutting with thermophysics elements

Technological processes of machine-building production

Stability of Mechanical Systems

Module 5. Designing bases

Brief description of the module content

The module allows you to become familiar with the basic principles of design using various tools and techniques for the calculation and design of machine components and parts.

Module disciplines

Engineering creativity in mechanical engineering

Fundamentals of scientific and technical creativity

Basics of machine manufacturing

Bases of technology of mechanical engineering

Theory of inventive problem solving

Selection of blanks in mechanical engineering

Hydraulics and hydraulic pneumatic drive

Optimization of calculations at design

Fundamentals of design and machine parts

Design and manufacture of preparations

Design and production of preparations in mechanical engineering

Manufacturing practice II

Ergonomics

Design of technological equipment

Planning of the technological rigging

Module 6. Machine equipment of machine-building production

Brief description of the module content

Students gain knowledge about the classification of machine tools used in the engineering industry, the principles of their operation and their scope of application. Students learn the basics of design and calculation of metal- cutting machines.

Module disciplines

Design and calculation of metal-cutting tools

Planning of instrument

Cutting tool

Metal-cutting machine tools

Fundamentals of machine design

Production practice III

Module 7. Design of machine-building enterprises

Brief description of the module content

Students study the basic aspects of designing enterprises in the mechanical engineering industry. Students gain knowledge about the calculation and design of production workshops, the selection and justification of the necessary equipment, the optimization of production processes and the management of production resources.

Module disciplines

Automation and mechanization of technological processes in mechanical engineering

Bases of planning of toolrooms

Fundamentals of design of sites

Basics of CAD/CAM/CAE

Preparation of machine-building production

Calculation and design of machine accessories in mechanical engineering industry

Mechanical engineering enterprise’s economics

Module 8. Manufacturing engineering

Brief description of the module content

Is designed to study the basic technological processes used in mechanical engineering. Students will become familiar with modern methods of processing materials, technologies for assembling mechanical components and mechanisms, as well as the basics of computer modeling and design in mechanical engineering

Module disciplines

Fundamentals of design of machine manufacturing engineering processes

Basics of repair of armored weapons and equipment

Technology of overhaul of armored weapons and equipment

Manufacturing engineering

Production technology and processing methods for standard parts in mechanical engineering

Digitalization of assembly production

Organization and planning of modern engineering production

Design of technological processes of machine manufacturing

SAPR in mechanical engineering

Machine equipment of tool production

Preproduction planning of machining processes on computer controlled machines

Manufacturing technology of standard parts

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

Machining technology and programming on numerically programmed machines

Manufacturing technology of parts on CNC machines

Machine production technology, reverse engineering

Prediploma practice

Final examination

Brief description of the module content

Writing and defending a graduation project or preparing and passing a comprehensive exam.

Module disciplines

Comprehensive exam

Diploma project

4.Summary table on the scope of the educational program
«6B07108 - Digital technologies in mechanical engineering»

Name of discipline	Cycle/ Component	Term	Number of credits	Total hours	Lec	SPL	LC	IWST	IWS	Knowledge control form
Module 1. Fundamentals of social and humanitarian knowledge										
Foreign language	GER/CC	1	5	150		45		35	70	Examination
Kazakh(Russian) language (1)	GER/CC	1	5	150		45		35	70	Examination
Bases of economics, law and ecological knowledge	GER/US	1	5	150	15	30		35	70	Examination
Physical Culture	GER/CC	1	2	60		60				Differentiated attestation
Foreign language	GER/CC	2	5	150		45		35	70	Examination
History of Kazakhstan	GER/CC	2	5	150	15	30		35	70	Qualification examination
Kazakh(Russian) language (2)	GER/CC	2	5	150		45		35	70	Examination
The module of socio-political knowledge (sociology, political science, cultural studies, psychology)	GER/CC	2	8	240	30	45		55	110	Examination
Physical Culture	GER/CC	2	2	60		60				Differentiated attestation
Physical Culture	GER/CC	3	2	60		60				Differentiated attestation
World of Abai	BS/US	3	3	90	15	15		20	40	Examination
Information and communication technology	GER/CC	4	5	150	15	15	15	35	70	Examination
Physical Culture	GER/CC	4	2	60		60				Differentiated attestation
Philosophy	GER/CC	5	5	150	15	30		35	70	Examination
Mathematics	BS/US	1	5	150	15	30		35	70	Examination
Physics	BS/US	1	3	90	15	15		20	40	Examination
Module 3. General technical training										
Introduction to Digital Engineering	BS/US	1	3	90	15	15		20	40	Examination
Engineering graphics	BS/CCh	1	5	150	15	30		35	70	Examination
Mechanical engineering drawing	BS/CCh	1	5	150	15	30		35	70	Examination
Descriptive geometry	BS/CCh	1	5	150	15	30		35	70	Examination
Training practice	BS/US	2	2	60						Total mark on practice
Computer programs and equipment	BS/CCh	2	5	150		30	15	35	70	Examination
Bases of computer modeling	BS/CCh	2	5	150		30	15	35	70	Examination
Engineering graphics in AutoCAD environment	BS/CCh	3	5	150		30	15	35	70	Examination

Machine graphics	BS/CCh	3	5	150		30	15	35	70	Examination
Machine graphics basics	BS/CCh	3	5	150	15	15	15	35	70	Examination
Fundamentals of scientific activity	BS/US	5	5	150	15	30		35	70	Examination
Module 4. Basic engineering training										
Theoretical mechanics	BS/CCh	1	5	143	15	15	8	35	70	Examination
Theoretical foundations of mechanics	BS/CCh	1	5	143	15	15	8	35	70	Examination
Theoretical mechanics	BS/CCh	1	5	143	15	15	8	35	70	Examination
Construction materials and heat treatment	BS/US	2	5	150	15	15	15	35	70	Examination
Interchangeability basics	BS/US	2	5	150	15	15	15	35	70	Examination
Design and modeling in the KOMPAS-3D system	BS/CCh	2	5	150		30	15	35	70	Examination
Production practice I	BS/CC	2	3	90						Total mark on practice
Strength of materials	BS/CCh	3	5	150	15	15	15	35	70	Examination
The analysis and synthesis of mechanisms	BS/CCh	3	5	150	15	15	15	35	70	Examination and term work/Project
Analytical dynamics and vibration theory	BS/CCh	3	5	150	15	15	15	35	70	Examination
Innovative materials	BS/US	3	3	90	15	15		20	40	Examination
Mechanicsof Materials	BS/CCh	3	5	150	15	15	15	35	70	Examination
Key elements of manufacturing preparation in mechanical engineering	BS/CCh	3	5	150	15	15	15	35	70	Examination
Bases of cutting of metals	BS/CCh	3	5	150	15	15	15	35	70	Examination
Theory of mechanisms and machines	BS/CCh	3	5	150	15	15	15	35	70	Examination and term work/Project
Theory of cutting	BS/CCh	3	5	150	15	15	15	35	70	Examination
The theory of cutting with thermophysics elements	BS/CCh	3	5	150	15	15	15	35	70	Examination
Technological processes of machine-building production	BS/US	3	5	150	15	15	15	35	70	Examination
Stability of Mechanical Systems	BS/CCh	3	5	150	15	15	15	35	70	Examination and term work/Project
Module 5. Designing bases										
Engineering creativity in mechanical engineering	BS/CCh	3	5	150	15	30		35	70	Examination
Fundamentals of scientific and technical creativity	BS/CCh	3	5	150	15	30		35	70	Examination
Basics of machine manufacturing	BS/CCh	3	5	150	15	15	15	35	70	Examination
Bases of technology of mechanical engineering	BS/CCh	3	5	150	15	15	15	35	70	Examination
Theory of inventive problem solving	BS/CCh	3	5	150	15	30		35	70	Examination
Selection of blanks in mechanical engineering	BS/CCh	4	5	150	15	15	15	35	70	Examination
Hydraulics and hydraulic pneumatic drive	BS/CCh	4	5	150	15	30		35	70	Examination
Optimization of calculations at design	BS/CCh	4	5	150	15	30		35	70	Examination

Fundamentals of design and machine parts	BS/US	4	5	150	15	15	15	35	70	Examination and term work/Project
Design and manufacture of preparations	BS/CCh	4	5	150	15	15	15	35	70	Examination
Design and production of preparations in mechanical engineering	BS/CCh	4	5	150	15	15	15	35	70	Examination
Manufacturing practice II	BS/CC	4	7	210						Total mark on practice
Ergonomics	BS/CCh	4	5	150	15	30		35	70	Examination
Design of technological equipment	AS/CCh	5	5	150	15	15	15	35	70	Examination
Planning of the technological rigging	AS/CCh	5	5	150	15	15	15	35	70	Examination
Module 6. Machine equipment of machine-building production										
Design and calculation of metal-cutting tools	BS/CCh	4	5	150	15	15	15	35	70	Examination
Planning of instrument	BS/CCh	4	5	150	15	15	15	35	70	Examination and term work/Project
Cutting tool	BS/CCh	4	5	150	15	15	15	35	70	Examination
Metal-cutting machine tools	AS/CCh	5	5	150	15	15	15	35	70	Examination and term work/Project
Fundamentals of machine design	AS/CCh	5	5	150	15	15	15	35	70	Examination
Production practice III	AS/CCh	6	15	450						Total mark on practice
Module 7. Design of machine-building enterprises										
Automation and mechanization of technological processes in mechanical engineering	AS/CCh	5	5	150	15	30		35	70	Examination
Bases of planning of toolrooms	AS/CCh	5	5	150	15	30		35	70	Examination
Fundamentals of design of sites	AS/CCh	5	5	150	15	30		35	70	Examination
Basics of CAD/CAM/CAE	AS/CCh	5	5	150	15	15	15	35	70	Examination
Preparation of machine-building production	AS/CCh	5	5	150	15	30		35	70	Examination
Calculation and design of machine accessories in mechanical engineering industry	AS/CCh	5	5	150	15	15	15	35	70	Examination
Mechanical engineering enterprise’s economics	AS/CCh	5	5	150	15	30		35	70	Examination
Module 8. Manufacturing engineering										
Fundamentals of design of machine manufacturing engineering processes	AS/CCh	4	5	150	15	15	15	35	70	Examination
Basics of repair of armored weapons and equipment	AS/CCh	4	5	150	15	15	15	35	70	Examination
Technology of overhaul of armored weapons and equipment	AS/CCh	4	5	150	15	15	15	35	70	Examination
Manufacturing engineering	AS/CCh	4	5	150	15	15	15	35	70	Examination
Production technology and processing methods for standard parts in mechanical engineering	AS/CCh	4	5	150	15	15	15	35	70	Examination
Digitalization of assembly production	AS/CCh	4	5	150	15	15	15	35	70	Examination
Organization and planning of modern engineering production	AS/CCh	5	5	150	15	15	15	35	70	Examination

Design of technological processes of machine manufacturing	AS/CCh	5	6	180	15	15	30	40	80	Examination and term work/Project
SAPR in mechanical engineering	AS/CCh	5	5	150	15	15	15	35	70	Examination
Machine equipment of tool production	AS/CCh	5	5	150	15	15	15	35	70	Examination and term work/Project
Preproduction planning of machining processes on computer controlled machines	AS/CCh	5	6	180	15	15	30	40	80	Examination and term work/Project
Manufacturing technology of standard parts	AS/CCh	5	6	180	15	15	30	40	80	Examination and term work/Project
Technology of overhaul of electrical equipment, instrumentation and equipment of armored weapons and equipment	AS/CCh	5	5	150	15	15	15	35	70	Examination
Machining technology and programming on numerically programmed machines	AS/CCh	5	6	180	15	15	30	40	80	Examination
Manufacturing technology of parts on CNC machines	AS/CCh	5	6	180	15	15	30	40	80	Examination and term work/Project
Machine production technology, reverse engineering	AS/CCh	5	6	180	15	15	30	40	80	Examination
Prediploma practice	AS/CCh	6	15	450						Total mark on practice
Final examination										
Comprehensive exam		6	8	240						
Diploma project		6	8	240						

NON -PROFIT LIMITED COMPANY «SHAKARIM UNIVERSITY OF SEMEY»

EDUCATIONAL PROGRAM DEVELOPMENT PLAN

6B07108 "Digital technologies in Mechanical Engineering"

for 2024-2027

2024 year

Content

1. Passport of the Development Plan of the Bachelor's degree program 6B07108 "Digital technologies in Mechanical Engineering"

(name of the EP)

1	Basis for development	Development program of the Non -Profit Limited Company «Shakarim University of Semey» for 2023-2029 School work plan
2	Implementation dates 2024-2027	2024-2027
3	Expected results of implementation	Provision of educational services at the level of world educational standards that ensure the competitiveness of graduates in the labor market. Training of specialists for the implementation of design and engineering and calculation and technological security of production, who can successfully apply modern digital technologies in the design and production of machines, are able to quickly adapt to changing socio-economic conditions, as well as meet the needs of the individual in comprehensive professional and intellectual development.

2. Analytical justification of the EP

2.1 Information about the educational program

The educational program is developed in accordance with the National Qualifications Framework and Professional standards, ***according*** to the Dublin Descriptors and the European Qualifications Framework. **The typical** duration of a bachelor's degree program is 3 years.

The main criterion for completing the educational process is the completion of at least 240 credits, with the award of a Bachelor of Engineering and technology degree in the educational program "6B07108" Digital Technologies in Mechanical Engineering".

2.2 Information about students

Academic year / Basis of study	2024-2025 academic year	2025-2026 academic year	2026-2027 academic year
Grant	22	25	20
Contract	-	-	-
Total	22	25	20

2.3 Internal and external conditions for EP development

The academic policy of the department, which implements the EP "6B07108" Digital Technologies in Mechanical Engineering", is aimed at using innovative teaching technologies based on best practices in teaching modern pedagogical and technical disciplines, at improving the quality of teaching using modern learning strategies, modern teaching methods in higher education.

Students, faculty and staff of the University have unlimited access to information and educational resources and electronic library systems necessary for independent educational and research work. Information electronic resources: full access to databases – Scopus, Science Direct, the Polpred Electronic Library System, Cyberleninka, the Boris Yeltsin Presidential Library, as well as limited access to some electronic databases, including domestic ones (https://web.smart-kitap.kz, http://aknurpress.kz/).

Educational and laboratory classrooms of the Department "Digital Technologies in Mechanical Engineering and Logistics" are equipped with modern equipment, meet the current sanitary standards, fire safety requirements, and qualification requirements for the activities of educational organizations. These classrooms are used both for conducting classes in the disciplines of EP "6B07108 "Digital technologies in Mechanical Engineering", and for independent work of students, performing course and diploma projects. EP "6B07108" Digital technologies in Mechanical Engineering", is sufficiently provided with basic methodological materials on the subjects taught.

Classrooms of the Department of "Digital Technologies in Mechanical Engineering and Logistics" are connected to the WI-FI network дfor holding online conferences, lectures, seminars with the participation of leading scientists from Kazakhstan, near and far abroad. There is a portal of educational resources атниверситета the Shakarim University in Semey (http://ais.semgu.kzais/), which contains lectures, videos, hyperlinks, tasks for self-checking, presentations on topics, textbooks, and other educational and methodical content on the subjects studied in the OP, the content of which the teaching staff uses in the classroom, and to which students have round-the-clock access. To comply with the principle of academic integrity, all

course and examination papers, dissertations are checked for anti-plagiarism in the system https://www.turnitin.com/. The most common innovative methods developed by teaching staff of departments for lecturing, conducting practical and laboratory classes, protecting and pre-protecting graduation papers include: video lectures, slide presentations, working with an interactive whiteboard, using the COMPASS-3D graphic editor, AutoCAD, ADEM, SolidWorks, and Autodesk Inventor.

Для проведения учебно-практических занятий, совместной научно- исследовательских работ, подготовки и проведения научных проектов обучающихсяA branch of the department operates on the basis of JSC Semey Engineering, an enterprise that uses modern technology in the production of machine-building products and is equipped with advanced machine - building equipment for conducting educational and practical classes, joint research work, preparation and implementation of scientific projects of students.

All types of practices implemented within the framework of the EP are carried out in accordance with the end-to-end internship program approved by the Vice-Rector for Academic Affairs, the academic calendar, contracts with the practice bases, as well as on the basis of P 042- 1.01-2022 Regulations on professional practice and determination of organizations as bases of Bachelor's and higher special education practices of Shakarim Universityand the order the rector of the university. Practice databases meet the requirements and content of the practice.

The bases of practices of OP Digital technologies in mechanical engineering are Joint-Stock Company "Semipalatinsk Machine-building Plant", Joint-Stock Company "Semey Engineering", Limited Liability Company "SemAZ", Allure Group of Companies JSC, Limited Liability Company "KazNII PPP", Limited Liability Company "PKF Semey Steel Service", Limited Liability Company "SEIVUR LTD", Limited Liability Company "Kazelectromash", Limited Liability Company "Daewoo Bus Kazakhstan", Limited Liability Company "PC" Semey Cement Plant", ToLimited Liability Company" Kaztsinkmash", LLP" Georgievsky Pump Plant".

2.4 Information about teaching staff implementing the educational program

The teaching staff of the department "Digital Technologies in Mechanical Engineering and Logistics", which ensures the implementation of EP 6B07108 "Digital technologies in Mechanical Engineering", consists of 7 people, including 1 doctor of Technical Sciences, 3 PhD doctors, 4 senior teachers, 2 teachers. The department's graduation rate is 57 %.

The Department of "Digital Technologies in Mechanical Engineering and Logistics" carries out the educational process in two levels of study: bachelor's and master's degree. The formation of scientific and pedagogical personnel at the department is carried out through training through a master's degree, advanced training of the teaching staff.

EP teachers undergo advanced training in leading universities of Kazakhstan (according to the professional development plan) and training seminars held by the Ministry of Education and Science of the Republic of Kazakhstan, universities and other organizations. Teachers ' training is confirmed by certificates and certificates. Teachers of EP 6B07108 "Digital technologies in Mechanical Engineering", in 2022 completed an advanced training course in the program "Mechanical Engineering technology, metal-cutting machines and tools" in the NJSC "Karaganda Technical University named after A. Saginov".

The qualified staff of teachers is able to provide a high-quality educational process, meets the qualification requirements, level and specifics of the educational program.

Teachers of the Department take part in competitions for grant funding, program-targeted financing of projects by the administrator, which are the Ministry of Education and Science of the Republic of Kazakhstan, the Ministry of Agriculture of the Republic of Kazakhstan, development institutes. The scientific direction of the department is related to research in the field of alternative energy, renewable energy sources, hardening and restoration of mechanical engineering parts, electrolyte-plasma technologies, etc. methods of processing materials. The faculty of the department has a high scientific and methodological publication activity. The results of scientific activity of teachers are reflected in scientific publications with an impact factor. Scientists of the Department ofDigital Technologies in Mechanical Engineering and Logisticshave an h-index in the Webofsciences and Scopus databases.

No	Indicators	Indicators Units	2024-2025 academic year	2025-2026 academic year	2026-2027 academic year
1	Share of teaching staff with an academic degree in EP	%	**57**	**57**	**57**
2	Including the share of teaching staff with an academic degree in the general education subjects cycle	%	**50**	**50**	**50**

2.5 Characteristics of the EP's achievements

The teaching staff of the department is constantly improving their knowledge and continuing professional development, including passing short-term advanced training courses, attending various seminars held by the Ministry of Education and Science of the Republic of Kazakhstan, internships at leading universities of Kazakhstan and educational and research centers.

Every year, practical teachers are involved in conducting classes:

1. Rasul Turagulov-Deputy Head of the Technical Department of Semey Engineering JSC
2. Otarov Nurlan Daniyaruly - JSC "Semey Engineering" Deputy Head of production. technical workshop
3. Kanat Mukametkanovich Kuzbayev - Head of Technical Control Department, Semey Engineering JSC

3. Main objectives of the EP development Plan

For effective implementation of the EP, the following tasks are defined:

- Providing high-quality training of competitive specialists
- Development and implementation of scientific projects
- Development of human resources
- Strengthening the material and technical base
- Development of international cooperation

The expected final results include: participation in funded grant projects, publishing activity of teaching staff in rating publications with a non-zero impact factor, development and functioning of joint educational programs with foreign universities**,** implementation of research results in the educational process, involvement of undergraduates in research, academic mobility of students and teaching staff.

4. Risk analysis of the EP

#	Name of risks	Measures to eliminate
1	Reduction of the number of students enrolled in EP	Activation of career guidance work, including in social networks for bachelor's and master's degrees. Work in the admissions committee, information material on the EP, updating the EP page on the university's website
2	Insufficient level of language proficiency for the introduction of trilingual education	Foreign language courses, including those organized on the basis of the university.
3	Reductionof employmentin the level of employment opportunities	Coordination of supply and demand for EP graduates, development of courses of the educational program taking into account the recommendations and needs of employers. Use of a system for informing graduates and employers about vacancies and candidates.
4	Risk of reducing the degree of post-graduate teaching staff	Training of young teachers by entering the doctoral program.

5. Action plan for the development of the EP

No	Criteria	Expected results	Units. Units	2024-2025 academic year		2025-2026 academic year		2026-2027 academic year	
				plan	Actual mplementation	plan	Actual mplementation	plan	Actual mplementation
Direction 1. Educational and methodological support									
1.1	Updating the educational program based on professional standards, taking into account the recommendations of employers	Conducting an expert examination of the Educational program "6B07108 "Digital technologies in Mechanical Engineering" in order to improve the quality of education practical orientation and development of professional competencies of graduates	fact.	+		+		+	
1.2	Monitoring and updating the catalogues of elective subjects in accordance with the development of key and professional competencies, the requirements of the labor market	Improving the quality of the content of educational programs by including elective courses aimed at developing key and professional competencies of graduates in accordance with the requirements of the labor market.	fact.	+		+		+	

1.3	Introduction into the educational process of modern teaching technologies that promote the development of cognitive activity, communication ability of students	Improving the quality of teaching academic subjects, taking into account the novelty and variety of forms of work that contribute to the development of cognitive activity.	fact.	+		--		-	
1.3.1	Introduction of mass open online courses (MOOCs) in the educational program into the educational process 6B07108 " Digital technologies in Mechanical Engineering	Introduction of disciplines in the educational process Improvement of the quality of teaching academic disciplines, taking into account the novelty and variety of forms of work that contribute to the development of cognitive activity.	units.	**1**		**0**		**0**	
1.4	Involvement of social partners and employers in the development and expertise of educational programs	implementation Improvement of the quality of educational programs implemented taking into account market demands and recommendations of employers	units.	**1**		**1**		**1**	
1.55	Development and implementation of elective courses in English	Introduction of disciplines in English into the educational process	units.	**0**		**0**		**0**	
1.6	Conducting seminars and round tables on the use of innovative technologies in the educational process	Introduction of innovative technologies in the educational process	units.	**1**		**1**		**1**	

1.77	Publication of educational,-methodological and scientific literature on implemented educational	programs Improvement of educational and methodological security in the disciplines of implemented educational programs	units.	**1**		**1**		**1**	
1.8	Conclusion of contracts with foreign and domestic partner universities in order to develop academic exchange of students of all levels and teaching staff	, Create a database of foreign and domestic partner universities for the development of academic exchange of students of all levels and teaching staff	units.	**0**		**0**		**0**	
1.9	Invite students from partner universities to study for a semester, short-term internships, internships, etc.	Development of international recognition of educational programs, implementation of academic mobility programs for students	person	-		-		-	
1.10	Participation of teaching staff and students in international academic exchange programs	Development of international cooperation with foreign universities implementing educational programs in the direction of 6B071-Engineering and Engineering	person	-		-		-	
1.11	Development of outgoing academic mobility of teaching staff and students in the direction of 6B071-Engineering	Improvement of the educational program based on the use of experience in implementing similar programs in leading universities of the Republic of Kazakhstan	person	-		**1**		**1**	
Direction 2. Teaching staff									
2.1	Professional development and training of scientific-and pedagogical personnel for the implementation of educational programs once every 5 years	The share of teaching staff who have completed advanced training at the national level is not less than 20%	people	**0**		**0**		**0**	

2.2	Completion of advanced training, retraining, internships of teaching staff at the international level	Completion of at least 2 teachers professional development programs, retraining, internships of teaching staff at the international level	people	**2**		**2**		**2**	
2.3	Promotion of teaching staff publications in international publications indexed by the Web of Science and Scopus databases	Increasing the share of teaching staff who have published research results in publications indexed by the Web of Science and Scopus databases – at least 30% of the total number of teaching staff	%	**30**		**35**		**35**	
2.4	Involvement of practical specialists in teaching and research activities	Participation of practical specialists in the implementation of educational programs (at least 20% of specialists)	%	**20**		**20**		**20**	
Direction 3. Internationalization of educational programs									
3.1	Conclusion of contracts for international cooperation with foreign universities	Implementation of joint projects, preparation of scientific publications with foreign partners, creation of bases for scientific internships of students	units.	**-**		**1**		**1**	
3.2	Attracting foreign students to study under the educational program "6B07108-Digital technologies in Mechanical engineering"	Increase in the number of foreign students	person	**-**		**-**		**-**	
3.3	Organization of joint scientific and practical events with international partners	Increase in the effectiveness of scientific and methodological activities of teaching staff, exchange of experience with foreign partners	units.	**0**		**0**		**0**	
3.4	Invitation of foreign specialists for lectures and consultations on master's projects and dissertations	Improvement of the content component of educational programs based on the introduction of the experience of foreign specialists in the implementation of educational programs	units.	**0**		**1**		**0**	

3.5	Expansion of cooperation with Leading foreign scientific and educational organizations in order to attract the most qualified foreign specialists to implement educational programs	Formation of key and professional competencies in accordance with the practice of leading universities	person	-		-		-	
Direction 4. Material and technical support and digitalization									
4.1	Step-by-step equipping classrooms with technical training tools (projectors, panels, interactive and interactive devices). multimedia whiteboards, multifunction devices, web cam, projector screen, etc.)	Equipping classrooms assigned to the department with technical training facilities (projectors, panels, interactive and multimedia whiteboards, multifunctional devices, a webcam, a projector screen, etc.)	units.	**1**		**1**		**1**	
4.2	Implementation of automation of the educational process (testing, session management, movement of the student body, dean's office, department, teaching staff load, schedule, library, syllabuses)	Information management based on automation of the educational process (testing, session management, movement of the student body, dean's office, department, teaching staff load, schedule, library, syllabus)	fact.	+		+		+	
4.3	Updating the full-text database of research results of teaching staff and students, teaching staff (articles, monographs, etc.)	Increasing the number of results of scientific works of scientists, research of teaching staff and students, teaching staff (articles, monographs, etc.)	units.	**1**		**2**		**2**	
4.4	Expanding the fund of scientific and educational literature, including on electronic media for educational programs implemented	Ensuring the implementation of educational programs based on modern educational and information resources, including on electronic media	%	**5**		**5**		**5**	

4.5	Monitoring the content and improvement of the faculty website	Formation of the faculty website on various aspects of the implementation of educational programs.	%	**50**		**50**		**50**	

Head of the department _____ **Sovetbayev R. A.**

REVIEWED

at the meeting of the Commission on Academic Quality
Graduate School Artificial Intelligence and Construction
Minutes of the meeting № 1 «06» 06. 2024
Chairman CAQ _____ — Adylkanova A.Zh.

AGREED

Dean _____ Kozhahmetova D.O.
«06» 06. 2024