NJSC SHAKARIM UNIVERSITY OF SEMEY

EDUCATIONAL PROGRAM

7M07 - Engineering, Manufacturing and Civil engineering
(Code and classification of the field of education)

7M071 - Engineering and engineering trades
(Code and classification of the direction of training)

0710
(Code in the International Standard Classification of Education)

M103 - Mechanics and metalworking
(Code and classification of the educational program group)

7M07104 -Mechanical engineering
(Code and name of the educational program)

Master
(Level of preparation)

Semey

Educational program

7M07 -- Engineering, manufacturing and construction industries
(Code and classification of the field of education)

7M071 - Engineering and Engineering affairs
(Code and classification of the direction of training)

0710
(Code in the International Standard Classification of Education)

M103 - Mechanics and metalworking
(Code and classification of the educational program group)

7M07104 - Mechanical Engineering
(Code and name of the educational program)

Master
(Level of preparation)

Semey 2024

PREFACE

Developed

The educational program 7M07104 - Mechanical Engineering in the direction of preparation 7M071 - 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	Yerzhan Shayakhmetov	Senior Lecturer of the Department of Digital Technologies in Mechanical Engineering and Logistics, PhD
Member of the AC	Sovetbayev Rail	Acting Head of the Department "Digital Technologies in Mechanical Engineering and Logistics"
Member of the AC	Abilmazhinov Yermek	Professor of the Department of Digital Technologies in Mechanical Engineering and Logistics, Doctor of Technical Sciences.
Member of the AC	Kuzbayev Kanat	Head of the Technical Control Department, Semey Engineering JSC
Member of the AC	Grazhdankin Dmitriy Sergeevich	ERG Service LLP , Chief Technologist
Member of the AC	Tussupov Damir Ruslanovich	Masters student of the MMSH 301.1 group
Member of the AC	Rais Alisher Alibekuly	Masters student of the MMSH 301.1 group

Reviewing

Full name of the reviewer	Position, place of work
Otarov Nurlan	Deputy Head of the Production and Technical Department of Semey Engineering JSC
Mussin Yedil	Technical Director of Daewoo Bus Kazakhstan LLP

Reviewed

at the meeting of the Commission on Academic Quality of the Faculty of Engineering and Technology
Protocol No. 3 dated January 15, 2024

at the 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 dated 06.06.24

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

7M07104 "Mechanical engineering" is a mandatory part of the main educational program. The program of each discipline (course) is aimed at implementing a single target setting for training a specific specialist and is a basic educational and methodological document.

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 masters of the scientific and pedagogical direction is the development of at least 88 credits of theoretical training, including 6 credits of pedagogical practice, 13 credits of research practice, as well as at least 24 credits of research work of a master s student, including internships and the completion of a master s thesis, at least 8 credits of the final attestations . A total of 120 credits.

1.3.Typical study duration: 2 years.

2.PASSPORT OF THE EDUCATIONAL PROGRAM

2.1.EP purpose	Training of specialists for the formation of skills of practical implementation and implementation of engineering solutions in the development of projects of product life cycle management, including the formation of technical documentation and protection of intellectual property.
2.2.Map of the training profile within the educational program	
Code and classification of the field of education	7M07 - Engineering, manufacturing and construction industries
Code and classification of the direction of training	7M071 - Engineering and Engineering affairs
Code in the International Standard Classification of Education	0710
Code and classification of the educational program group	M103 - Mechanics and metalworking
Code and name of the educational program	7M07104 - 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	Master of Technical Sciences under the educational programme 7M07104- Mechanical Engineering
Name of professional standard	1 Professional standard: Teacher (faculty) of higher and (or) postgraduate education organizations 20.11.2023 2 Testing 2 "Conducting tests"
Atlas of new professions	-
Regional standard	-
Name of the profession / list of positions of a specialist	lecturer at University, head of laboratory, technologist, master of food enterprises of different ownership forms, production technician production lab specialist (assistant) in research institutes and Universities, specialist centres of standardization and certification without presentation of requirements to the work experience in accordance with the qualification requirements Qualification Handbook for managers, professionals and other employees.
OQF qualification level (industry qualification framework)	7
Area of professional activity	all industries, including the military-industrial complex, machine-building production, all industries, including military-industrial, industry, transport and communications, agriculture and utilities, education and consumption .
Object of professional activity	government bodies, enterprises, organizations of state and non-state ownership, including industry, agriculture and utilities, the military-industrial complex, production and consumption. government bodies, enterprises, organizations of state and non-state ownership, including industry, agriculture and utilities, the military-industrial complex, production and

	consumption.
Types of professional activity	graduates of the master s degree program in mechanical engineering can perform the following types of professional activities production and technological; organizational and management; research and teaching; design and development; expert; design.
2.5.Graduate Model	1 Description of the OP The educational program 7M07104 – "Mechanical Engineering" is a qualification characteristic of a graduate. It reflects the specifics of the goals of educational training of undergraduates with innovative thinking, advanced technologies in the field of engineering, with formed scientific thinking, Soft skills, which are necessary for flexible response to market needs, further self-improvement and competitiveness. The graduate model of the educational program 7M07104 – "Mechanical Engineering" was developed on the basis of: 1. The Law of the Republic of Kazakhstan "On Education" No. 319-III dated July 27, 2007. 2. State Standard of Higher and Postgraduate Education dated July 20, 2022 No. 2. 3. Rules for the organization of the educational process on credit technology of education Order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152 4. Standard rules for the activities of educational organizations implementing educational programs of higher education, Resolution No. 595 of the Government of the Republic of Kazakhstan dated October 30, 2018 5. The development program of the NAO "Shakarim Semey University" for 2023-2029 2 The purpose of the educational program Training of specialists for the formation of skills for the practical implementation and implementation of engineering solutions in the development of product lifecycle management projects, including issues of technical documentation and intellectual property protection: – training of highly qualified personnel in demand in the labor market; – formation of an engineer capable of solving current professional problems, with systematic knowledge in the field of engineering; – formation of key and special competencies of the Master of Technical Sciences (Mechanical Engineering), possessing high social and civic responsibility, capable of carrying out professional, scientific and pedagogical activities; mastering by undergraduates the basics of scientific work, methodology, theory of experiment, mathematical and statistical methods of experiment processing, creation of new inventive solutions;

	formation of universal and socio-personal values in the context of scientific thinking and worldview. 3 Objectives of the educational program - To prepare a Master of technical sciences with responsibility for their decisions, determination, the ability to lead, the ability to work in a team, carry out scientific research, apply modern methods of scientific and pedagogical direction, the ability to self-improvement and self-development. - To prepare specialists for the implementation of design and technological security of production and the formation of design and technological documentation of machine-building production, capable of quickly adapting to rapidly changing socio-economic conditions, as well as meeting the needs of the individual in comprehensive professional and intellectual development. - To provide an opportunity to acquire knowledge in engineering and various research methods. 4 Results of the Master`s degree in Technical Sciences OP 7M07104 – "Mechanical Engineering": - ready to solve the tasks of professional activity of the following types: research, scientific and pedagogical, organizational and managerial, technological; - demonstrate the developing knowledge and understanding gained at the level of higher professional education, the ability to self-study; - apply knowledge, understanding and the ability to solve problems in new or unfamiliar situations in contexts and within broader (or interdisciplinary) fields related to the field being studied, often in the context of scientific research; - integrate knowledge, cope with difficulties and make judgments based on incomplete or limited information, taking into account the ethical and social responsibility for the application of these judgments and knowledge; - clearly, clearly and reasonably communicate their conclusions and knowledge and their justification to specialists and non-specialists. 4.1 Acquired competencies expressed in the achieved learning outcomes As a result of mastering this Master`s degree program, the graduate must have the following competencies: 1) general cultural competencies (OK): - the ability to improve and develop their intellectual and cultural level; - willingness to use knowledge of modern problems of science and education in solving educational and professional tasks; - the ability to independently master new research methods, to change the scientific profile of their professional activities; 2) professional competencies: general professional: - the ability to manage the project at all stages of the life cycle;

	- the ability to solve production and (or) research tasks based on fundamental knowledge in the field of mechanical engineering; - the ability to evaluate the results of research and development, scientific research and justify their own choice, systematizing and summarizing achievements in the field of engineering; - the ability to develop scientific and technical, design and service documentation, prepare scientific and technical reports, reviews, publications, reviews; - the ability to independently carry out research on modern equipment and devices (in accordance with the goals of the master`s program) and set new research tasks. 4.2 Personal qualities of the graduate The personal qualities of a graduate that must be possessed in order to be a competitively capable specialist in the field of engineering: - Analytical skills: the ability to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy of action; - Diagnostic skills: the ability to determine and implement the priorities of one`s own activities and ways to improve them based on self-assessment, to design a further educational route and professional career; - Verbal and non-verbal skills: the ability to organize and lead the work of a team, analyze and take into account the diversity of cultures in the process of intercultural interaction, develop a team strategy to achieve a goal. - Predictive skills: the ability to put forward goals and objectives; selection of ways to achieve goals; foreseeing the result, possible deviations and undesirable phenomena; determining the stages (or stages) of the process; time allocation; manifestations of perseverance, activity, ability to withstand the load, perseverance in performing complex tasks. - Correctional skills: the ability to determine and implement the priorities of one`s own activities and ways to improve it based on self-assessment.

3.Modules and content of the educational program

Sociolinguistic and scientific-pedagogical activity

Brief description of the module content

Promotes the formation of sociolinguistic competence and the application of fundamental scientific, pedagogical, managerial, communication knowledge and skills in professional activities.

Module disciplines

Foreign language (professional)

History and philosophy of science

Higher Education Pedagogy

Psychology of management

Pedagogical practice

Scientific research and automation in mechanical engineering

Brief description of the module content

The module reveals aspects of independent and team work on scientific projects and projects in the field of automation of machine-building production, calculations and technical justification of production automation; creative and innovative solutions to scientific problems

Module disciplines

Automation of tool production

Automation of technological processes in mechanical engineering

Flexible manufacturing cells and automated production lines in mechanical engineering

Methods of experimental design

Increasing the efficiency of the cutting tool

Statistical methods for planning an experiment

Theoretical foundations of modeling cutting processes

Theory of cutting and high precision machining

Introduction to experiment

Research work of a master student, including internship and master s thesis I

Research work of a master student, including internship and master s project II

Research work of a master student, including internship and master s project III

Process modeling and innovation activities in Mechanical Engineering

Brief description of the module content

The module reveals aspects of independent and team work on projects and innovative activities in the field of mechanical engineering, calculations and technical justification; creative and innovative problem solving using the capabilities of modern digital technologies.

Module disciplines

Measurement of vibration and shock

Engineering methods to ensure the reliability of the machines

Innovative technologies in mechanical engineering

Qulimetry of machine engineering

Preparation of machine-building production

System analysis, optimization and mathematical modeling in mechanical engineering

Improvement and optimization of technological processes in mechanical engineering

Tenzo and Vibrometry in mechanical engineering

Oscillation theory

Technical regulation in mechanical engineering

Engineering methods of calculation

Innovative solutions of machine-building production

Simulation of oscillations in a mechanical system
Modernizathion of technological processes in mechanical engineering
Organization and planning of research and innovation
Applied theory of mechanical vibrations
Computational modeling of the processing time norm
The control system in mechanical
Improvement of automated production
Modern problems of technologies of production machines
System management of processes in mechanical engineering
Research practice

Final assessment

Brief description of the module content

Writing and defending a master`s thesis.

Module disciplines

Master`s dissertation

4.Summary table on the scope of the educational program

«7M07104 - Mechanical Engineering »

Name of discipline	Cycle/ Component	Term	Number of credits	Total hours	Lec	SPL	LC	IWST	IWS	Knowledge control form
Sociolinguistic and scientific-pedagogical activity										
Foreign language (professional)	BS/US	1	3	90		30		20	40	Examination
History and philosophy of science	BS/US	1	5	150	15	30		35	70	Examination
Higher Education Pedagogy	BS/US	1	3	90	15	15		20	40	Examination
Psychology of management	BS/US	1	3	90	15	15		20	40	Examination
Pedagogical practice	BS/US	3	6	180						Total mark on practice
Scientific research and automation in mechanical engineering										
Automation of tool production	BS/CCh	1	5	150	15	30		35	70	Examination
Automation of technological processes in mechanical engineering	BS/CCh	1	5	150	15	30		35	70	Examination
Flexible manufacturing cells and automated production lines in mechanical engineering	BS/CCh	1	5	150	15	30		35	70	Examination
Methods of experimental design	BS/CCh	1	5	150	15	30		35	70	Examination
Increasing the efficiency of the cutting tool	BS/CCh	1	5	150	15	30		35	70	Examination
Statistical methods for planning an experiment	BS/CCh	1	5	150	15	30		35	70	Examination
Theoretical foundations of modeling cutting processes	BS/CCh	1	5	150	15	30		35	70	Examination
Theory of cutting and high precision machining	BS/CCh	1	5	150	15	30		35	70	Examination
Introduction to experiment	AS/CCh	1	5	150	15	30		35	70	Examination
Research work of a master student, including internship and master s thesis I	AS/US	2	11	330						Total mark on practice
Research work of a master student, including internship and master s project II	AS/US	3	4	120						Total mark on practice
Research work of a master student, including internship and master s project III	AS/US	4	9	270						Total mark on practice
Process modeling and innovation activities in Mechanical Engineering										
Measurement of vibration and shock	AS/CCh	2	5	150	15	30		35	70	Examination
Engineering methods to ensure the reliability of the machines	AS/CCh	2	5	150	15	30		35	70	Examination
Innovative technologies in mechanical engineering	AS/CCh	2	5	150	15	30		35	70	Examination
Qulimetry of machine engineering	AS/US	2	5	150	15	30		35	70	Examination
Preparation of machine-building production	AS/CCh	2	5	150	15	30		35	70	Examination
System analysis, optimization and mathematical modeling in mechanical	AS/CCh	2	5	150	15	30		35	70	Examination

engineering										
Improvement and optimization of technological processes in mechanical engineering	AS/CCh	2	5	150	15	30		35	70	Examination
Tenzo and Vibrometry in mechanical engineering	AS/CCh	2	5	150	15	30		35	70	Examination
Oscillation theory	AS/CCh	2	5	150	15	30		35	70	Examination
Technical regulation in mechanical engineering	AS/CCh	2	5	150	15	30		35	70	Examination
Engineering methods of calculation	AS/CCh	3	5	150	15	30		35	70	Examination
Innovative solutions of machine-building production	AS/CCh	3	5	150	15	30		35	70	Examination
Simulation of oscillations in a mechanical system	AS/CCh	3	5	150	15	30		35	70	Examination
Modernizathion of technological processes in mechanical engineering	AS/CCh	3	5	150	15	30		35	70	Examination
Organization and planning of research and innovation	AS/CCh	3	5	150	15	30		35	70	Examination
Applied theory of mechanical vibrations	AS/CCh	3	5	150	15	30		35	70	Examination
Computational modeling of the processing time norm	AS/CCh	3	5	150	15	30		35	70	Examination
The control system in mechanical	AS/CCh	3	5	150	15	30		35	70	Examination
Improvement of automated production	AS/CCh	3	5	150	15	30		35	70	Examination
Modern problems of technologies of production machines	AS/CCh	3	5	150	15	30		35	70	Examination
System management of processes in mechanical engineering	AS/CCh	3	5	150	15	30		35	70	Examination
Research practice	AS/US	4	13	390						Total mark on practice
Final assessment										
Master`s dissertation		4	8	240						

NON -PROFIT LIMITED COMPANY «SHAKARIM UNIVERSITY OF SEMEY»

EDUCATIONAL PROGRAM DEVELOPMENT PLAN

7M07104 – “Mechanical Engineering”

for 2024-2026

Semey 2024

Content

1. Passport of the Development Plan for the master's degree program 7M07104 – “Mechanical Engineering”

1	Basis for development	The DEVELOPMENT PROGRAM OF the NJSC "Shakarim University of Semey" for 2023-2029
2	Implementation deadlines	2023-2025 yy
3	Expected results of implementation	Providing educational services at the level of world educational standards, ensuring the competitiveness of graduates in the labor market. Training of specialists for the implementation of design and technological security of production and the formation of design and technological documentation of machine-building production, capable of quickly adapting to rapidly changing socio-economic conditions, as well as meeting 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 has been developed in accordance with the National Qualifications Framework and Professional Standards, according to the Dublin Descriptors and the European Qualifications Framework. The typical period of mastering the master's degree program is 2 years (scientific and pedagogical).

The main criterion for the completion of the educational process is the development of at least 120 credits, with the award of a Master of Technical Sciences degree in the educational program 7M07104- Mechanical Engineering.

The future specialist develops scientific thinking, Soft skills, which are necessary for flexible response to market needs, further self-improvement and competitiveness. Specialists in EP 7M07104- Mechanical Engineering, are trained by the Department of "Digital Technologies in Mechanical Engineering and Logistics" of the "Digital Technologies in Mechanical Engineering and Logistics" for the higher education system, the scientific sphere and production.

2.2 Information about students

Academic year / Basics of training	2024-2025 academic year	2025-2026 academic year
Grant	5	6
Agreement	-	2
Total	5	10

2.3 Internal and external conditions for the development of EP

The academic policy of the department implementing 7M07104 – Mechanical Engineering is aimed at using innovative teaching technologies based on best practices in teaching modern pedagogical and technical disciplines, on 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 to carry out independent educational and research work. Electronic information resources: full access to databases – Scopus, Science Direct, the Electronic Library system "Polpred", Cyberleninka, the Presidential Library named after B.N. Yeltsin, as well as limited access to some electronic databases, including domestic ones (https://web.smart-kitap .kz, http://aknurpress.kz/). Microsoft Teams, Zoom conference system is used for online conferences, lectures, seminars with the participation of leading scientists from Kazakhstan, near and far abroad, and practical engineers.

The educational and laboratory classrooms of the Department of "Digital Technologies in Mechanical Engineering and Logistics"are equipped with modern equipment, comply with 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 7M07104 – Mechanical Engineering, and for independent work of students, completing a dissertation. EP 7M07104 – Mechanical engineering, is sufficiently provided with basic methodological materials in the disciplines taught.

The classrooms of the Department of "Digital Technologies in Mechanical Engineering and Logistics"are connected to a WI-FI network for online conferences, lectures, seminars with the participation of leading scientists from Kazakhstan, near and far abroad. The Portal of educational resources of Shakarim University is functioning. Families (http://ais.semgu.kz/), which contains lectures, videos, hyperlinks, tasks for self-examination, presentations on topics, textbooks and other educational and methodological content on the studied disciplines of the EP, 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 term papers and examination papers, dissertations are checked for anti-plagiarism in the system https://www.turnitin.com /. The most common innovative methods developed by faculty of departments for lecturing, conducting practical and laboratory classes, protection and pre-protection of graduation papers include: video lectures, slide presentations, working with an interactive whiteboard, using the graphic editor COMPASS-3D, AutoCAD, ADEM, SolidWorks, Autodesk Inventor.

All types of practices implemented within the framework of the EP are carried out according to the practice program approved by the Faculty Council, the academic calendar, contracts with practice bases, as well as on the basis of P 042-2.14-2022 "Regulations on the organization and conduct of practices and scientific internships for undergraduates and PhD doctoral students" and the order of the rector of the university. The practice bases meet the requirements and content of the practice.

To conduct joint research, preparation and implementation of scientific projects of students, a branch of the department operates on the basis of JSC Semey Engineering, an enterprise using modern technology in the production of machine-building products and equipped with advanced machine-building equipment. At the Semey Engineering JSC enterprise, undergraduates of the department can conduct scientific experiments and receive advice from existing engineers of the enterprise.

The Department concludes contracts and cooperates with enterprises Joint-Stock Company Semipalatinsk Machine-Building Plant, Joint-Stock Company Semey Engineering, Limited Liability Company SemAZ, Limited Liability Company KazNII PPP, Limited Liability Company PKF Semey Steel Service, Limited Liability Company SEYVUR LTD, Partnership Kazelectromash Limited Liability Company, Daewoo Bus Kazakhstan Limited Liability Company, Limited Liability Partnership "PC "Semey Cement Plant", Limited Liability Partnership "Kazzinkmash", LLP "Georgievsky Pumping Plant", the database of enterprises can be used to conduct research (R&D) for students of EP 7M07104 – Mechanical Engineering.

Pedagogical practice takes place on the basis of the NAO "Shakarim Semey University", where undergraduates conduct classes under the guidance of experienced mentors. The scientific base of LLP "Kazakhstan Institute of Science and Technology", Pavlodar, LLP "PlasmaSciense" is used for scientific internship. In the future, the issues of internships at national universities of Kazakhstan and foreign partner universities are being considered.

2.4 Information about teaching staff implementing the educational program

The qualified staff of teachers is able to provide a high-quality educational process, meets the qualification requirements, the level and specifics of the educational program. The teaching staff of the Department of Technological equipment and mechanical engineering, which ensures the implementation of EP 7M07104- Mechanical Engineering, consists of 3 people, including 1 Doctor of Technical Sciences, 2 PhD. The settlement of the teaching staff ensuring the implementation of the EP is 100%. All teachers of the educational program have a basic education and carry out teaching activities according to an individual plan, there are no deviations from the plan.

Teachers of the department take part in competitions for grant funding, program-targeted financing of projects, the administrator of which are the Ministry of Education and Science of the Republic of Kazakhstan, Ministry of Agriculture of the Republic of Kazakhstan, development institutes. The scientific direction of the department is related to research in the field of improving technological machines and equipment, processes and devices of the food, meat and dairy and processing industries, alternative energy. The teaching staff of the department has a high scientific and methodological publication activity. The results of the scientific activity of teachers are reflected in scientific publications with an impact factor. The scientists of the department have the h-index in the Web of Science and Scopus databases.

EP teachers undergo advanced training at leading universities in Kazakhstan and training seminars held by the Ministry of Education and Science of the Republic of Kazakhstan, universities and other organizations. Teachers of OP 7M07104 – Mechanical Engineering, in 2022 completed a refresher course under the program "Technology of Mechanical Engineering, metal-cutting machines and tools" at the Karaganda Technical University named after A. Saginov, as well as production practice at the enterprise of JSC Semey Engineering and LLP Semey Mechanical Plant in 2023 and 2024.

No.	Indicators	Unit.	2024-2025 academic year	2025-2026 academic year
1	Share of teaching staff with an academic degree in EP	%	**100**	**100**
2	Including the share of teaching staff with an academic degree in the OOD cycle	%	**100**	**100**

2.5 Characteristics of the achievements of the EP

OP 7M07104 - Mechanical engineering has successfully passed accreditation from the agency "Central Asian Association for Accreditation of Education" "CAAAE" for a period of 5 years (OP 7M07104-"Mechanical Engineering" registration number 24/20KA0013 from 31.05.24 to 30.05.2029). Also, the agency "Central Asian Association for Education Accreditation" (CAAAE) issued the European Quality Mark of Engineering education EUR-ACE® Label (European Accredited Engineer – "European Accredited Engineer") for OP 7M07104 "Mechanical Engineering".

Graduates of EP Mechanical Engineering successfully work at enterprises throughout Kazakhstan and hold senior positions (JSC Semey Engineering, SemAZ LLP, Asia LLP, Daewoo Bus Kazakhstan LLP, Pavlodar Machine-Building Plant JSC, ModeX Astana LLP, etc.).

Undergraduates of EP 7M07104 – Mechanical Engineering, as well as teachers of the department, participate and are members of research groups of scientific projects implemented within the framework of a competition for grant funding for scientific and (or) scientific and technical projects of the Ministry of Education and Science of the Republic of Kazakhstan (Kuanysh Ormanbekov IRN :AR13068529 "Development of technology for electron beam modification of polymer materials used in mechanical engineering", Shynarbek Aibek IRN: AR13068451 "Production of multifunctional calcium phosphate coatings with titanium dioxide nanoparticles by plasma-electrolytic oxidation").

7M07104 - Машина жасау ББББ "CAAAE" «Білім беру багдарламасы Орталық Азия білім жуйесін аккредиттеу» кауымдастыгымен 5 жыл мерзімге аккредиттеуден сәтті өтті (7M07104-"Машина жасау" ББББ тіркеу нөмірі 24/20KA0013 31.05.24 бастап 30.05.2029 дейін).

3. Main objectives of the EP development plan

The following tasks are defined for the effective implementation of the OP

- 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, the publication activity of teaching staff in rating publications with a non-zero impact factor, the development and operation of joint educational programs with foreign universities, the introduction of research results into the educational process, the involvement of undergraduates in scientific research, academic mobility of students and teaching staff.

4. Risk analysis of OP

No.	Name of risks	Corrective measures
1	Decrease in the number of EP students	Activation of career guidance, including in social networks for bachelor's and master's degrees. Work in the admissions committee, information material on the OP, updating the EP page on the university's website
2	Insufficient level of language knowledge to introduce trilingual education	Foreign language courses, including those organized on the basis of the university.
3	Insufficient development of external and internal academic mobility of students and teaching staff	Conducting an analysis of the academic mobility of students and teaching staff, strengthening work with them to enhance academic mobility
4	The risk of reducing the stability of the teaching staff in the PLO	Training of young teachers through admission to doctoral studies.

5. Action plan for the development of EP

No.	Criteria	Expected results	Unit change	2024-2025		2025-2026	
				plan	Actual Execution	plan	Actual Execution
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 examination of the Educational program "7M07104 - Mechanical Engineering" in order to improve the practice orientation and development of professional competencies of graduates	fact .	+		-	
1. 2	Monitoring and updating catalogs of elective disciplines in accordance with the development of key and professional competencies and labor market demands	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 demands of the labor market.	fact .	-		+	
1. 3	Introduction into the educational process of modern teaching technologies that contribute to the development of cognitive activity and communicative ability of students	Improving 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.	fact .	-		+	

1.3.1	Introduction into the educational process of massive open online courses (MOOCs) according to the educational program " Technological machines and equipment "	The introduction of disciplines into the educational process is to improve 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**	
1.4 _	Involving social partners and employers in the development and examination of the implementation of educational programs	Improving the quality of educational programs implemented, taking into account market demands and recommendations from employers	units _	**1**		**1**	
1.5 _	Development and implementation of elective courses in English	The introduction of disciplines in English into the educational process	units _	**-**		**-**	
1.6 _	Conducting seminars and round tables on the use of innovative technologies in the educational process	Introduction of innovative technologies into the educational process	units _	**1**		**1**	
1.7 _	Publication of educational, educational , methodological and scientific literature on implemented educational programs	Improving educational and methodological support in the disciplines of implemented educational programs	units _	**1**		**2**	
1.8	Concluding agreements with foreign and domestic partner universities in order to develop academic exchange of students of all levels and teaching staff	Creation of a base of foreign and domestic universities - partners for the development of academic exchange of students of all levels and teaching staff	units _	**-**		**1**	

1.9	Inviting students from partner universities to study for a semester, short-term internships, practice, etc.	Development of international recognition of educational programs, implementation of academic mobility programs for students	people	**-**		**1**	
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 field 7M07104 - Mechanical Engineering	people	**-**		**-**	
1.11	Development of outgoing academic mobility of teaching staff and students in the direction 7M07104 - Mechanical Engineering	Improving the educational program based on the experience of implementing such programs in leading foreign universities	people	**-**		**-**	
Direction 2. Faculty							
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 and international levels is at least 20%	people	**-**		**-**	
2.2	Advanced training, retraining, internships of teaching staff at the international level	Completion of at least 2 teachers of the advanced training program, retraining, internships of teaching staff at the international level	people	**-**		**1**	
2.3	Promotion of publications of the works of the Faculty in international publications indexed by the Web of Science and Scopus databases	An increase in the share of teaching staff who have published the results of scientific research in publications indexed by the Web of Science and Scopus databases – at least 30% of the total number of teaching staff	%	**30**		**40**	
2.4	Involvement of practical specialists in teaching and scientific activities	Participation of practitioners in the implementation of educational programs (at least 20% of specialists)	%	**20**		**20**	

Direction 3. Internationalization of educational programs							
3.1	Conclusion of agreements on 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 _	**-**		**-**	
3.2	Attracting foreign students to study under the educational program "7M07104 - Mechanical Engineering"	Increasing the number of foreign students	people	**-**		**-**	
3.3	Organization of joint scientific and practical events with international partners	Improving the effectiveness of scientific and methodological activities of teaching staff, exchange of experience with foreign partners	units _	**-**		**-**	
3.4	Inviting foreign experts to give lectures and consultations on master's projects and dissertations	Improving the content component of educational programs based on the introduction of the experience of foreign specialists in the implementation of educational programs	units _	**-**		**1**	
3.5	Expansion of cooperation with leading foreign scientific and educational organizations in order to attract the most qualified foreign specialists to the implementation of educational programs	Formation of key and professional competencies in accordance with the practice of leading universities	people	**-**		**1**	
Direction 4. Logistics and digitalization							

4.1	Step-by-step equipment of classrooms with technical training tools (projectors, panels, interactive and multimedia whiteboards, multifunction devices, webcam, projector screen, etc.)	Equipping classrooms assigned to the department with technical training tools (projectors, panels, interactive and multimedia whiteboards, multifunction devices, webcam, projector screen, etc.)	units _	**1**		**-**	
4.2	Automation of the educational process (testing, session management, student body movement, dean's office, department, teaching staff workload, schedule, library, syllabuses)	Information management based on automation of the educational process (testing, session management, student body movement, dean's office, department, teaching staff workload, schedule, library, syllabuses)	fact .	+		+	
4.3	Replenishment of the full-text database of research results of teaching staff and students, teaching staff (articles, monographs, etc.)	An increase in the number of results of scientific works of scientists, research of teaching staff and students, teaching staff (articles, monographs, etc.)	units _	**3**		**3**	
4.4	Expansion of the fund of scientific and educational literature, including on electronic media for ongoing educational programs	Ensuring the implementation of educational programs based on modern educational and information resources, including on electronic media	%	**10**		**10**	
4.5	Monitoring the content and improvement of the faculty's website	The formation of the faculty's website on various aspects of the implementation of educational programs.	%	**50**		**65**	

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