NJSC SHAKARIM UNIVERSITY OF SEMEY

DEVELOPMENT PLAN EDUCATIONAL PROGRAM

7M07104 - Mechanical engineering

Semey

NJSC "SHAKARIM UNIVERSITY OF SEMEY"

APPROVED

Member of the Board - Vice-Rector for Academic Affairs

_____ I. Oralkanova

"25" _____ 20__

EDUCATIONAL PROGRAM DEVELOPMENT PLAN

7M07104 – "Mechanical Engineering"

(code and name of EP)

for 2023-2025

Semey 2023

Content

1. Passport of the Development Plan for the master's degree program Mechanical Engineering
(name of EP)

1	Basis for development	Shakarim University Strategic Plan for 2021-2025. Faculty work plan.
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).

EP "7M07104 - Mechanical Engineering" was developed by the Academic Committee. Reviewed at the meeting of the Quality Assurance Commission of the Faculty of Engineering and Technology (Protocol No. 4/6 dated 04/10/2023)

Approved at the meeting of the Academic Council of the University (Protocol No. 8 dated 04/25/2023).

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 Technological Equipment and Mechanical Engineering of the Faculty of Engineering and Technology for higher education, scientific sphere and production.

2.2 Information about students

Academic year / Basics of training	2023-2024 academic year	2024-2025 academic year
Grant	8	8
Agreement	4	2
Total	12	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 Technological Equipment and Mechanical Engineering 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 Technological Equipment and Mechanical Engineering 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 4 people, including 1 Doctor of Technical Sciences, 2 Candidate of Technical Sciences, 1 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. Scientists of the technological equipment and mechanical engineering department have the Hirsch index (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. The teachers' training is confirmed by certificates and certificates. Teachers of EP 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 a production internship at the Semey Engineering JSC enterprise in 2023.

No.	Indicators	Unit.	2023-2024 academic year	2024-2025 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

EP 7M07104 - Mechanical engineering has successfully been accredited by the independent agency for accreditation and examination of the quality of education "ARQA" for a period of 5 years (EP 6B07106-"Mechanical Engineering" registration number HE-SA-000137 from 06/20/19 to 06/19/2024).

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").

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	2022-2023		2023-2025	
				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**		**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**		**4**	
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.	%	**55**		**75**	

Head of the department _____ **Zhumadilova G.A.**

REVIEWED
at a meeting of the Quality Assurance Commission
Faculty of Engineering and Technology
Protocol No.5 from "25" 05. 2023
Chairman of the QAC _____ Abdilova G.

AGREED

Dean of the Faculty _____ Nurymkhan G.
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