MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN

M.Auezov SOUTH KAZAKHSTAN UNIVERSITY

« APPROVED BY»

Chairman of the Board– Rector

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

«04» 02 2023y.

EDUCATION PROGRAMME

8D07120 - Mechanical engineering

Registration number	8D07100105
Code and classification of the field of education	8D07 – Engineering, Proccessing and construction branches
Code and classification of training areas	8D071 – Engineering and Engineering business
Group of educational programs	D103 – Mechanics and Metalworking
Type of EP	current
ISCE level	8
NQF level	8
SQF of education level	8
Language of learning	Kazakh, Russian, English
Typical duration of study	4 years
Direction of training	Scientific and pedagogical
The complexity of the EP, not less	180 credits
Distinctive features of EP	-
University Partner (JEP)	-
University Partner (TDEP)	-
Social Partner (DE)	-

Shymkent, 2023

Drafters:

Name	Position	Sign
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EP reviewed by AK «Engineering and Engineering business» protocol № 4
от «24» 01 2023г.

Chairman of AC _____ Aitureev M.Zh.
sign

Considered and recommended for approval at the meeting of Educational and Methodical Council of M. Auezov SKU, protocol № 4, от «22» 02 2023г.

Chairman _____ Abisheva R.Zh.

Approved by the decision of the Academic Council of the University, protocol № 15, от «23» 02 2023г.

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1. PROGRAM CONCEPT

Mission of the University	Generation of new competencies, training of a leader who translates research thinking and culture.
University Values	• Openness–open to change, innovation and cooperation. • •Creativity – generates ideas, develops them and turns them into values. • Academic freedom – free to choose, develop and act. • Partnership – creates trust and support in a relationship where everyone wins. • Social responsibility – ready to fulfill obligations, make decisions and be responsible for their results.
Graduate Model	• Deep subject knowledge, their application and continuous expansion in professional activity. • •* Information and digital literacy and mobility in rapidly changing conditions. • Research skills, creativity and emotional intelligence. • Entrepreneurship, independence and responsibility for their activities and well-being. • Global and national citizenship, tolerance to cultures and languages.
Uniqueness of the EP	Graduates receive readiness for organizations of science, higher education and key industries capable of solving the tasks of the Industry 4.0 program, critically evaluate and apply modern scientific achievements, generate new ideas when solving research and engineering problems in the field of industrial production.
Academic Integrity and Ethics Policy	• The University has taken measures to maintain academic integrity and academic freedom, protection from any kind of intolerance and discrimination: • Rules of academic Integrity (protocol of the Academic Council №3 from 30.10.2018y.); Anti-Corruption Standard (order №373 from 27.12.2019y). • • Code of Ethics (protocol of the Academic Council №8 from 31.01.2020y).
Regulatory and legal framework for the development of EP	• Industry Qualifications Framework "Education" - Astana, 2019; • Industry qualifications Framework "Mechanical Engineering". - Astana, 2016; • "Atlas of new Professions and Competencies of Kazakhstan", No. 6 of 2020; - Specialist in the field of nanotechnology (https://www.enbek.kz/atlas/profession/374) - BigDate Analyst (https://www.enbek.kz/atlas/profession/379) - Virtual Prototyping specialist (https://www.enbek.kz/atlas/profession/369) • Professional standard. Organization of interaction between science and innovators. Appendix No. 1 to the order of the Deputy Chairman of the Board of NCE RK "Atameken", dated 12/24/2019, No. 259; • Professional standard. Technical design of innovative products/services. Appendix No. 12. NCE RK "Atameken", dated 12/24/2019, No. 259; • Professional standard. Teacher. NCE RK "Atameken", dated 08.06.2017, No.133; • National Qualifications Framework (NQF) as

	amended by the joint Order of the Ministry of Education and Science of the Republic of Kazakhstan dated 18.12.2013 No. 665 –o-m and the Ministry of Education and Science of the Republic of Kazakhstan dated 10.01.2014, No. 6;
Organization of the educational process	• • Implementation of the principles of the Bologna Process • • Student-centered learning • • Availability • • Inclusivity
Quality assurance of the EP	• • Internal quality assurance system • • Involvement of stakeholders in the development of the EP and its evaluation • • Systematic monitoring • • Updating the content (updating)
Requirements for applicants	Are established according to the Standard rules of admission to training in educational organizations implementing educational programs of higher and postgraduate education Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 600 dated 31.10.2018

2 PASSPORT OF THE EDUCATIONAL PROGRAM

Purpose of the EP	training of highly qualified, competitive research scientists and teachers capable of innovative activities in the field of science, education and production management in the machine-building industry.
Tasks of the EP	• formation of skills of independent research and pedagogical activity; •formation of competencies in the field of design and operation of machines and technological processes; • in-depth study of theoretical and methodological foundations in mechanical engineering; • formation of competencies in the field of research, pedagogical and innovative activities; •ability to analyze and predict the strength and reliability of mechanical engineering products. •development of the ability to analyze the effectiveness of additive technological processes and the use of modern software; • mastering the design of design and technological preparation of production, tool technology, new types of processing of information space materials, enterprise planning and management, programs, innovation activities in the conditions of modern mechanical engineering.
Harmonization of the EP	• 8th level of the National Qualifications Framework of the Republic of Kazakhstan; • Dublin Skill Level 8 descriptors; • Cycle 3 of the Qualification Framework of the European Higher Education Area (A Framework for Qualification of the European Higher Education Area); • Level 8 of the European Qualification Framework for Lifelong Learning (The European Qualification Framework for Life long Learning).
Connection of the EP with the professional sphere	• Industry Qualifications Framework "Education" - Astana, 2019; • Industry qualifications Framework "Mechanical Engineering". - Astana, 2016; • "Atlas of new Professions and Competencies of Kazakhstan", No. 6 of 2020; • Professional Standard. Organization of interaction between science and innovators. Appendix No. 1 to the order of the Deputy Chairman of the Board of NCE RK "Atameken", dated 12/24/2019, No. 259; • Professional standard. Technical design of innovative products/services. Appendix No. 12. NCE RK "Atameken", dated 12/24/2019 No. 259; • Professional standard. Teacher. NCE RK "Atameken", dated 08.06.2017, No.133; • National Qualifications Framework (NQF) as amended by the joint Order of the Ministry of Education and Science of the Republic of Kazakhstan dated 18.12.2013 No. 665 –o-m and the Ministry of Education and Science of the Republic of Kazakhstan dated 10.01.2014, No. 6; • Professional standard. 3D printing of metal and plastic products. Appendix No. 37. NCE RK "Atameken", dated 30.12.2019, No. 269; • Professional standard. Metrological support and control of processes in mechanical engineering – Appendix No. 43. NCE RK "Atameken", dated 30.12.2019, No. 269. • Professional standard. The master of operation and repair of machines and mechanisms. Appendix No. 46. NCE RK "Atameken", dated

	30.12.2019, No. 269.
List of qualifications and positions	Doctor of Philosophy under the program 8D07120 – "Mechanical Engineering" can hold the position of teacher – head of innovative development, president of the enterprise, CEO, head of scientific institutes, head of innovative development in accordance with the qualification requirements of the Qualification Directory of positions of managers, specialists and other employees approved by the order of the Minister of Labor and Social Protection of the Republic of Kazakhstan dated 31 December 2020, No. 553.
Field of professional activity	• scientific and managerial activity in universities, research and production centers, research institutes; • Managerial functioning in the structural divisions of the Ministry of Science and Higher Education. • planning and organization of scientific research in the field of mechanical engineering to solve research, information retrieval, methodological problems of technological processes • organization of the educational process in educational organizations according to the profile.
Objects of professional activity	• Ministry of Science and Higher Education of the Republic of Kazakhstan, research institutes and design organizations; • higher education institutions; • enterprises and organizations working on the Industrialization Map; • machine-building plants, enterprises and organizations operating technological equipment: design, design and technological organizations; branded and dealer centers of machine-building and repair plants; marketing and forwarding services; logistics systems.
Subjects of professional activity	• pedagogical and production management in experimental research, design organizations and in production; • experimental research activities in the field of education and in the workplace in the field of educational and methodological progress, professional development of employees in accordance with specialization. • organizations and enterprises of any form of ownership that deal with the design and operation of machines; • mathematical modeling of objects and processes of machine-building industries; • systems of machine–building industries that provide design and technological preparation of machine-building production, their management, metrological and technical maintenance; • methods and means of diagnostics, testing and control of machine-building products, as well as product quality management at the stages of the life cycle;
Types of professional activity	• production and technological; • organizational and managerial; • scientific research; • teacher – head of innovative development; • design and engineering.
Learning outcomes	**LO1.** Generate new ideas when solving research and practical tasks, including in interdisciplinary fields, as well as follow ethical standards in professional activities by carrying out a critical analysis and evaluation of modern scientific achievements. **LO 2.** It is scientifically justified to make original decisions in the field of design, modeling and production of machines, drives, equipment, as well

	as means of technological equipment of production. **LO 3.** It is reasoned to present scientific hypotheses and research results, taking the initiative in situations of technical and economic risk. **LO 4.** Demonstrate a systematic understanding of the field of research in the organization and planning of experimental work, teaching activities in universities, research centers and in the workplace. **LO 5.** Design production and technological processes based on an understanding of methods for increasing productivity during technological preparation of production and instrumental support of modern equipment. **LO 6.** To carry out independent scientific research and management of scientific projects based on modern methods and methodology, characterized by academic and scientific integrity, taking into account social and economic aspects; **LO 7.** Perform analysis and evaluation of the reliability efficiency of machine-building equipment, analyze and evaluate the product life cycle through the synthesis of various concepts, theories, objective patterns used in assessing the strength and reliability of objects in mechanical engineering; **LO 8.** It is scientifically justified to choose modern materials, knowledge–intensive and additive technologies in the implementation of production and technical activities. **LO 9.** Apply modern technologies of open production and open source, virtual (VR) and augmented (AR) reality, reverse engineering and 3D modeling technologies, prototyping and the use of Big Data Analytics in the design and management of production.

3 THE COMPETENCE OF GRADUATE EP

GENERAL COMPETENCIES (SOFT SKILLS). Behavioral skills and personal qualities	
GC 1. Competence in managing one's literacy	GC 1.1. Ability to solve problems of their own professional and personal development; GC 1.2. The ability to use logical thinking to make decisions and implement them in practice.
GC 2. Language competence	GC 2. The ability to possess the skills of scientific communication in a foreign language, competent communication in scientific and professional activities.
GC 3. Mathematical competence and competence in the field of science	GC 3. The ability to professionally use information technology for mathematical processing of scientific data, communication and exchange.
GC 4. Digital competence, technological literacy	GC 4. The ability to be productive in the subject area on the basis of information and computer technologies, relying on existing experience and constantly improving and expanding its boundaries.
GC 5. Personal, social and educational competencies	GC 5.1. The ability to creatively analyze and evaluate modern scientific achievements, modern problems and prospects of socio-economic development of Kazakhstan; GC 5.2. The ability to generate ideas, predict the results of innovative activities, implement large-scale changes in the professional and social sphere
GC 6. Entrepreneurial competence	GC 6.1. The ability to develop creative and entrepreneurial skills of the team, to be prepared for the implementation of management functions and to solve professional problems in the interests of the organization as a whole based on a deep understanding of the features of the market economy, the functions and economic role of the state; GC 6.2. Ability to manage complex production processes and scientific projects with decision-making in conditions of uncertainty and risk.
GC 7. Cultural awareness and self-expression	GC 7. Ability to demonstrate awareness of social responsibility and commitment to civilized ethical standards of behavior in scientific work and business.
PROFESSIONAL COMPETENCIES (HARDSKILLS).	
Theoretical knowledge and practical skills specific to this field	PC 1. Ability to create strategies for functioning and corporate governance, intersectoral interaction and lean manufacturing, design of large institutional structures of the industry;
	PC 2. The ability to plan, develop and analyze the results of business processes, risks and opportunities of the enterprise that can lead to significant changes, organization of maintenance, repair, modernization and testing of machinery and equipment;
	PC 3. The ability to solve problems of increasing the efficiency of machine-building industries on the basis of modern research methods of technological and production processes;
	PC 4. The ability to establish regularities and interrelations of technological processes of forming machine-building products, as well as technical and technological means of implementing processes at the stage of their creation and operation;

	PC 5. Ability to analytical, system, design, environmental and logical thinking, modeling and experimental research of new processes of mechanical and physico-technical processing, materials research at the molecular and atomic level;
	PC 6. Ability to design, calculate and optimize technological processes, develop design documentation of mechanical engineering products based on 3D scanning and prototyping;
	PC 7 The ability to set and solve innovative tasks related to the development of methods and technical means that increase the strength and reliability of engineering industry facilities using deep fundamental and specialized knowledge, analytical methods and complex models.

3.1 Matrix of correlation of learning outcomes on the EP as a whole with the competencies being formed

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9
GC 1	+				+				+
GC 2			+	+			+		
GC 3		+		+	+				
GC 4		+	+	+	+			+	
GC 5	+					+	+		+
GC 6		+	+				+	+	+
GC 7	+					+		+	
PC 1	+		+			+			
PC 2	+			+			+		
PC 3	+	+				+	+	+	
PC 4				+	+				+
PC 5	+		+	+	+	+			+
PC 6		+			+			+	
PC 7		+	+			+	+	+	+

4. MATRIX OF THE INFLUENCE OF MODULES AND DISCIPLINES ON THE FORMATION OF LEARNING OUTCOMES AND INFORMATION ON LABOR INTENSITY

№	Name of the module	cycle	component	Name of the discipline	Number of credits	Generated learning outcomes (codes)								
						LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9
1	Scientific Research Methods and Academic Writing	BD	HsC	Academic writing	3			v						
		BD	HsC	Scientific research methods	4						v		v	
		BD	EC	Methods of forecasting the life cycle of mechanical engineering article manufactured	6							v		
		BD	EC	Instrumental support of modern machine-building production						v				
2	Highly efficient production and digitalization in mechanical engineering	PD	EC	Modern materials and technologies in mechanical engineering	6				v				v	
		PD	EC	Scientific foundations of production management		v					v			
		PD	EC	Digital design and object modeling technologies in mechanical engineering	6		v							v
		BD	HsC	Pedagogical Practice	10				v					
				Research Practice	10			v			v			
3	Module of scientific- research work and Final Certification			Research work of a doctoral student	123		v	v	v		v		v	
				Writing and defending a doctoral dissertation	12	v	v	v	v	v	v	v	v	v

4 MATRIX OF THE INFLUENCE OF DISCIPLINES ON THE FORMATION OF LEARNING OUTCOMES AND INFORMATION ON LABOR INTENSITY

№	Name of the module	cycle	component	Name of the discipline	Name of the module	Number of credits	Generated learning outcomes (codes								
							LO 1	LO 2	LO 3	LO 4	LO5	LO 6	LO 7	LO 8	LO 9
1	Scientific Research Methods and Academic Writing	BD	HsC	Academic writing	Purpose: to develop and improve competencies in field of written scientific communication, providing a high level of doctoral students training necessary for effective communication in academic environment. Content: Features of academic writing. General requirements for scientific work. Types of academic texts. Presentation style. Errors in written scientific papers. Magazine selection. Working with sources. References and citation rules. Plagiarism. Compiling a bibliography. Structuring and preparation for writing a scientific text. Practical recommendations for writing a scientific text. Writing a scientific text.	3			v					
		BD	HsC	Scientific	Purpose: formation of knowledge	4						v		v	

				research methods	about the classification of scientific research, their main types, scientific documents and publications on scientific activity. Contents: Introduction. Organization of work with scientific literature (books, monographs, patents). Creative potential. Stages of research work. Ways to solve the research problems. Registration and implementation of research results. Research results.										
		BD	EC	Methods of forecasting the life cycle of mechanical engineering article manufactured	Purpose: to form the skills of designing and managing the life cycle of products based on high-tech innovative enterprises Contents: The purpose and essence of functional modeling of the life cycle of science-intensive products. Tools for functional modeling of the life cycle of science-intensive products. Object-oriented modeling of the product life cycle, distinctive features. Basic operations on data in the life cycle management of science-intensive products. Logical life cycle design. Conceptual models of life cycle management tasks. Problems of production planning in life cycle management systems. Reliability of	6							v		

					engineering products from the point of view of the life cycle, consisting of stages: design, manufacture, operation, disposal of the facility. Creation of a model of a high-tech innovative enterprise.										
		BD	EC	Instrumental support of modern machine-building production	Purpose: familiarization with the basics of knowledge in general issues of tool support and equipment of automated machine-building production. Content: The system of instrumental support. Subsystem of instrumental materials. The structure of instrumental systems. Features of tool support in automated production. Information and material flows on instrument support. Auxiliary tool systems. Basing and anchoring systems. Systems of replaceable nozzles. Complex profiling of disk tools for processing screw surfaces. The algorithm of complex profiling of tools that process screw surfaces. Computer-aided design of the tool system. Instrumental modular systems. The main directions and tasks for solving modern problems of instrumental support of machine-building industries.						v				

2	Highly efficient production and digitalization in mechanical engineering	PD	EC	Modern materials and technologies in mechanical engineering	The purpose of the discipline: The purpose of the discipline: the formation of knowledge about new materials and the production of products, modern technologies for processing materials that are competitive in the world market of engineering production. Content of discipline: Metals and new metal alloys. Materials of powder metallurgy. Ceramic materials and their types. Fiber composites. Composites with metal, polymer and carbon matrices. Classification of nanostructured materials. New processing methods in mechanical engineering. Thermal methods for controlling the physical and chemical properties of materials. Blade processing methods and directions of their intensification. New methods of abrasive processing. Methods of plastic deformation of surfaces. Additive technologies. Electrochemical and electrophysical processing methods.	6				v				v	
		PD	EC	Scientific foundations of production management	Purpose: familiarization with the conceptual foundations of the formation of the production (operational) strategy of the enterprise; formation of a managerial worldview		v					v			

					in the field of production based on knowledge of the characteristics of industrial enterprises and service enterprises; education of managerial culture skills in the field of production management. Content: Management of the process of formation of the production system. Planning of production activities. Operational management in production. Improving the performance of production systems. Lean manufacturing. Integrated product and process development. Methodology for assessing quality and competitiveness. Innovation as a source of enterprise development. Automated production management systems.										
		PD	EC	Digital design and object modeling technologies in mechanical engineering	Purpose: to form students' professional competencies in the field of development, design and manufacture of products using direct digital manufacturing technologies for machine-building products; in the field of modernization of existing and design of new efficient machine-building industries for various purposes. Content: The concept of direct digital	6		v							v

					production. The use of direct digital production technologies to solve various problems of mastering new products. Direct digital production modules. Digitization methods and control and measuring machines. Direct digital production modules. Rapid prototyping. Computer integration of production; Software and information support of automation systems of technological processes; Development of computer-aided design systems.										
		BD	HsC	Pedagogical practice	Purpose: formation of professional and personal competencies necessary for the organization of the educational process in higher education. Content: Introduction. Global trends in the development of education and modernization of higher and postgraduate education in the Republic of Kazakhstan . Modern pedagogical theories and educational technologies of teaching and upbringing at the university. Innovative forms of organization and management of the educational process of higher education. Psychological foundations of teaching and education of future specialists. Individual work plan for the period of pedagogical practice.	10				v					

					Curricula, syllabuses on the disciplines of the educational program and the teaching and methodological documentation of the department, the principles of their compilation and development.										
				Research practice	Purpose: to master the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as the consolidation of practical skills, the use of modern methods of scientific research, processing and interpretation of experimental data in dissertation research. Contents: Introduction. Conducting an analytical review of literary sources. Conducting experimental research work. The results of research to optimize the operational and design parameters of the object under study. Information technologies and computer programs in the processing of research results. Modern methods of scientific research. Methods of analysis and processing of experimental and empirical data.	10			v			v			
3	Module of final certificati			Research work of a doctoral student	Purpose: to demonstrate a systematic understanding of the field of study, mastering the skills and research	123		v	v	v		v		v	

	on				methods used in the field of mechanical engineering. Content: Selection of the topic of the dissertation. Works of domestic and foreign scientists. Participation in conferences and projects of young scientists. Writing articles. Reference and bibliographic system. Modern IT technologies and online platforms. Domestic and foreign electronic database. Scientific internship. The empirical base of the study. Dissertation work. National Center for State Scientific and Technical Expertise.										
				Writing and defending a doctoral dissertation	Purpose: to confirm the competencies acquired in the course of training in accordance with the chosen specialization of training. Content: defense of a doctoral dissertation in dissertation councils in the direction. The procedure and regulations for the defense of a doctoral dissertation are established by the regulations on the dissertation council in the specialty.	12	v	v	v	v	v	v	v	v	v

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

Course of Study	Semester	The number of mastered modules	The number of studied disciplines		Number of KZ credits					Total hours	Total KZ credits	The number of	
			HSC	EC	Theoretical training	Pedagogical practice	Research practice	Research work of a doctor student	final examination			exam	dif. test
1	1	2	2	3	25			5		900	30	6	1
	2	2				10		20		900	30		2
2	3	2					10	20		900	30		2
	4	1						30		900	30		1
3	5	1						30		900	30		1
	6	1						18	12	900	30		2
Total			3	3	25	10	10	123	12	5400	180	6	9

6. LEARNING STRATEGIES AND METHODS, MONITORING AND EVALUATION

Learning strategies	Student–centered learning: The student is the center of teaching/learning and an active participant in the learning and decision-making process. Practice-oriented training: orientation to the development of practical skills.
Teaching methods	Conducting lectures, seminars, various types of practices: • application of innovative technologies: • problem-based learning; • case study; • group work; • discussions and dialogues, quizzes; • presentations; • lecture with analysis of specific situations; • lecture-visualization; • lecture-consultation; • round table; • situational analysis; • analysis of production documentation. • solving situational problems. • rational and creative use of information sources: • multimedia training programs; • electronic textbooks; • digital resources. Organization of independent work of students, individual consultations.
Monitoring and evaluation of the achievability of learning outcomes	Current control on each topic of the discipline, control of knowledge in classroom and extracurricular classes (according to syllabus). Assessment forms: • survey in the classroom; • testing on the topics of the discipline; • control works; • protection of independent work; • discussions; • colloquiums; • essays, etc. Boundary control at least twice during one academic period within the framework of one academic discipline. Intermediate certification is carried out in accordance with the working curriculum, academic calendar. Forms of holding: • exam in the form of testing; • oral exam; • written exam; • protection of practice reports; • differentiated credit. Final certification.

7. EDUCATIONAL AND RESOURCE SUPPORT OF THE EP

Information Resource Center	The structure of the JRC has 6 subscriptions, 16 reading rooms, 2 electronic resource centers (IRC). The basis of the network infrastructure of the OIC consists of 180 computers with Internet access, 110 automated workstations, 6 interactive whiteboards, 2 video doubles, 1 videoconferencing system, 3 scanners of A-4 format, 3. The software of the OIC – AIBS "IRBIS-64" for MSWindows (a basic set of 6 modules), an autonomous server for uninterrupted operation in the IRBIS system. The library fund is reflected in the electronic catalog available to users on the website http://lib.ukgu .kz is on-line 24 hours 7 days a week. Thematic databases of their own generation have been created: "Almamater", "Works of scientists of SKSU", "Electronic Archive".Online access from any device 24/7 via an external linkhttp://articles.ukgu.kz/ru/pps. Working with catalogs in electronic form. The EC consists of 9 databases: "Books", "Articles", "Periodicals", "Works of the teaching staff of SKSU", "Rare books", "Electronic Fund", "SKSU in print", "Readers" of "SKU". The JIC provides its users with 3 options for accessing its own electronic information resources: from the Electronic Catalog terminals in the catalog hall and divisions of the JIC; through the university's information network for faculties and departments; remotely on the library's website http://lib.ukgu.kz /. Access to international and republican resources is open: "SpringerLink", "Envoy", "Web of Science", "EVSSO", "Epigraph", to electronic versions of scientific journals in open access, "Zan", "RMEB", "Adebiet", Digital library "Akpigress", "Smart-kitar", "Kitar.kz", etc. For people with special needs and disabilities, the library's website has been adapted to the work of visually impaired users in the JRC.
Material and technical base	The EP is implemented in 7 educational and research laboratories, a computer classroom connected to the Internet, 2 classrooms equipped with an interactive whiteboard and a multimedia projector, an educational and methodological office. Laboratory base In the process of training and conducting research, doctoral students use the laboratory base of the department, as well as the services of IRLIP and factory laboratories of Kazgeomash LLP, KARLSKRONA LLP, Asia Trafo LLP, Kazmedpribor Holding LLP, Etalon Plant LLP, DDEK LLP. Laboratories of the department 114 – A.Ainabekov Educational and Research, Scientific Laboratory of Mechanical Tests; 116 – Educational and research Laboratory of cutting theory; 126B - educational laboratory "Theory of machines and mechanisms"; 128 B - Materials Science Training Laboratory,

	131B – educational laboratory "Technology of mechanical engineering"; 134B – educational laboratory "Machine parts"; 136B – educational laboratory "Materials Science and foundry processes"; Building 16 is an educational and research workshop. Classroom fund: in the presence of a specialized physics, chemistry and mathematics room, as well as a computer class 133B.

APPROVAL SHEET

by Education Program 8D07120 «Mechanical Engineering»

Director of AID _____ A.S.Naukenova

Director of ASD _____ U.B.Nazarbek

Director of DEC _____ T.S.Bazhirov

REVIEW
for a modular educational program
8D07120 – Mechanical engineering
developed at SKSU im. M.Auezov, Shymkent

1. Brief description of the enterprise and the profile of its activities

LLP "KARLSKRONA LC / AB" is a manufacturer of pumping, electrical, non-standard equipment and valves used in the field of water supply, water treatment, heating, sewerage, the company also cooperates and supplies equipment to subsoil users and other industries.

The company provides professional and prompt warranty and post-warranty Service (preventive maintenance and emergency repair).

LLP "KARLSKRONA LC / AB" pays great attention to the development of its Service department, expanding the range of services provided and improving the qualifications of its employees. The plant is equipped with advanced technologies and modern machine-building equipment, including metal-working machines and machining centers. "KARLSKRONA LC / AB LLP" is an authorized service partner of the world's largest equipment manufacturers.

2. Relevance and demand of EP

Modern trends in the development of production in the southern region of the Republic of Kazakhstan are defined in a number of successive programs of industrial and innovative development of our state. One of the important priority areas is the development of domestic engineering. The level of development of the machine-building industry is one of the important indicators of the state economy. As you know, mechanical engineering includes a number of sub-sectors, including those important for our region, such as metallurgy, chemical, energy, lifting and transport, railway, tractor, agricultural, aviation, electrical, electronic and radio industries, as well as the automotive industry, which has received a powerful impetus. Therefore, the problem of personnel training for modern machine-building enterprises is very relevant. The demand for the EP "8D07120 – Mechanical Engineering" is concluded in the graduates receiving readiness for organizations of science, higher education and key industries

3. Learning outcomes and competencies, their relationship with labor market demands

The results of the training are presented in all modules and components of EP 8D07120 – "Mechanical Engineering" and are aimed at obtaining general and professional competencies by students. The competencies of the graduate in the EP "8D07120 – Mechanical Engineering" meet the expectations and requirements of modern machine-building industries. I would especially like to mention such key competencies as:

- perform mathematical modeling of processes and objects based on standard computer-aided design and research packages;
- to use the organizational and legal foundations of management and entrepreneurial activity;
- to study the research of problems in the field of management and marketing and use the results obtained to improve the methods of enterprise management.

A modern enterprise, first of all, has to solve precisely the problems of automation of production processes and commercial activities. Therefore, the learning outcomes and competencies of graduates of the OP are also very

4. Availability of components that develop practical skills

A number of components of the modules of the specialty EP 8D07120 – Mechanical Engineering are aimed at acquiring students' practical skills in the specialty. These are

disciplines related to research methods, methods of forecasting the life cycle of products in mechanical engineering, as well as modern materials and technologies in mechanical engineering, which include the scientific foundations of production management, digital design technologies and object modeling in mechanical engineering. As a result of the dissertation work and the development of disciplines, students receive practical skills to work on the development of progressive technological processes and optimal production modes for simple types of products or its elements. Passing a research internship after a course of theoretical training, as well as pedagogical practice, allows you to consolidate the acquired knowledge and acquire practical, communicative skills of working in production. As bases of the proposed production practice

5. Content of the educational program (modules, disciplines)

EP "8D07120 – Mechanical Engineering " is developed on the basis of a modular approach to the construction of a training program on OP. It contains general, additional modules of disciline that go beyond the qualification. Each group of modules is aimed at obtaining the relevant competencies presented in the corresponding tables "Content of modules". As a result of mastering each module, students acquire certain competencies. Disciplines are organized into modules in order to obtain certain pedagogical and professional competencies.

The modules of the specialty include disciplines that meet the modern requirements of machine-building enterprises. It is particularly necessary to note such important areas as modern materials and technologies in mechanical engineering, digital design and object modeling technologies in mechanical engineering, as well as the scientific foundations of production management.

6. The quality of the modular guide

The modular reference book contains a description of the modules, the amount in credits and the weekly workload of students. The content of the modules and the results of training aimed at obtaining professional and universal competencies of students are presented in detail. The relevant literature is indicated. Textbooks and manuals are recommended in the updated edition for the last 10 years, textbooks and modern periodical literature in English are also presented. The modules are designed taking into account the logical connection and sequence of studying disciplines, which allows you to gradually increase the level of acquired competencies.

7. Opinion on EP

The educational program "8D07120 – Mechanical Engineering", developed at the M. Auezov SKU within the framework of the OP, fully corresponds to the specified specialty, meets the requirements of the state standard of higher education (doctoral studies), as well as the requirements of modern machine-building enterprises of the Republic of Kazakhstan and world standards of enterprises of the machine-building industry. The modular principle of OP construction and the competence approach allow students to gain in-depth professional knowledge, skills and abilities necessary for the operational adaptation of a specialist in the conditions of modern production.

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