

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC  
OF KAZAKHSTAN

M.Auezov SOUTH KAZAKHSTAN UNIVERSITY



**EDUCATION PROGRAMME**

**8D07160 - Chemical technology of inorganic substances**

Registration number	8D07100002
Code and classification of the field of education	8D07 - Engineering, Manufacturing and Civil Engineering
Code and classification of training areas	8D071 - Engineering and engineering Trades
Group of educational programs	D097 - Chemical engineering and processes
Type of EP	Active
ISCE level	8
NQF level	8
IQF of education level	8
Language of learning	English, Kazakh, Russian
Complexity of the EP	180 credits
Distinctive features of EP	-
University Partner ( JEP )	-
University Partner ( TDEP )	-

Shymkent, 2023

Authors:

Name	Position	Sign
Seitmagzimova G.M.	C.i.s., professor of TI&PCP department	
Kadirybayeva A.A.	C.i.s., associate professor of TI&PCP department	
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Asilov A.A.	General Director of LLP "KAZNIIHIMPROEKT"	

The Education Program was considered by the Academic Committee on "Engineering and engineering business" training direction, Minutes № 4 from « 24 » 01 2023.

Chairman of Academic Commission  M. Aitureyev

The EP was considered and recommended for approval at a meeting of Educational and Methodical Council of M. Auezov SKU

Minutes № 4 " 22 " 02 2023.

Chairman of EMC  Abisheva R.Zh.

Approved by the decision of the Academic Council of the University  
Minutes № 13 from 23.02 2023.

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC  
OF KAZAKHSTAN

M.Auezov SOUTH KAZAKHSTAN UNIVERSITY

«APPROVED»  
Chair of the Board –  
Rector \_\_\_\_\_ d.h.s.,  
academician Kozhamzharova D.P.  
«\_\_» \_\_\_\_\_ 2023

**EDUCATION PROGRAMME**

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# 1 CONCEPT OF THE EDUCATION PROGRAM

<b>The university mission</b>	We are focused on generating new competencies, training a leader who translates research thinking and culture.
<b>University values</b>	<ul style="list-style-type: none"> <li>• Openness – open to change, innovation and cooperation.</li> <li>• Creativity – generates ideas, develops them and turns them into values.</li> <li>• Academic freedom - free to choose, develop and act.</li> <li>• Partnership – builds trust and support in relationships where everyone wins.</li> <li>• Social responsibility - ready to fulfill obligations, make decisions and be responsible for their results.</li> </ul>
<b>Graduate Model</b>	<ul style="list-style-type: none"> <li>• Deep subject knowledge, its application and constant expansion in professional activity.</li> <li>• Information and digital literacy and mobility in a rapidly changing environment.</li> <li>• Research skills, creativity and emotional intelligence.</li> <li>• Entrepreneurship, independence and responsibility for their activities and well-being.</li> <li>• Global and national citizenship, tolerance for cultures and languages.</li> </ul>
<b>EP uniqueness</b>	<ul style="list-style-type: none"> <li>• Practice orientation and orientation to the regional labor market and social order through formation of graduate professional competencies, adjusted to stakeholders requirements.</li> <li>• Based on integration of educational, methodological and research training and aimed at developing analytical thinking and entrepreneurship that will allow to be competitive in the domestic and international labor market.</li> </ul>
<b>Academic Integrity and Ethics Policy</b>	<p>The university has taken measures to maintain academic honesty and academic freedom, protection from any kind of intolerance and discrimination:</p> <ul style="list-style-type: none"> <li>• Rules of academic integrity (Order No. 212-ҢҚ dated 10.10.2022);</li> <li>• Anti-Corruption Standard (Order No. 221-ҢҚ dated 07.12.2021).</li> <li>• Code of Ethics (order No. 212-ҢҚ dated 10.10.2022).</li> <li>• Anti-Corruption Policy of the NJSC “M. Auezov South Kazakhstan University.” (order No. 144 нқ dated 07.14.2022).</li> </ul>
<b>Legal framework for EP development</b>	<ol style="list-style-type: none"> <li>1 Law of the Republic of Kazakhstan "On Education" No. 319-III dated July 27, 2007;</li> <li>2. Standard rules of activity of educational organizations implementing educational programs of higher and (or) postgraduate education, approved by Order of the Ministry of Education and Science of the Republic of Kazakhstan dated October 30, 2018, No. 595</li> <li>3. State obligatory standards of higher and postgraduate education, approved by order of the Ministry of Education and Science of the Republic of Kazakhstan dated July 20.2022 No. 2;</li> <li>4. Rules for organizing the educational process on credit technology of education, approved by order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152;</li> </ol>

	<p>5. Qualification directory of positions of managers, specialists and other employees, approved by order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan dated December 30, 2020 No. 553.</p> <p>6. Guidelines for the use of ECTS.</p> <p>7. Guidelines for the development of educational programs for higher and postgraduate education, Appendix 1 to the order of the Director of the Center for the Bologna Process and Academic Mobility No. 45 o / d dated June 30, 2021</p>
<b>Organization of the education process</b>	<ul style="list-style-type: none"> <li>• Implementation of the Bologna Process principles</li> <li>• Student-centered learning</li> <li>• Availability</li> <li>• Inclusiveness</li> </ul>
<b>EP quality assurance</b>	<ul style="list-style-type: none"> <li>• Internal quality assurance system</li> <li>• Involvement of stakeholders in the EP development and its evaluation</li> <li>• Systematic monitoring</li> <li>• Updating the content</li> </ul>
<b>Requirements for applicants</b>	Set according to Standard Rules for admission to training in educational organizations realizing educational programs of higher and postgraduate education (order of MES RK №600 of 31.10.2018).
<b>Conditions for the implementation of educational programs (EP) for persons with disabilities and special educational needs (SSN)</b>	<p>For students with SEN (special educational needs) and persons with disabilities (PSI), tactile PVC tiles, specially equipped toilets, a mnemonic diagram, and shower bars have been installed in educational buildings and student dormitories. Special parking spaces have been created. Crawler lift installed. There are desks for people with limited mobility (PLM), signs indicating the direction of movement, ramps. In the educational buildings (main building, building No. 8) there are 2 rooms with six working places adapted for users with disorders of the musculoskeletal system (DMS). For visually impaired users, the SARA™ CE Machine (2 pcs.) is available for scanning and reading books. The library website is adapted for the visually impaired. There is a special NVDA audio program with a service. The JIC website <a href="http://lib.ukgu.kz/">http://lib.ukgu.kz/</a> is open 24/7.</p> <p>An individual differentiated approach is provided for all types of classes and in the organization of the educational process.</p>

# 1 PASSPORT OF THE EDUCATION PROGRAM

<b>EP Goal</b>	Training of in-demand scientific personnel - PhD doctors for higher education, research institutions, as well as enterprises of the chemical industry.
<b>EP objectives:</b>	<ul style="list-style-type: none"> <li>• providing conditions for the acquisition of a high intellectual level of development, mastering logical and critical thinking to summarize the results of research and defend their own scientific ideas for the development of new technologies;</li> <li>• development of capability to use the acquired knowledge in professional activities to solve scientific and pedagogical, managerial and technological problems, formation of skills of interaction in the scientific community, including at the international level;</li> <li>• development of skills of autonomy, leadership, pedagogical and scientific ethics of the researcher and continuing education throughout the professional activity.</li> </ul>
<b>Harmonization of EP</b>	<ul style="list-style-type: none"> <li>• 8<sup>th</sup> level of the National Qualifications Framework of the Republic of Kazakhstan;</li> <li>• Dublin descriptors of the 8<sup>th</sup> level of qualification;</li> <li>• 3 cycle of a Framework for Qualification of the European Higher Education Area);</li> <li>• 8<sup>th</sup> Level of European Qualification Framework for Lifelong Learning).</li> </ul>
<b>EP communication with the professional sphere</b>	<ul style="list-style-type: none"> <li>• Attachment No. 2 to the Industry qualifications framework "Chemical production" (Approved by the minutes of the Meeting of industry commissions on social partnership and regulation of social and labor relations for mining and metallurgical, chemical, construction and woodworking, light industry and mechanical engineering on August, 16<sup>th</sup>, 2016 (minutes № 1);</li> </ul>
<b>Name of the degree awarded</b>	Persons, who have mastered the EP of doctoral studies and defended a PhD thesis, with a positive decision of the dissertation councils of the OHPE with a special status or the Committee for Quality Assurance in Education and Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan, are awarded the PhD degree on the EP «8D07160-Chemical technology of inorganic substances»
<b>List of qualifications and positions</b>	<ul style="list-style-type: none"> <li>• research scientist;</li> <li>• senior lecturer in educational institutions;</li> <li>• leading technologist;</li> <li>• project manager in research institutions and design organizations;</li> <li>• head of production, technical director at enterprises for production of inorganic substances and compounds.</li> </ul>
<b>Professional area</b>	<ul style="list-style-type: none"> <li>• research institutions of chemical engineering;</li> <li>• manufactures of inorganic substances and compounds;</li> <li>• higher educational institutions in the field of specialty.</li> </ul>
<b>Objects of professional activity</b>	<ul style="list-style-type: none"> <li>- all kinds of inorganic synthesis products;</li> <li>- mineral and technogenic raw materials;</li> <li>- industrial production of phosphorus, ammonia, fertilizers and acids;</li> <li>- industrial plants and technological equipment for the production of inorganic substances and compounds;</li> <li>- analytical devices in research laboratories;</li> <li>- technique of research and analysis methods;</li> <li>- research and scientific projects;</li> <li>- design documentation;</li> </ul>



	<ul style="list-style-type: none"> <li>- management of primary labor collectives;</li> <li>- educational and methodical documentation, technical means of training;</li> <li>- research work.</li> </ul>
<b>Subjects of professional activity</b>	<ul style="list-style-type: none"> <li>- investigation of inorganic compounds;</li> <li>- improvement of technological processes and equipment;</li> <li>- modernization of existing production facilities;</li> <li>- analysis and solution of problematic industrial situations;</li> <li>- design of production of inorganic substances;</li> <li>- management of research projects;</li> <li>- management of scientific work of master students and bachelor students;</li> <li>- development of plans for development of an unit or an enterprise;</li> <li>- patent activity;</li> <li>- teaching the special disciplines on chemical engineering;</li> <li>- education of students.</li> </ul>
<b>Kinds of professional activity</b>	<ul style="list-style-type: none"> <li>- research activities in the field of chemical technology of inorganic substances;</li> <li>- scientific and pedagogical activity in higher educational institutions;</li> <li>- design and organizational activities in design institutes;</li> <li>- management activity.</li> </ul>
<b>Learning outcomes</b>	<p><b>LO1</b> Organize and plan scientific research in the field of technology of inorganic compounds; conduct independent scientific research, characterized by academic integrity, based on modern theories and methods of analysis.</p> <p><b>LO2</b> Systematize scientific information, effectively use modern research methodology and demonstrate the effectiveness of selected scientific methods in the field of technology of inorganic substances.</p> <p><b>LO3</b> Organize professional activities on a scientific basis with the use of innovative teaching methods, apply modern methods of mathematical processing of scientific data using information technology.</p> <p><b>LO4</b> Effectively manage the team, show leadership qualities, creativity and critical thinking when making operational management and technical decisions in unusual situations in professional activities.</p> <p><b>LO5</b> Develop scientific projects, submit them to the competition for grant funding and manage scientific domestic or international project in the field of production of inorganic compound</p> <p><b>LO6</b> Scientifically substantiate the optimal technological regimes, propose ways to modernize production, new ways to dispose of man-made waste, prepare applications for the protection of intellectual property rights.</p> <p><b>LO7</b> Plan, predict and coordinate the testing and implementation of the developed technologies of mineral acids, salts and fertilizers based on industrial chemical waste in existing industries.</p> <p><b>LO8</b> Analyze and summarize new scientific data in the scientific report and publications in international peer-reviewed scientific journals; report their own scientific ideas and prove the practical significance of the research results to an audience of specialists.</p> <p><b>LO9</b> Apply knowledge and skills to problem analysis in interdisciplinary related fields of knowledge; develop acquired skills throughout life.</p>

### 3 COMPETENCIES OF A GRADUATE OF THE EDUCATION PROGRAM

<b>GENERAL COMPETENCIES (SOFT SKILLS). Behavioral and personal skills</b>	
GC 1. Literacy management	GC 1.1. The ability to solve problems of own professional and personal development. GC 1.2. Ability to use logical thinking to make decisions and implement them in practice.
GC 2. Language competence	GC 2.1. The ability to master the skills of scientific communication in foreign language, competent communication in scientific and professional activities.
GC 3. Mathematics and science competence.	GC 3.1. The ability to professionally use information technology for mathematical processing of scientific data, communications and exchange.
GC 4. Digital competence and technological literacy	GC 4.1. The ability to work productively in the subject area based on information and computer technologies, relying on existing experience and constantly improving and expanding its boundaries
GC 5. Personal, social and educational competence	GC 5.1. The ability to creatively analyze and evaluate modern scientific achievements, modern problems and prospects for the socio-economic development of Kazakhstan; GC 5.2. Ability to generate ideas, predict the results of innovation, implement large-scale changes in the professional and social sphere.
GC 6. Entrepreneurship competence	GC 6.1. The ability to develop creative and entrepreneurial skills of a team, be prepared to carry out management functions and solve professional problems in the organization interests as a whole based on deep understanding of market economy features, functions and economic role of the state; GC 6.2. The ability to manage complex industrial processes and scientific projects with decision-making under conditions of uncertainty and risk.
GC 7. Cultural awareness and self-expression	GC 7.1. The ability to demonstrate awareness of social responsibility and adherence to civilized ethical standards of behavior in scientific work and business.
<b>PROFESSIONAL COMPETENCIES (HARD SKILLS).</b>	
PC 1. Research competence	PC 1.1. Ability to independently design and implement theoretical and empirical research in the field of chemical technology of inorganic substances and generalize the results of scientific work; PC 1.2. The ability to analyze and optimize technologies, modernize the existing production of inorganic substances and compounds based on the results of their own research.
PC 2. Methodological competence	PC 2.1. Ability for detailed analysis of scientific and technical information, interpretation and reflection of new scientific data based on the methodology of scientific research; PC 2.2. The ability to apply new methods of teaching specialized disciplines in pedagogical activities.

### 3.1 Matrix of correlating the EP learning outcomes as a whole with formed competencies

	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	+	+	+					+	



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

№	Module title	Cycle	Component	Component title	Brief discipline description	Number of credits	Formed LO (codes)									
							LO 1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	
1	Module of Scientific Substantiation of Technology	BD	HSC	Academic writing	<p>Goal: To familiarize doctoral students with principles of planning, writing, editing and reviewing a scientific manuscript.</p> <p>Contents: Structural elements of an article: introduction, main part, conclusion; citation and references to works of other authors; awareness of the future audience; clarity and accuracy of statements; following the rules of punctuation, grammar and spelling. Selecting a scientific journal to publish the experimental results. Mastering the practice of academic writing, presentation of the manuscript, preparation for publication in scientific journals.</p>	3	V								V	
2		BD	HSC	Research methods	<p><b>Goal:</b> Formation of research competence and ability to apply the acquired knowledge and skills in scientific research implementation.</p> <p><b>Contents:</b> Principles of scientific knowledge, design stages of scientific research: conceptual, technological and reflexive phases. Criteria for effectiveness of scientific research, hypotheses, creation of a research program. Methodology of an experiment, methods of processing the measurement results, ability to comprehend scientific activities.</p>	4	V	V								V

				Formation of ethical standards of implementation and resource information base of scientific work, problem analysis skills in related fields of knowledge.											
3		BD	EC	Management of Scientific Projects of Inorganic Compounds' Productions	<p><b>Goal:</b> Formation of skills to develop, implement and adapt projects leading to acquisition of new knowledge and new solutions.</p> <p><b>Contents:</b> Principles of preparation of scientific projects in the field of inorganic substances' production for research competition for grant funding. Personnel and communications management of the project, time management, quality and risks of the project. Project implementation control, evaluation of the effectiveness of research work. Summarizing research results in a report and scientific publications.</p>	6	V			V	V				V
4		BD	EC	Management of Scientific Projects of Electrochemical Productions	<p><b>Goal:</b> Formation of skills to independently develop a scientific project in the field of electrochemical production technology.</p> <p><b>Contents:</b> Preparation of competitive documentation for grant funding for scientific programs. Development of a project concept, compiling a calendar plan of work, development of a Gantt chart, management of all project processes. Justification of the research project relevance. Organization, planning and control of scientific research in the field of electrochemical technology. Research group and research environment. Estimate and financial calculations of the work cost.</p>		V			V	V				V
5				Pedagogical Practice	<p><b>Goal:</b> Formation of practical skills of scientific and pedagogical activity of a teacher of higher education, mastering the</p>	10			V	V					V

					<p>bases of pedagogical skills, independent conduct of educational and teaching work.</p> <p><b>Contents:</b> Formation of pedagogical competencies for development of educational and methodical documentation to ensure the educational process, conducting training classes using innovative active teaching methods. Organization of educational work in groups, showing tact and tolerance towards students, scientific and pedagogical activities using new knowledge in the field of technology of inorganic substances.</p>											
6	Module of New Technological Aspects	PD	EC	Optimization of Chemical-Technological Substances	<p><b>Goal:</b> Analysis and synthesis of complex chemical-technological processes to optimize them.</p> <p><b>Contents:</b> Problems of system analysis and optimization and modeling the technological processes based on a systematic approach. Principles of managing processes and systems. Systems of regulation and control of technological processes. Multilevel optimization of processes and systems of chemical technology. Solving problems of mathematical modeling of technological processes. Analytical and statistical methods of mathematical processing of experimental data.</p>	6			V			V				V
7		PD	EC	Innovative Technologies of Inorganic Substances	<p><b>Goal:</b> Analysis and evaluation of modern technologies of inorganic substances based on substandard raw materials.</p> <p><b>Contents:</b> Current level of scientific research in the field of technology of inorganic substances, innovative technologies for processing</p>				V			V	V			

				substandardraw materials and technogenic industrial wastes with solving problematic industrial situations, improving the technology of liquid and suspended complex fertilizers. Improvement of technology and equipment for production of inorganic substances. Performing kinetic and thermodynamic analysis of technological processes using computer programs.											
9		PD	EC	The latest Achievements in Applied Electrochemistry	<b>Goal:</b> Formation of skills in technical and economic analysis of methods of electrochemical production. <b>Contents:</b> Achievements in the field of applied electrochemistry, new methods of purification and regeneration of solutions. Modern methods of applying protective and decorative coatings, processing waste from electrochemical processes. Peculiarities of deposition of metal coatings on dielectric materials. Coating of noble metals (silvering, gilding). Modern galvanic cells and batteries. Application of knowledge of the regularities of electroplating processes in professional activities.	6		V				V	V		
10		PD	EC	Technology of Nitric-Acid Processing Phosphate Raw Materials	<b>Goal:</b> Study of kinetics of natural phosphates' decomposition by nitric acid. <b>Contents:</b> Separation of fluorine compounds, phosphates of rare earth elements from nitric acid solution. Methods for removing excess calcium from nitric acid extract. Modern schemes for processing of nitric acid extract based on scientific information in the field under study. Characteristics of solid phases that precipitate during neutralization of nitric-			V				V	V		



					phosphate solutions. Analysis of features of nitric acid decomposition of mineral raw materials and industrial wastes and their application to determine optimal conditions for production of complex mineral fertilizers.													
11				Research practice	<p><b>Goal:</b> Acquaintance with the latest theoretical, methodological and technological achievements of domestic and foreign science.</p> <p><b>Contents:</b> Analysis of the state of development of chemical technology in the world and Kazakhstan; the role of science and innovation in technology improvement and modernization. Analytical review of production methods in the research area under study. Application of modern methods of scientific research, collection, analysis and mathematical processing and interpretation of experimental data in the dissertation research.</p>	10	v	v	v								v	
12	Module of Research Work and Final Attestation			Research Work of a Doctoral Student, Including Passing an Internship and Completing a Doctoral Dissertation	<p><b>Goal:</b> Preparation of PhD doctor who owns the methodology of scientific knowledge and able to apply scientific methods in the study of problems of modern science and technology.</p> <p><b>Contents:</b> Analysis of modern achievements in science and technology, methods for obtaining inorganic compounds using information technology. Planning and implementation of experimental research work using the instrumental base based on methodology of scientific research. Developing the ability to critically evaluate and master theoretical concepts to their implementation and to report the research</p>	123	v	v		v	v	v					v	

				results in peer-reviewed scientific publications.												
			Writing and Defending a Doctoral Thesis	<p><b>Goal:</b> Evaluation of scientific-theoretical and research-analytical level of a doctoral candidate, formed professional and managerial competencies, readiness to independently perform professional tasks and compliance of his preparation with the requirements of a professional standard and educational program.</p> <p><b>Contents:</b> Formation of skills to generalize the results of an independent study of one of the urgent problems in the field of chemical technology of inorganic substances, interpretation and substantiation of results of scientific research and presenting them in the form of a doctoral thesis and defense to a wide audience.</p>	12	v	v	v							v	v

## 5 SUMMARY TABLE REFLECTING THE VOLUME OF MASTERED CREDITS BROKEN DOWN 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	SRWD	Writing and defense of doctoral dissertation			exam	Diff. pass
1	1	3	2	3	25			5		30	900	5	1
	2					10		20		30	900		2
2	3						10	20		30	900		2
	4							30		30	900		1
3	5							30		30	900		1
	6							18	12	30	900		1
Total			2	3	25	10	10	123	12	180	5400		

## 6 STRATEGIES AND METHODS OF TEACHING, MONITORING AND EVALUATION

<b>Training strategies</b>	<p><b>Student-centred teaching:</b> The student is the centre of teaching and an active participant in the learning and decision-making process.</p> <p><b>Practice-oriented teaching:</b> the focus is on the development of practical skills.</p>
<b>Teaching methods</b>	<p>Conducting lectures, seminars, various types of practical classes with:</p> <p>Using innovative technologies:</p> <ul style="list-style-type: none"> <li>• problem-based learning;</li> <li>• case studies;</li> <li>• group work and creative groups;</li> <li>• discussions and dialogues, intellectual games, quizzes;</li> <li>• reflection methods, projects, benchmarking;</li> <li>• presentations;</li> </ul> <p>Rational and creative use of information sources:</p> <ul style="list-style-type: none"> <li>• multimedia training programmes;</li> <li>• electronic textbooks;</li> <li>• digital resources.</li> </ul> <p>Organisation of students' independent work, individual consultations.</p>
<b>Monitoring and the evaluating</b>	<p><b>Current control</b> on each topic of the discipline, knowledge control in the classroom and out-of-class activities (<i>according to the syllabus</i>). Forms of assessment:</p>

<b>attainability of learning outcomes</b>	<ul style="list-style-type: none"> <li>• questioning in class;</li> <li>• defence of independent works;</li> <li>• discussions;</li> <li>• trainings;</li> <li>• colloquia;</li> <li>• projects;</li> <li>• analytical reviews.</li> </ul> <p><b>The mid-term assessment</b> shall be carried out in accordance with the syllabus and academic calendar.</p> <p><b>Intermediate attestation</b> is carried out in accordance with the working curriculum, academic calendar.</p> <p>The forms of conducting: exam in the form of testing; oral exam; written exam; combined examination; attestation on SRWM; defence of the practice and internship reports.</p> <p><b>The final state attestation</b> is the defense of a dissertation.</p>
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## 7 EDUCATIONAL AND RESOURCE SUPPORT OF THE EDUCATION PROGRAM

<b>Information and Resource Centre</b>	<p>The structure of the Educational Information Center (EIC) includes 6 subscriptions, 16 reading rooms, 2 electronic resource centres (ERC). The basis of the network infrastructure of the EIC consists of 180 computers with Internet access, 110 automated workstations, 6 interactive whiteboards, 2 video decks, 1 video conferencing system, 3 A-4 scanners, 3. The EIC software is IRBIS-64 under MSWindows (basic set of 6 modules), an autonomic server for uninterrupted work in the IRBIS system.</p> <p>The library collection is reflected in the electronic catalogue, which can be accessed online 24/7 at <a href="http://lib.ukgu.kz">http://lib.ukgu.kz</a>.</p> <p>Thematic databases of own generation were created: "Almamater", "Proceedings of SKSU scientists", "Electronic Archive". Online access from any device in 24/7 mode by external link <a href="http://articles.ukgu.kz/ru/pps">http://articles.ukgu.kz/ru/pps</a>.</p> <p>Work with catalogues in electronic form. The EC consists of 9 databases: "Books", "Articles", "Periodicals", "Proceedings of SKSU staff", "Rare books", "Electronic collection", "SKSU in press", "Readers" "SKR".</p> <p>The EIC provides its users with three options for accessing its own electronic information resources: from the "Electronic Catalogue" terminals in the catalogue hall and departments of the EIC; via the university information network for faculties and departments; and remotely on the library's website <a href="http://lib.ukgu.kz/">http://lib.ukgu.kz/</a>.</p>
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	<p>Access to international and national resources is open: "SpringerLink", "Polpred", "Web of Science", "EBSCO", "Epigraph", to electronic versions of scientific journals in open access, "Zan", "RMEB", "Adebiat", Digital Library "Aknurpress", "Smart-Kitap", "Kitap.kz", etc.</p> <p>For people <i>with special needs and disabilities</i>, the EIC has adapted the library website for visually impaired users.</p>
<p><b>Material and technical base</b></p>	<p>The material and technical base of the Chair of CTIS includes the following classrooms and laboratories for master's degree students:</p> <ul style="list-style-type: none"> <li>• Laboratory of cooperation of LLP "Kazphosphate" and the chair of CTIS of M. Auezov SKU -126AB,</li> <li>• Laboratory named after Sh. Moldabekov - 316A;</li> <li>• Room for scientific research of PhD doctoral students with the support of the Erasmus + program of the European Union -323A;</li> <li>• Scientific laboratory for master's and doctoral students -331A</li> <li>• Lecture rooms with interactive whiteboard - 320A, 330A.</li> </ul> <p>Students use the services of common laboratories of Regional Testing Laboratory of Engineering Profile "Structural and Biochemical Materials" (IRLIP "KBM") and SAPA to perform chemical and physico-chemical analysis.</p>

**AGREEMENT SHEET**  
on the Education program  
8D07160 - «Chemical technology of inorganic substances»

Director of PGEI	_____	Konarbayeva Z. K.
Director of DASc	_____	Nazarbek U. B.
Director of DIC	_____	Bazhirov T. S.