NJSC SHAKARIM UNIVERSITY OF SEMEY

EDUCATIONAL PROGRAM

7M05 - Natural Sciences, Mathematics and Statistics
(Code and classification of the field of education)

7M053 - Physical and chemical sciences
(Code and classification of the direction of training)

0530
(Code in the International Standard Classification of Education)

M090 - Physics
(Code and classification of the educational program group)

7M05302 - Technical physics
(Code and name of the educational program)

Master
(Level of preparation)

Semey

Educational program

7M05 -- Natural Sciences, Mathematics and Statistics
(Code and classification of the field of education)

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0530
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Master
(Level of preparation)

Semey 2024

PREFACE

Developed

The educational program 7M05302 - Technical Physics in the direction of preparation 7M053 - Physical and chemical sciences 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	Kassymov Askar	Dean Research School of Physical and Chemical Sciences
Educational program manager	Yermolenko Mikhail	Senior Lecturer of the Department of Technical Physics and Thermal Power Engineering
Member of the AC	Stepanova Olga	Head of the Department of Technical Physics and Thermal Power Engineering
Member of the AC	Vityuk Vladimir	Deputy Director General for Science (National Nuclear Center of the Republic of Kazakhstan)
Member of the AC	Irkimbekov Ruslan	Head of the Laboratory of Thermophysical and Neutronic Characteristics of Irradiating Devices, Branch of the IAE RSE NNC RK
Member of the AC	Mukhamedov Nurzhan	Head of Reactor Fuel Laboratory, Institute of Atomic Energy of National Nuclear Center of the Republic of Kazakhstan
Member of the AC	Serikbekuly Nurzhan	Master s student of the group MTF-301
Member of the AC	Seken Darkhan	Master s student of the group MTF-301
Member of the AC		

Reviewing

Full name of the reviewer	Position, place of work
Mukhamedova Nuriya	Senior Researcher at the Laboratory of Materials Testing under Thermo-Nuclear Reactor at IAE branch of RSE NNC RK
Kakimzhanov Dauir	Director of «PlasmaScience» LLP

Reviewed

At the meeting of the Commission on Academic Quality of the Faculty of Engineering and Technology
Protocol №3 15.01. 2024

At a meeting of the Academic Quality Commission of the Research School of Physical and Chemical Sciences
Recommended for approval by the University Academic Council
Protocol No. 1 June 06, 2024

Approved

at a meeting of the University Academic Council by protocol No. 6/1 of January 19, 2024.

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

Content

1.Introduction

1.1.General data

Training under the educational program 7M05302- Technical Physics is carried out at the Shakarim University of the city of Semey at the Department of Technical Physics and Heat Power Engineering of the Research School of Physical and Chemical Sciences. When implementing the educational program, the peculiarities of training masters, characteristic of the Shakarim University of Semey and the region, were taken into account - these are educational trajectories of training "Nuclear Reactors and Power Plants", "Technology and Physics of Low Temperatures" and "Medical Physics". The uniqueness of this educational program lies in the fact that the training of specialists in this field is carried out in close cooperation with the National Nuclear Center of the Republic of Kazakhstan and the Center for Nuclear Medicine and Oncology of the city of Semey. These areas of specialization on the territory of the Republic of Kazakhstan are carried out only at the Shakarim University of the city of Semey. The assessment of the quality of training of future specialists in the framework of the defense of dissertations is carried out at the field meetings of the certification commission on the basis of the branch of the department in the NNC RK (Kurchatov) and the Center for Nuclear Medicine and Oncology in the city of Semey.

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	Preparation of competitive specialists with deep fundamental knowledge in the field of technical physics, able to work in modern conditions, rapidly changing technologies and a rapidly increasing amount of information.
2.2.Map of the training profile within the educational program	
Code and classification of the field of education	7M05 - Natural Sciences, Mathematics and Statistics
Code and classification of the direction of training	7M053 - Physical and chemical sciences
Code in the International Standard Classification of Education	0530
Code and classification of the educational program group	M090 - Physics
Code and name of the educational program	7M05302 - Technical Physics
2.3.Distinctive features of the OP (double degree/joint, OVPO-partner, Double major, innovative)	No
2.4.Qualification characteristics of the graduate	
Degree awarded / qualification	Master of Natural Sciences
Name of professional standard	"Radiation control", "Teacher (faculty) of organizations of higher and (or) postgraduate education".
Atlas of new professions	Not available
Regional standard	Not available
Name of the profession / list of positions of a specialist	Design engineer, physics engineer, junior researcher, senior laboratory assistant, college teacher, university.
OQF qualification level (industry qualification framework)	7
Area of professional activity	Industry, energy industry, education, science, medicine.
Object of professional activity	Enterprises and firms of energy and technological profiles. Research institutions. Higher and secondary specialized educational institutions. Radiation Diagnostics and Therapy Centers.
Types of professional activity	Experimental and research. Organizational and managerial. Educational (teaching).
2.5.Graduate Model	Apply fundamental scientifc, pedagogical, managerial, communicative knowledge and skills in professional activities. To form the strategy and structure of the organization of scientific research and physico-mathematical modeling of nuclear facilities. To form the strategy and structure of the organization of scientific research and computer-aided design in low-potential energy. To form the strategy and structure of the organization of scientific research in the field of measurement of ionizing radiation and mathematical methods of analysis for biomedical research.

	To develop measures for safe operation and research on modern NPPs, engineering networks and equipment. To operate the fundamental concepts of modern physics in the field of nanotechnology, non-Newtonian fluids and energy production. To operate with the fundamental concepts of modern physics in the field of visualization methods and nuclear-physical methods of diagnosis and therapy. To operate information in the field of modern nuclear power plants, thermonuclear energy in matters of their safe operation and research activities. To operate information in the field of modern low-temperature systems and research activities. To operate information in the field of modern ionizing medical systems and research activities.

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

Organization of scientific research in technical physics

Brief description of the module content

This module includes the study of the organization and conduct of scientific research in the field of technical physics. CAD issues in the field of low- potential and nuclear power engineering with the study of the properties of nuclear materials and signal processing methods are considered.

Module disciplines

Scientific research methodology

Methods of measurement of ionizing radiation and the properties of nuclear materials

Methods of processing signals and images in medicine

Organization and planning of scientific research

The basic principles of the design of instruments and equipment

Basics of CAD low potential energy

Theory and Techniques of a scientific experiment

Theory and technique of heating experiment

Physics and mathematics modeling of nuclear power plants

Fundamental concepts of modern physics

Brief description of the module content

This module reveals modern aspects of fundamental physics in the field of energy conversion and material properties.

Module disciplines

Selected chapters of modern physics

Magnetic resonance methods

Mechanics of continuous media

The research work of a student, including an internship and the implementation of a master s thesis I

Basic principles of modern physics (in English)

Basics of cogeneration

Basics of nanotechnology

Fundamentals of nuclear physics in the application to medicine

Modern methods of energy conversion

Physics of rheological fluids

Physical methods of visualization

Modern directions of technical physics

Brief description of the module content

This module examines the issues of applied physics in solving the problems of safe operation of nuclear equipment in the field of medicine and energy. The prospects and problems of technology in the field of low temperatures are being studied.

Module disciplines

Perspectives and heat physics problems of heat refrigerants technique

Atomic power stations

Safety operation of nuclear power plants

Hydrogen energetics

Cryogenic technique

Medical dosimetry

Medical materials science

The research work of a student, including an internship and the implementation of a masters thesis II

Application of accelerators in medicine and industry

Principles of radiation diagnostics and therapy

Theory of calculation of refrigeration systems

Using heat and gas refrigeration machines

Plasma physics and thermonuclear reactors

Research practice

The research work of a student, including an internship and the implementation of a masters thesis III

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

«7M05302 - Technical Physics»

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
Organization of scientific research in technical physics										
Scientific research methodology	BS/CCh	1	5	150	15	30		35	70	Examination
Methods of measurement of ionizing radiation and the properties of nuclear materials	BS/CCh	1	5	150	15	30		35	70	Examination
Methods of processing signals and images in medicine	BS/CCh	1	5	150	15	15	15	35	70	Examination
Organization and planning of scientific research	BS/CCh	1	5	150	15	30		35	70	Examination
The basic principles of the design of instruments and equipment	BS/CCh	1	5	150	15	30		35	70	Examination
Basics of CAD low potential energy	BS/CCh	1	5	150	15	30		35	70	Examination
Theory and Techniques of a scientific experiment	BS/CCh	1	5	150	15	15	15	35	70	Examination
Theory and technique of heating experiment	BS/CCh	1	5	150	15	15	15	35	70	Examination
Physics and mathematics modeling of nuclear power plants	BS/CCh	1	5	150	15	30		35	70	Examination
Fundamental concepts of modern physics										
Selected chapters of modern physics	AS/US	2	5	150	30	15		35	70	Examination
Magnetic resonance methods	AS/CCh	2	5	150	30	15		35	70	Examination
Mechanics of continuous media	AS/CCh	2	5	150	15	30		35	70	Examination
The research work of a student, including an internship and the implementation of a master s thesis I	AS/US	2	11	330						Total mark on practice
Basic principles of modern physics (in English)	AS/CCh	2	5	150	30	15		35	70	Examination
Basics of cogeneration	AS/CCh	2	5	150	15	30		35	70	Examination
Basics of nanotechnology	AS/CCh	2	5	150	30	15		35	70	Examination
Fundamentals of nuclear physics in the application to medicine	AS/CCh	2	5	150	15	30		35	70	Examination
Modern methods of energy conversion	AS/CCh	2	5	150	15	30		35	70	Examination
Physics of rheological fluids	AS/CCh	2	5	150	15	30		35	70	Examination

Physical methods of visualization	AS/CCh	2	5	150	15	30		35	70	Examination
Modern directions of technical physics										
Perspectives and heat physics problems of heat refrigerants technique	AS/CCh	3	5	150	30	15		35	70	Examination
Atomic power stations	AS/CCh	3	5	150	15	30		35	70	Examination
Safety operation of nuclear power plants	AS/CCh	3	5	150	30	15		35	70	Examination
Hydrogen energetics	AS/CCh	3	5	150	15	30		35	70	Examination
Cryogenic technique	AS/CCh	3	5	150	15	30		35	70	Examination
Medical dosimetry	AS/CCh	3	5	150	15	30		35	70	Examination
Medical materials science	AS/CCh	3	5	150	15	30		35	70	Examination
The research work of a student, including an internship and the implementation of a masters thesis II	AS/US	3	4	120						Total mark on practice
Application of accelerators in medicine and industry	AS/CCh	3	5	150	30	15		35	70	Examination
Principles of radiation diagnostics and therapy	AS/CCh	3	5	150	15	15	15	35	70	Examination
Theory of calculation of refrigeration systems	AS/CCh	3	5	150	15	30		35	70	Examination
Using heat and gas refrigeration machines	AS/CCh	3	5	150	15	30		35	70	Examination
Plasma physics and thermonuclear reactors	AS/CCh	3	5	150	15	30		35	70	Examination
Research practice	AS/US	4	13	390						Total mark on practice
The research work of a student, including an internship and the implementation of a masters thesis III	AS/US	4	9	270						Total mark on practice
Final assessment										
Master`s dissertation		4	8	240						

NON -PROFIT LIMITED COMPANY «SHAKARIM UNIVERSITY OF SEMEY

DEVELOPMENT PLAN FOR THE EDUCATIONAL PROGRAMME

7M05302 – «Technical Physics»

for the years 2024-2026

Semey 2024

Content

1. Passport of the Development Plan of the Bachelor's/Master's Program 7M05302 – « Technical Physics»

1	Basis for development	Development program of the Non -Profit Limited Company «Shakarim University of Semey» for 2023-2029. School work plan
2	Implementation timeframe	2024-2026
3	Expected results of realization	Training of competitive specialists with deep fundamental knowledge in the field of technical physics, who are able to work in modern conditions of rapidly changing technologies and a sharply increasing amount of information.

2. Analytical substantiation of the educational program

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 for mastering the Master's degree program is 2 years.

The main criterion for the completion of the educational process is the development of at least 120 credits, with the award of the degree of Master of Natural Sciences.

Training in the educational program 7M05302- Technical Physics is carried out at the Shakarim University of Semey at the Department of Technical Physics and Thermal Power Engineering. During the implementation of the educational program, the peculiarities of master's degree training characteristic of Shakarim University of Semey and the region are taken into account – these are educational training trajectories "Nuclear reactors and power plants", "Low Temperature Engineering and Physics" and "Medical Physics". The uniqueness of this educational program lies in the fact that the training of specialists in this field is carried out in close cooperation with the National Nuclear Center of the Republic of Kazakhstan and the Center for Nuclear Medicine and Oncology of Semey city. Assessment of the quality of training of future specialists in the framework of defending dissertations is carried out at field meetings of the attestation commission on the basis of the branch of the department in the National Research Center of the Republic of Kazakhstan (Kurchatov).

2.2 Internal and external conditions of the educational program development

Academic year / Basis of learning	2024-2025 academic year	2025-2026 academic year
Grant	7	8
Contract	2	-
Total	9	8

2.3 Internal and external conditions of the educational program development

The academic policy of the Department of Technical Physics and Thermal Power Engineering, which implements the OP "Technical Physics", is aimed at using innovative teaching technologies based on best practices in teaching basic and core disciplines, on the quality of teaching using modern learning strategies, modern teaching methods in higher education. Undergraduates and teaching staff of the Department of Technical Physics and Thermal Power Engineering have unlimited access to information and educational resources and electronic library systems necessary to carry out independent educational and research work.

The educational and laboratory classrooms of the Department of Technical Physics and Thermal Power Engineering are equipped with modern equipment, comply with current sanitary standards, fire safety requirements, and qualification requirements for the activities of educational organizations. Some of the disciplines are held on the basis of the branch of the department at the RSE National Nuclear Center of the Republic of Kazakhstan.

The classrooms of the Department of Technical Physics and Thermal Power 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 the Shakarim Semey University is functioning (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 OP, the content of which the teaching staff uses in the classroom, and to which students have round-the-clock access.

The practice bases meet the requirements and content of the practice.

The department carries out work on funded projects:

AP13068365 Development of a resource-saving method for surface hardening of working bodies of tillage machines (74221878 tng.);

AP13068529 Development of technology for electron beam modification of polymer materials used in mechanical engineering (73941056 tng.);

AP13068451 Production of multifunctional calcium phosphate coatings with titanium dioxide nanoparticles by plasma-electrolytic oxidation (74405400 tng.);

AP14871373 Development of supersonic arc metallization technology for the restoration of worn surfaces of crankshafts of internal combustion engines (76840457 tng.);

AR23489446 Improving the efficiency of hybrid solar collectors using nanomodified materials with phase transitions (79 005 621 tng.).

2.4 Information about the teaching staff implementing the educational program

The teaching staff of the Department of Technical Physics and Thermal Power Engineering, which ensures the implementation of the OP "Technical Physics" is:

№	Indicators	Unit	2024-2025 academic year	2025-2026 academic year
1	Share of teaching staff with academic degrees in EP	%	**100**	**100**
2	Including the share of faculty members with a degree in general education disciplines cycle	%	**100**	**100**

The Department of Technical Physics and Thermal Power Engineering carries out the educational process at three levels of study: bachelor's degree, Master's degree and PhD doctoral studies. The formation of scientific and pedagogical personnel at the department is carried out through training through a master's degree, PhD doctoral studies, advanced training of the teaching staff.

OP teachers undergo advanced training at leading universities in Kazakhstan (according to the FPC plan) and training seminars held by the Ministry of Education and Science of the Republic of Kazakhstan, universities and other organizations.

The Faculty of Technical Physics takes part in competitions for grant financing, program-targeted financing of projects, the administrator of which are the Ministry of Education and Science of the Republic of Kazakhstan, development institutes. 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 «Technical physics and thermal power engineering» department have the Hirsch index (h-index) in the Webofsciences and Scopus databases.

2.5 Characteristics of the educational program achievement

In 2023, the EP “Technical Physics” successfully passed specialized accreditation with the Independent Agency for Accreditation and Expertise of Educational Quality (ARQA) for a period of 5 years (Registration number HE – SA – 000130 dated July 02, 2020).

Undergraduates of the educational program are winners of scientific competitions.

3. Main objectives of the educational program development plan

The following tasks are defined for the effective implementation of the OP "Technical Physics":

- Development and implementation of scientific projects;
- Development of human resources;
- Strengthening the material and technical base;
- Development of international cooperation.

The expected final results imply: 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 students in scientific research, academic mobility of students and teaching staff.

4. Risk analysis of the educational program

The mechanism for monitoring possible risks of the OP "Technical Physics" is surveys and questionnaires of students with satisfaction with the organization of the educational process, the quality of teaching, and the material and technical base. The questionnaires of employers are systematically monitored, which assess the quality of training of specialists. The results of the survey and risk monitoring are analyzed and used in the future when updating educational programs.

№	Name of risks	Elimination measures
1	Decrease in the number of EP students	Strengthen career guidance work

2	Insufficient development of external and internal academic mobility of students and teaching staff	Identification of universities for academic mobility of undergraduates and conclusion of contracts
3	The risk of reducing the stability of the PPP in the PLO	To work out a system of support and stimulation of teaching staff
4	Changing the needs and priorities of students	Identification of universities for academic mobility and conclusion of agreements
5	The risk of reducing the degree of teaching staff in the EP	Increasing the level of material and technical equipment of the department and increasing the prestige of postgraduate education on the part of employers.

5. Action plan for the development of the educational program

№	Criteria	Expected results	Unit	2024-2025		2025-2026	
				Plan	Actual implementation	Plan	Actual implementation
Orientation 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 "Technical Physics" in order to increase the practice orientation and development of professional competencies of graduates	fact.	When changing the standard		When changing the standard	
1.2	Monitoring and updating catalogs of elective disciplines in accordance with the development of key and professional competencies, and the demands of the labor market	Improving the quality of the content of educational programs by including elective courses aimed at developing key and professional competencies of graduates in accordance with the demands of the labor market.	fact.	At the request of employers		At the request of employers	

1.3	The introduction of modern learning technologies into the educational process that contribute to the development of cognitive activity and the 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 6B05303 – «Technical Physics»	Introduction of disciplines into the educational process 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.	unit.	-		-	
1.4	Involving social partners and employers in the development and examination of the implementation of educational programs	Improving the quality of implemented educational programs taking into account market demands and employer recommendations	unit.	1		1	
1.5	Development and implementation of elective courses in English	Introduction of disciplines in English into the educational process	unit.	-		-	

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	unit.	-		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	unit.	-		1	
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	unit.	-		-	
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.	-		-	
1.10	Participation of teaching staff and students in international academic exchange programs	Development of international cooperation with foreign universities implementing educational programs in the field of Technical Physics	people.	-		-	

1.11	Development of outgoing academic mobility of teaching staff and students in the field of Technical Physics	Improving the educational program based on the experience of implementing such programs in leading foreign universities	people.	-		-	
Orientation 2. Teaching staff							
2.1	Increasing the professional level and training of scientific and pedagogical personnel for the implementation of educational programs once every 5 years	The share of teaching staff who have undergone advanced training at the republican and international level is at least 20%	people.	2		2	
2.2	Completion of advanced training, retraining, internship of teaching staff at the international level	Completion of at least 2 teachers in advanced training, retraining, and internship programs for teaching staff at the international level	people.	2		2	
2.3	Promotion of publications of teaching staff works in international publications indexed by the Web of Science and Scopus databases	Increasing 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		35	
2.4	Involvement of practical specialists in teaching and scientific activities	Participation in the implementation of educational programs of practitioners (at least 20% of specialists)	%	20		20	
Orientation 3. Internationalization of educational programs							

3.1	Concluding agreements on international cooperation with foreign universities	Implementation of joint projects, preparation of scientific publications with foreign partners, creation of bases for scientific internships for students	unit.	-		-	
3.2	Attracting foreign students to study under the educational program "Technical Physics"	Increase in the number of foreign students	people.	-		-	
3.3	Organization of joint scientific and practical activities with international partners	Improving the efficiency of scientific and scientific-methodological activities of teaching staff, exchange of experience with foreign partners	unit.	-		1	
3.4	Expansion of cooperation with advanced 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	unit.	-		1	
3.5	Expanding 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	

Orientation 4: Logistics and digitalization							
4.1	Step-by-step equipping of classrooms with technical means of education (projectors, panels, interactive and multimedia boards, multifunctional devices, webcam, projector screen, etc.).	Equipping the classrooms assigned to the department with technical means of education (projectors, panels, interactive and multimedia boards, multifunctional devices, web camera, projector screen, etc.).	unit.	-		-	
4.2	Carrying out automation of the educational process (testing, session management, student contingent movement, dean's office, department, faculty workload, schedule, library, syllabus)	Information management based on the automation of the educational process (testing, session management, student contingent movement, dean's office, department, faculty workload, schedule, library, syllabus)	fact.	+		+	
4.3	Replenishment of the full-text database of the results of scientific research of faculty and students, teaching staff (articles, monographs, etc.).	Increase in the number of results of scientific works of scientists, research of faculty and students, teaching staff (articles, monographs, etc.).	unit.	10		10	
4.4	Expanding the collection of scientific and educational literature, including electronic media for the educational programs being implemented	Ensuring the implementation of educational programs on the basis of modern educational and information resources, including electronic media	%	20		20	

4.5	Monitoring of filling and improvement of the faculty website	Formation of the Faculty website on various aspects of the implementation of educational programs.	%	20		20	

Head of department _____ **O.A. Stepanova**

REVIEWED

at the meeting of the Commission on Academic Quality
of the Research School of Physical and Chemical Sciences
Protocol of the meeting No. 1 dated 06.06.2024
Chairman _____ Kassymova Zh.S.

AGREED

Dean _____ Kasymov A.B.
06.06.2024