NJSC SHAKARIM UNIVERSITY OF SEMEY

DEVELOPMENT PLAN EDUCATIONAL PROGRAM

6B05303 - Technical physics

Semey

NON-PROFIT JOINT-STOCK COMPANY «SHAKARIM UNIVERSITY OF SEMEY»

APPROVED

Board member - Vice rector for academic affairs

_____ I. Oralkanova

«26» 05 2023.

DEVELOPMENT PLAN FOR THE EDUCATION PROGRAMME

6B05303 «Technical Physics»

(code and name of the educational programme)

for the years 2023-2027

Semey 2023

Content

1. Passport of the Development Plan of the Bachelor's/Master's degree programme 6B05303 «Technical Physics»
(name of the educational programme)

1	Basis for the development	Shakarim University Strategic Plan 2021-2025 Faculty Plan of Work
2	Implementation timeframe	2023-2027
3	Expected results of the implementation	Training of specialists with extensive knowledge for modern high-tech industries focused on design, technological and development activities in the field of technical physics related to the nuclear industry and low-potential technology.

2. Analytical substantiation of the educational programme

2.1 Information about the educational programme

The educational programme is designed in accordance with the National Qualifications Framework and professional standards, ***according*** to the Dublin Descriptors and the European Qualifications Framework. **The typical** duration of the Bachelor's degree programme is 4 years.

Educational programme 6B05303 «Technical Physics» is developed by the Academic Committee
Considered at the meeting of the Quality Assurance Commission of the engineering - technological faculty
(Protocol No. 4/6 of 10.04.2023)
Approved at the meeting of the Academic Council of the University (Protocol No. 8 of 25.04.2023).

The main criterion for the completion of the educational process is the completion of at least 240 credits, with the award of the Bachelor of Science degree in the educational programme 6B05303 «Technical Physics».

The educational programme «Technical Physics» is aimed at training competitive specialists for work in the nuclear industry and low-potential technology, able to quickly adapt to rapidly changing socio-economic conditions, as well as to meet the needs of the individual in comprehensive professional and intellectual development.

Training of bachelors on EP 6B05303 - «Technical Physics» is carried out by the department «Technical Physics and Heat Power Engineering» of the engineering - technological faculty.

2.2 Information about students

Academic year / Basis of study	2023-2024 academic year	2024-2025 academic year	2025-2026 academic year	2026-2027 academic year
Grant	30	32	36	38
Contract	1	2	4	5
Total	31	32	40	43

2.3 Internal and external conditions of educational programme development

The academic policy of the Department of «Technical Physics and Heat Power Engineering», implementing the EP «Technical Physics», is aimed at the use of innovative teaching technologies based on the best teaching practices of modern general education, basic and profile disciplines, the quality of teaching using modern teaching strategies, modern teaching methods in higher education. Students and faculty members of the Department of "Technical Physics and Heat Power Engineering" have unlimited access to information and educational resources and electronic library systems necessary for independent study and research work. Information electronic resources: full access to databases - Scopus, ScienceDirect, Electronic Library System «Polpred», Cyberlenink, Boris Yeltsin Presidential Library, as well as limited access to some electronic databases.

Training and laboratory classrooms of the Department of «Technical Physics and Heat Power Engineering», are equipped with modern equipment, meet the current sanitary standards, fire safety requirements, qualification requirements for the activities of educational organisations. These classrooms are used both for conducting classes on the disciplines of the EP «Technical Physics», and for independent work of students, fulfilment of term and diploma projects. EP «Technical Physics» is sufficiently provided with the basic methodological materials for the disciplines taught.

Auditoriums of the department of «Technical Physics and Heat Power Engineering» are connected to WI-FI network for online conferences, lectures, seminars with the participation of leading scientists of Kazakhstan, near and far abroad. The portal of educational resources of Shakarim University of Semey (http://ais.semgu.kz/) is functioning, which contains lectures, video materials, hyperlinks, tasks for self-checking, presentations on topics, textbooks and other educational and methodological content on the studied disciplines of the programme, the content of which is used by the teaching staff in classes, and to which students have round-the-clock access. The most common innovative methods developed by faculty members of the departments for lectures, practical and laboratory classes, defence and pre-defence of graduation works include: video lectures, slide presentations, work with interactive whiteboard, use of graphic editor KOMPAS, AutoCAD, as well as for training, calculations and engineering calculations MathCAD.

Practice bases are:

- specialisation «Low temperature technology and physics» - enterprises of food processing industry using artificial cold, such as «Semipalatinsktorgtekhnika» LLP «Kazpoligraf» LLP, etc.

- specialisation «Nuclear reactors and power plants» - enterprises of nuclear and atomic industry, such as the National Nuclear Centre of the Republic of Kazakhstan, CCP on PCV «Centre of Nuclear Medicine and Oncology of Semey city», RSE on PCV «Institute of Nuclear Physics» , Almaty.

Practice bases are selected according to the following criteria:
- equipping of enterprises with modern equipment;
- use of innovative technologies;
- fulfilment of the requirements of safety instructions;
- environmental safety of the enterprise.

The internship centres meet the requirements and content of the internship.

2.4 Information about the teaching staff implementing the educational programme

The teaching staff of the Department of «Technical Physics and Heat Power Engineering», providing the implementation of the EP «Technical Physics» is:

№	Indicators	Unit of measure	2023-2024 academic year	2024-2025 academic year	2025-2026 academic year	2026-2027 academic year
1	Share of teaching staff with academic degrees in the Programme of study	%	**50**	**52**	**53**	**54**
2	Including the share of teaching staff with a degree in general education disciplines cycle	%	**35**	**37**	**39**	**40**

The Department of «Technical Physics and Heat Power Engineering» carries out the educational process at three levels of education: bachelor's, master's and PhD doctoral studies. Formation of scientific and pedagogical staff at the department is carried out by training through master's degree, PhD doctoral studies, professional development of teaching staff.

Teachers of educational programmes undergo professional development in leading universities of Kazakhstan and training seminars held by the Ministry of Education and Science of the Republic of Kazakhstan, universities and other organisations. Training of teachers is confirmed by certificates and certificates. Faculty members of the university undergo scientific internships

in foreign and neighbouring countries, in universities and research institutes of the Republic of Kazakhstan. The qualification composition of teachers is able to provide quality educational process, meets the qualification requirements, level and specificity of the educational programme.

The teaching staff of EP «Technical Physics» takes part in competitions for grant funding of the Ministry of Science and Education of the Republic of Kazakhstan. The scientific direction of the department is related to research in the field of solving scientific and practical problems in various areas of energy. The teaching staff of the department has a high scientific and methodical publication activity. The results of scientific activity of teachers are reflected in scientific editions with impact factor. Scientists of the department "TPhE" have Hirsch index (h-index) in WebofScience and Scopus bases.

2.5 Characteristics of achievement of the educational programme

EP «Technical Physics» in 2020 has successfully passed specialised accreditation in the Independent Agency for Accreditation and Review of Quality of Education (ARQA) for a period of 5 years (Registration number HE - SA - 000183 dated 02 July 2020).

3. Main objectives of the educational programme development plan

In accordance with the Strategic Development Plan of the University, the following tasks have been defined for the effective implementation of the Technical Physics programme

- Provision of quality training of competitive specialists
- Development and realisation of scientific projects
- Development of human resources potential
- Strengthening of material and technical base
- Development of international co-operation

Expected outcomes include: participation in funded grant projects, publication activity of teaching staff in rating publications with non-zero impact factor, development and operation of joint educational programmes with foreign universities, implementation of research results in the educational process, involvement of students in research, academic mobility of students and teaching staff.

4. Risk analysis of the educational programme

Identification and assessment of risks of EP «Technical Physics» is carried out in accordance with the Strategic Development Plan of the University until 2025. The mechanism for monitoring possible risks of the Technical Physics Programme is surveys and questionnaires of students' satisfaction with the organisation of the educational process, quality of teaching, material and technical base. In order to assess the quality of the implemented programme, meetings with specialists, graduates of previous years, students are held. Employers' questionnaires are systematically monitored to assess the quality of specialists' training. The results of questionnaires and risk monitoring of the educational programme are analysed and used in further updating of educational programmes.

№	Name of risks	Elimination measures
1	Decrease in the contingent of students on EP	Strengthen career guidance work
2	Insufficient level of language skills to implement trilingual education	Foreign language courses
3	Decrease in the employment rate	Involvement of employers, graduate fairs
4	Insufficient development of external and internal academic mobility of students and teaching staff.	Selection of universities for academic mobility and conclusion of contracts
5	Risk of decrease in the retention rate of the teaching staff in the specialised programme	Increase motivation to work at the university

5. Action plan for the development of the educational programme

№	Criteria	Expected results	Unit of measure	2023-2024		2024-2025		2025-2026		2026-2027	
				Plan	Actual performance	Plan	Actual performance	Plan	Actual performance	Plan	Actual performance
Orientation 1. Educational and methodological support											
1.1	Updating the educational programme on the basis of professional standards, taking into account the recommendations of employers	Examination of the Educational Programme 6B05303 «Technical Physics» in order to improve the practice-orientation and development of professional competences of graduates	fact.	-		+		-		+	
1.2	Monitoring and updating catalogues of elective disciplines in accordance with the development of key and professional competencies and labour market demands	Improving the quality of the content of educational programmes by including elective courses aimed at the development of key and professional competencies of graduates in accordance with the demands of the labour market.	fact.	+		-		-		-	

1.3	Introduction into the educational process of modern teaching technologies that promote the development of cognitive activity and communicative ability of students	Improving the quality of teaching of academic disciplines, taking into account the novelty and diversity of forms of work that contribute to the development of cognitive activity.	fact.	+		+		+		+	
1.3.1	Introduction of Massive Open Online Courses (MOOCs) on the educational programme 6B05303 «Technical Physics» into the educational process	Introduction of disciplines into the educational process Improving the quality of teaching of academic disciplines, taking into account the novelty and diversity of forms of work that contribute to the development of cognitive activity.	unit.	-		-		1		1	
1.4	Involvement of social partners and employers in the development and expertise of the implementation of educational programmes	Improving the quality of educational programmes implemented, taking into account market demands and employers' recommendations	unit.	2		2		2		2	
1.5	Development and implementation of elective courses in English	Introduction of disciplines in English into the educational process	unit.	-		-		1		1	
1.6	Holding seminars and round tables on the application of innovative technologies in the educational process	Introduction of innovative technologies into the educational process	unit.	-		1		1		1	
1.7	Publication of educational, teaching, methodological and scientific literature on the implemented Programme of study	Improvement of teaching and methodological support for the disciplines of the implemented educational programmes	unit.	-		1		1		1	

1.8	Conclusion of agreements with foreign and domestic partner universities in order to develop academic exchange of students of all levels and faculty members	Creation of a base of foreign and domestic partner universities for the development of academic exchange of students of all levels and teaching staff	unit.	-		-		1		1	
1.9	Inviting students from partner universities to study for a semester, short-term internships, practical training, etc.	Development of international recognition of educational programmes, implementation of academic mobility programmes for students	people.	-		-		1		1	
1.10	Participation of faculty and students in international academic exchange programmes	Development of international cooperation with foreign universities implementing educational programmes in Nuclear Technology and Engineering and Low Temperature Physics	people.	-		-		1		1	
1.11	Development of outgoing academic mobility of teaching staff and students in the fields of Nuclear Technology and Engineering and Low Temperature Physics	Improvement of the educational programme based on the experience of similar programmes in leading foreign universities	people.	-		-		1		1	
Orientation 2. Faculty members											
2.1	Professional development and training of scientific and pedagogical staff for the implementation of educational programmes once every 5 years	Share of teaching staff who have undergone advanced training at the national and international level at least 20%	people.	2		2		2		2	

2.2	Professional development, retraining, internships of teaching staff at the international level	At least 2 teachers undergoing a programme of professional development, retraining, internship of teaching staff at the international level	people.	2		2		2		2	
2.3	Promotion of faculty publications in international editions indexed by Web of Science and Scopus databases	Increase in the share of faculty members who have published the results of scientific research in publications indexed by Web of Science and Scopus databases - at least 30% of the total number of faculty members	%	30		30		30		30	
2.4	Involvement of practitioners in teaching and research activities	Participation of practitioners in the implementation of educational programmes (at least 20% of specialists)	%	20		20		20		20	
Orientation 3: Internationalisation of educational programmes											
3.1	Conclusion of agreements on international co-operation with foreign universities	Implementation of joint projects, preparation of scientific publications with foreign partners, creation of bases for scientific internships of students	unit.	-		-		1		1	
3.2	Attraction of foreign students to study in the educational programme 6B05303 - Technical Physics	Increase in the number of foreign students	people.	-		-		1		1	

3.3	Organisation 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		1		1		1	
3.4	Inviting foreign specialists to give lectures and consultations on master's projects and dissertations	Improvement of the content component of educational programmes on the basis of introducing the experience of foreign specialists in the implementation of educational programmes	unit.	1		-		1		1	
3.5	Expansion of cooperation with advanced foreign scientific and educational organisations in order to attract the most qualified foreign specialists to the implementation of educational programmes	Formation of key and professional competences in accordance with the practice of leading universities	people.	1		-		1		1	
Orientation 4: Logistics and digitalisation											
4.1	Step-by-step equipment of classrooms with technical means of education (projectors, panels, interactive and multimedia boards, multifunctional devices, web camera, projector screen, etc.)	Equipping classrooms assigned to the department with technical means of education (projectors, panels, interactive and multimedia boards, multifunctional devices, web camera, screen for projector, etc.).	unit.	-		-		1		1	

4.2	Automation of the educational process (testing, session management, student contingent movement, dean's office, department, faculty workload, timetable, library, syllabus)	Information management based on the automation of the educational process (testing, session management, student contingent movement, dean's office, department, faculty workload, timetable, library, syllabus)	fact.	+		+		+		+	
4.3	Replenishment of the full-text database of the results of scientific research of faculty members and students, teaching staff (articles, monographs, etc.).	Increase in the number of results of scientific works of scientists, research of teaching staff and students, teaching staff (articles, monographs, etc.).	unit.	5		5		5		5	
4.4	Expanding the collection of scientific and educational literature, including on electronic media for the educational programmes being implemented	Ensuring the implementation of educational programmes on the basis of modern educational and information resources, including electronic media	%	10		10		10		10	
4.5	Monitoring the content and improvement of the Faculty's website	Formation of the Faculty website on various aspects of the implementation of educational programmes.	%	20		20		20		20	

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

REVIEWED
at the meeting of the Quality Assurance Commission
of the Faculty of Engineering - technological Protocol No. 4/6
Protocol No.5 of 25.05.2023
Chairman _____ G.B. Abdilova

APPROVED

Dean of the Faculty _____ G.N. Nurymkhan
May 26, 2023