Staff training experience for Uzbekistan nuclear industry in Branch of MEPhI in Tashkent

M V Bayaskhalanov, Y A Maslov, A Sanetullaev and V I Skrytnyy
National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Moscow, Russia

YAMaslov@mephi.ru

Abstract. The article describes history of creation Branch of National Research Nuclear University MEPhI in Tashkent, which will provide training of highly qualified national staff for solving the most important tasks of Uzbekistan nuclear industry.

1. Tashkent branch - Prerequisites for creation
In December 2017 in Tashkent, ROSATOM and Government of the Republic Uzbekistan signed the cooperation agreement in the field of peaceful use of atomic energy. This document creates a legal basis for bilateral cooperation between two countries in the field of peaceful use of atomic energy.

According to the signed agreement, it is planned to build a nuclear power plant with VVER-type reactors by 2028. During the construction and operation of nuclear power plants, the most modern and sophisticated technologies are used, therefore, highly qualified specialists with deep knowledge and practical skills are needed [1-3]. Taking into account the complexity of the problems and the need for their comprehensive and systematic solution, it is necessary to attract young scientific and engineering national staff capable of ensuring the country's economic development in the nuclear industry. Therefore, in Tashkent is created in accordance with the instructions of The Chairman of the Government of the Russian Federation D.A. Medvedev and the Resolution of the President of the Republic Uzbekistan Sh.M. Mirziyoyev "On the creation and organization of activities in the city of Tashkent of a branch of the Federal State Autonomous Educational Institution of Higher Education" National Research Nuclear University "MEPhI", one of the leading university in the field of nuclear physics and technology [4]. NRNU MEPhI has a developed branch network in Russia and has extensive experience in training highly-demanded staff for the nuclear industry [5].

2. The main tasks of branch NRNU MEPhI in Tashkent
The main task of the Tashkent branch of NRNU MEPhI is to provide training of highly qualified engineering and technical staff to solve scientific, technological and production problems of the nuclear industry [6].

The Tashkent branch is being created in close cooperation with The Agency for the Development of Atomic Energy "Uzatom" and Nuclear Physics Institute of the Academy of Sciences of Republic Uzbekistan.

The main tasks and activities of the branch, defined by the Uzbek side, are:
training of highly qualified engineering and technical staff at the international educational standards level, capable of solving the most important scientific, technological and production problems in the interests of the sectoral needs of nuclear power and thermal physics [7];

- development of the training system of specialists and scientific staff based on the principle continuity of education and science, as well as mandatory harmonious integration into the world educational and scientific community;

- carrying out fundamental and applied scientific research in the field of nuclear physics;

- development and implementation of new educational programs and forms of education aimed to improving and modernizing the training system for engineering and technical personnel;

- support for the development of educational potential, active improvement of teaching methods and technologies;

- development and strengthening of long-term relations with leading educational institutions, scientific research centers of foreign countries in the educational and scientific and technical fields.

The educational model of Tashkent Branch includes:

- fundamental physical and mathematical training based on the best practices of the leading nuclear university NRNU MEPhI;

- practical training carried out by NRNU MEPhI in close cooperation with State Atomic Energy Corporation Rosatom and Agency for the Development of Nuclear Energy "Uzatom" [8];

- academic mobility program, internships for teachers and students at NRNU MEPhI;

- modern digital and online educational technologies based on the educational and methodological experience of NRNU MEPhI teachers and implemented on the electronic platforms EdX, Coursera, etc [9-14].

3. Educational activities of Tashkent Branch

For implementation in Tashkent branch of NRNU MEPhI in 2019, 4 main educational bachelor's programs were developed: "Design and operation of nuclear power plants" in the direction of training 14.03.01 Nuclear energy and thermal physics, "Nuclear technologies" in the direction of training 14.03.02 Nuclear physics and technologies, "Automation of technological processes and production in the power industry" in the direction of training 13.03.01 Heat power engineering and heat engineering and "Power plants" in the direction of training 13.03.02 Electrical power engineering and electrical engineering, which were considered and approved in the prescribed manner at NRNU MEPhI Scientific Council meeting for implementation in Tashkent branch in 2019/2020 academic year. A package of documents for licensing educational activities in Tashkent branch of NRNU MEPhI was formed for submission to Federal service for supervision in education and science Rosobrnadzor and in April 2019 a license was obtained to carry out educational activities in the branch.

The training programs are the same in all branches, including the Tashkent branch. All graduates will receive a state diploma from NRNU MEPhI, which is recognized as a document of higher education in Republic Uzbekistan. In addition, the graduates will be guaranteed employment according to the distribution of Uzatom Agency.

4. Admission campaign '2019

In 2019, a quota for admission to Tashkent branch for 2019/2020 academic year was agreed in 100 people amount - 25 people for each of the four areas of training. Training is carried out only on a grant format the expense of the budgetary funds of Republic Uzbekistan.

Also in 2019, after agreement with Uzatom Agency and Ministry of Higher and Secondary Specialized Education of Republic Uzbekistan, the Regulation "On the procedure for admission to the first year of the branch of the Federal State Autonomous Educational Institution of Higher Education" National Research Nuclear University "MEPhI in the city of Tashkent (Republic Uzbekistan in 2019)".

3
To conduct entrance examinations and recommend enrollment in the composition of students of persons who passed the competition, the admission committee of the Branch was created, which was approved by the university rector order. To organize work and office work, by the university rector order, an executive secretary of the admission committee was also appointed.

The technical staff of the admission committee of the branch, consisting of employees seconded from the head office, carried out the acceptance of documents from applicants wishing to enter Tashkent branch of NRNU MEPhI. During the acceptance of documents for 100 places, 667 applications from applicants were submitted.

To prepare and conduct entrance examinations at the branch, by the university rector order, examination commissions in mathematics, physics and Russian language were formed, consisting of teachers from NRNU MEPhI (Moscow). To conduct consultations on the content of entrance examinations, on the requirements and criteria for evaluating applicants, as well as to conduct entrance examinations, members of the examination commissions were sent to Tashkent. For applicants, three entrance tests were held: in mathematics, physics and Russian.

![Figure 1. Entrance examinations.](image)

The entrance tests lasted three hours. For each entrance test, a minimum score was set at 40 score. Applicants who received the lower number of points were not allowed to the subsequent entrance test. The results of the entrance tests were published the day after the exam. For applicants who, for objective reasons, could not pass the entrance test on the main day, a reserve day was provided.

In order to ensure compliance with uniform requirements and resolve controversial issues when evaluating examination papers during entrance examinations and protecting the rights of applicants to the Tashkent branch, by the university rector order, an appeal commission was approved for each subject. Reception of appeals from applicants was carried out within 24 hours from the date of publication of the results of entrance examinations. In the course of appeals, the commission checked the correctness of the assessment of the results of the entrance test, after which it made a decision to change (increase or decrease) or leave the mark unchanged.
The best applicants who successfully passed all the entrance tests, scored the highest scores and passed the competitive selection for the areas of study were enrolled in Tashkent branch of National Research Nuclear University MEPhI.

5. Branch staff
When ensuring the recruitment of branch staff, first of all, attention was paid to the teaching staff. A resume form was developed for a candidate for the position of a teacher in the branch and the selection of the teaching staff and educational support personnel for the departments of natural sciences, humanities and physical education of Tashkent branch was carried out. Based on the results of interviews with candidates, a list of those recommended for employment as teachers and those recruited to the Tashkent branch was compiled.

For all teachers of Tashkent branch, the faculty of the general education departments of NRNU MEPhI head office (Moscow) conducted advanced training.

6. Tashkent branch is open
On September 3, 2019, the opening ceremony of Tashkent branch of NRNU MEPhI was held in Tashkent.

Figure 2. Branch of National Research Nuclear University MEPhI in Tashkent.

The opening ceremony of the branch was attended by Abdulla Aripov - Prime Minister of Uzbekistan, Alisher Sultanov - Minister of Energy of Republic Uzbekistan, Alexei Likhachev - General Director of Rosatom State Corporation, Jurabek Mirzamakhmudov - General Director of Uzatom Agency, Bekhzod Yuldashev - President of Academy of Sciences, Mikhail Strikhanov - Rector of NRNU MEPhI, scientists and other guests of honor.
Figure 3. The opening ceremony of Tashkent branch of NRNU MEPhI.

The opening was also attended by the parents of students and representatives of the admission and examination commissions sent from Moscow.

7. Educational process

On September 4, 2019, training sessions began for the students of Tashkent branch of NRNU MEPhI. A timetable was drawn up for the students, which corresponded to the previously approved working curricula. The teaching during the semester was carried out in part by the teachers of Tashkent branch of NRNU MEPhI, who successfully passed the interview for the position of the teaching staff from among the teachers of the leading universities of Republic Uzbekistan. In addition, in order to increase the level of knowledge among students and conduct optional classes, teachers of natural sciences and humanities were sent to the Tashkent branch from Moscow office of NRNU MEPhI during the first semester. The seconded teachers carried out lectures, practical, laboratory and optional classes.

In the middle of the semester, with the aim of intermediate control of students' knowledge, control works were organized by the teachers of the Moscow office of NRNU MEPhI. At the end of the semester, a test session was organized, according to the results of which 98 students of the branch were admitted to the examination session. In January 2020, an examination session was also held at Tashkent branch with the help of teachers sent from Moscow.

The results of the first year of work of Tashkent branch and regular checks on the students performance showed that every fifth student of the university can confidently participate in the republican Olympiads in physics. According to the results of the summer test-examination session of 2019/2020 academic year, students successfully certified in all disciplines were transferred to the second year: two students have "excellent" marks in all subjects and 9 students have "good-excellent".

Today, when creating a new nuclear industry in Republic Uzbekistan, it is very important to ensure the training of qualified staff. NRNU MEPhI is known not only graduating strong specialists who are recognized all over the world, but also for creating an environment aimed at achieving results and continuous development. Tashkent branch of NRNU MEPhI is just beginning its long journey of staff training with the necessary knowledge and skills to use them in the future for their country benefit.
References

[1] Putilov A V., Strikhanov M N and Tikhomirov G V. 2019 Personnel training for the developing nuclear power industry Nucl. Energy Technol. 5 201–6

[2] Putilov A, Timokhin D and Pimenova V 2020 Adaptation of the educational process to the requirements of the global nuclear market according the concept of economic cross through its digitalization Procedia Computer Science vol 169 (Elsevier B.V.) pp 452–7

[3] Pershukov V A, Tikhomirov G V., Lavrukhin A A, Karpov S A and Sofronov V L 2020 Experience of implementation in NRNU MEPhI of the education program focused on training of specialists for “proryv” project Journal of Physics: Conference Series vol 1475 (Institute of Physics Publishing)

[4] Berestov A V., Guseva A I, Kalashnik V M, Kaminsky V I, Kireev S V. and Sadchikov S M 2020 Project “National Research University” – Driver of russian higher education Vyss. Obraz. v Ross. 29 22–34

[5] Berestov A V., Guseva A I, Kalashnik V M, Kaminsky V I, Kireev S V. and Sadchikov S M 2020 Flagship universities as development potential of regions and industries Vyss. Obraz. v Ross. 29 9–25

[6] Rybina G V. and Fontalina E S 2020 Some Aspects of Individual Approach to Learning Based on Tutoring Integrated Expert Systems 2020 5th International Conference on Information Technologies in Engineering Education, Inforino 2020 - Proceedings (Institute of Electrical and Electronics Engineers Inc.)

[7] Volkov Y N, Geraskin N I and Kosilov A N 2019 Nuclear education in Russia and abroad Vyss. Obraz. v Ross. 28 105–16

[8] Ganchenkova M G and Boyko O V. 2019 Industry based adaptive educational programs Vyss. Obraz. v Ross. 28 126–33

[9] Petrovskaya A, Pavlenko D, Feofanov K and Klimov V 2020 Computerization of learning management process as a means of improving the quality of the educational process and student motivation Procedia Computer Science vol 169 (Elsevier B.V.) pp 656–61

[10] Korotkova M A, Carpow G and Zakhryapin S O 2020 GraphLabs Extendable Module System for Education Support Mechanisms and Machine Science vol 80 (Springer) pp 257–66

[11] Astashova N A, Melnikov S L, Tonkikh A P and Kamynin V L 2020 Technological resources in modern higher education Obraz. i Nauk. 22 74–101

[12] Vishtak O, Zemskov V, Vishtak N, Gritsyuk S, Shyrova I and Mikheev I 2020 The automated information systems for the education of specialists of the energy industry Procedia Computer Science vol 169 (Elsevier B.V.) pp 430–4

[13] Geraskin N I, Kulikov E G and Glebov V B 2019 The knowledge preservation problem in the nuclear industry and the role of Web-based tools in its solution Ind. High. Educ. 33 350–5

[14] Telnov V and Korovin Y 2019 Semantic web and knowledge graphs as an educational technology of personnel training for nuclear power engineering Nucl. Energy Technol. 5 273–80