Medical Accelerators of Charged Particles

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

Degree or qualification is awarded: **Master degree**

Language of study: **Russian**
Mode of study: **full-time**
Duration: **2 years**
Availability of free education: **yes**
Price: **196 820 rubles per semester**

Programme curator: **Sergey M. Polozov**
Tel.: **Contact name: Olga N. Petukhova, Phone number. +74957885699, ext. 8045.**
E-mail: ONPetukhova@mephi.ru

Field of study: "Nuclear Physics and Technologies".

Duration of training: 2 years, 120 credits.

Course delivery language: russian.

Basic department: Electrophysical Facilities (No. 14).

Educational course supervisor and director: A.N. Didenko, corresponding member of the Russian Academy of Sciences, Dr. Phys.-Math Sc., Head of Department.

The course aim is to raise the qualification of specialists and bachelors (engineer-physicist) to the Master's Degree. It could follow the graduation immediately or after several years of employment on this speciality. Qualified masters are demandable at all High Tech medical centers (at Obninsk, Dimitrovgrad, Tomsk, etc.), the Russian Oncology Treatment Center named after N.N. Blokhin (Moscow, www.ronc.ru), the Russian Academy of Sciences, international scientific research institutions and high-tech medical centers, and Rosatom subsidiaries.

The educational program features the study of two integrated physics areas, namely particle accelerator physics and medical physics. Since graduated masters are to develop and operate accelerator facilities at nuclear therapy and PET centers, basic program incorporates extra courses "Nuclear Medicine" and "Radiation Therapy Planning". Part of the curriculum is also implemented in English.

Along with theory study, lectures, and seminars, comprehensive practical trainings at MEPhI laboratories and facilities at collaborating research and educational centers are parts of the educational plan. Substantive education and scientific research activities are important course components.

Graduated masters have overall knowledge of particle accelerators, nuclear and physical facilities, electronic and automated control systems, medical radiation technologies, mathematical simulation models for theoretical and experimental research of different charged particle physics aspects, environmental and ecological monitoring, and safety of nuclear materials, facilities, and installations used in atomic industry and power engineering.

Basic professional training and educational program comprises the following special topics:

- electrophysical facilities and technologies;
- microwave technics, microwave electronics and engineering;
- vacuum technics and physical electronics;
- electronics of electrophysical facilities;
- information technologies of electrophysical facilities.

Additional or optional subjects are also proposed for study, namely:

- radio frequency instrument design;

- electrophysical facility magnetic systems;
- electromagnetic interference;
- intense electron beams;
- charged particle beam conveying and distribution;
- electromagnetic wave slow-down systems.

These additional subjects are to be chosen by a student according to his preferences or by his future employment features.

Scientific and facility-dedicated practice is hosted by leading high tech medicine centers at Dimitrovgrad, Tomsk, and Obninsk, the Russian Oncology Treatment Center named after N. N. Blokhin, Russian and international scientific research institutions, and Rosatom subsidiaries.

Specializations within this programme

Nuclear physics and technologies

Professional skills and specialization areas: modern electronics, nuclear and electrophysical facilities electronic systems, automated control systems for nuclear reactors and nuclear physical facilities, ionizing radiation effect on human, environment and control electronics, matematical modelling of radiation propagation and interaction with matter study, environmental and ecological surveillance, nuclear materials, facilities and installations safety.