Radiation Safety of a Human Being and the Environment

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: **207 610 rubles per semester**

Programme webpage at the university website:
http://eis.mephi.ru/AccGateway/index.aspx?report_url=/Accreditation/program_annotation&report_param_pid=77

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Program purpose: training of scientific professional community of the top qualification in the field of nuclear and radiation safety of nuclear technologies for the nuclear industry and related concepts, including the base institutes of the Russian Academy of Sciences.

The problem of providing radiation safety has arisen from the very first steps of development of the nuclear industry. Eventually, the significance of this problem has essentially increased after a series of accidents which have occurred in the nuclear industry. The high quality professionals and experts worth certainly the best high professional education must solve the emergent complications.

The department of radiation protection and ionizing radiation dosimetry was organized at MEPhI in the early 1950s as part of the program of development and provision of nuclear and radiation safety. It became a progenitor of the present department "Radiation Physics and Safety of Nuclear Technologies". In the last sixty years, the department's graduates worked in the nuclear industry everywhere and filled posts from ordinary specialists up to key managers of the industry.

At the present time, the approved and updated necessary programs of courses have already been generated. The methodical materials such as manuals, lab practical works and imitating games have been prepared. The department has the equipped laboratories and perfect computer center with modern personal computers.

The main base and special disciplines of master training are:

- nuclear physics and background knowledge of safety of atomic and nuclear technologies;
- numerical methods of the transport theory of ionizing radiation;
- reliability of the nuclear reactor equipment and risk management;
- radiation control systems;
- radiometry and spectrometry of reactor neutrons;
- dosimetry of radiobiological processes, etc.

Part of the curriculum is also implemented in English.

The program is complemented with a number of additional professional courses selectively of the future specialists.

The graduates will obtain necessary knowledge on the interaction and penetration of ionizing radiations into matter on the basis of fundamental science: mathematics and physics. Masters will be able to develop new dosimetric and radiometric equipment and use ionizing radiation spectrometers for radiation field analysis, as well as for identification of radionuclides. They will know modern methods for calculation and design of biological shield and will be able to put obtained knowledge into practice. Masters will be able to solve a problem of nuclear power plant decommissioning, to assess accumulation of radionuclides in reactors, and to use obtained knowledge in management of spent fuel and radioactive waste. The graduates will be capable of estimating risks, taking into account ALARA principle, and applying

the methods of decision-making.

The range of professional work of magistracy’s graduates is, first of all, in the nuclear industry and related concepts, including the base institutes of the Russian Academy of Sciences: the Russian Academy of Sciences Nuclear Safety Institute (IBRAE); the Scientific and Engineering Center for Nuclear and Radiation Safety; Science and Research Institute of Nuclear Power Plants and Utilities Operation; the Burnazyan Federal Medical Biophysical Centre (FMBA); Russian Federal Nuclear Center – Zababakhin All-Russia Research Institute of Technical Physics; Russian Federal Nuclear Center – All-Russia Research Institute of Experimental Physics; National Research Centre "Kurchatov Institute"; Moscow SIA "Radon"; National Research Institute for Physicotechnical and Radioengineering Measurements; Doza Scientific Production Company; and other scientific research institutes and construction departments of the nuclear industry. The same enterprises are places of industrial and scientific practice of masters.

Specializations within this programme

Nuclear Physics and Technologies

Objects of the professional activity: a nucleus, particles, radiation influence of an ionising radiation to a human being and environment, mathematical models for theoretical and experimental research of spread of ionising radiation In a substance and radionuclides in nature areas; ecological monitoring of an enironment; calculating of biological protection of any source of ionising radiation; dosimetric, radiometric, spectrometric devices, systems of radiation control of nuclear objects, technologies of application of tools and installations for measurig characteristics of a radiation field; evaluation of reliability of facilities of atomic industry, and risk of emergency cases and their consequences to human being and nature.