

# Micro- and nanoelectronic devices and systems for the physical installations

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

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

Language of study: **Russian**

Mode of study: **full-time, part-time**

Duration: **5,5 years**

Availability of free education: **yes**

Price: **91 000 - 120 800 rubles per semester**

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**The program goal** is to obtain the highest professional profiled education enables graduates to successfully work in activities related to nuclear and radiation physics, nuclear materials and technology, to have a universal and subject-specialized competencies, promote social mobility and stability in the labor market.

## Basic department

Micro- and Nanoelectronics (# 27)

## Characteristics of the scope and objects of professional activity of future graduates

Research and development of new principles of operation of micro- and nanoelectronic devices, the creation of methods and means of designing and manufacturing; study of the properties of optoelectronic devices, micro- and nanoelectronic sensors and actuators, the organization of their operation in the control, measuring and control systems; development of theoretical models for the effects of ionizing, laser and electromagnetic radiation on electronic equipment; development of control systems, data acquisition and processing based on modern microprocessors, programmable logic chips, analog devices, optoelectronic and nanoelectronic devices; the design of new types of integrated circuits, systems on a chip, sensors and transducers, optoelectronic and nanoelectronic devices and equipment; the development of manufacturing technology of modern micro- and nanoelectronic devices and systems, including the creation of radiation-resistant products and products.

## Brief description of the curriculum

Working curriculum provides theoretical training for 9 semesters, training and protection of the degree project for 10-11-th semester. The educational process is combined with an active research and development work that is done under the guidance of experienced professionals in the scientific laboratories of the department and the base enterprises.

Basic and special disciplines: "Fundamentals of Microelectronics", "Microcircuitry", "Microprocessor systems", "Physics of micro- and nanostructures", "Physical installation", "Physical fundamentals of nanoelectronics", "Optoelectronic devices and systems", "Micro and nanoelectronic sensors and transformers", "Modern micro- and nanoelectronic technologies", "The radiation reliability and stability of microelectronic devices and systems", "Design of integrated circuits and systems on a chip", "Telecommunication systems and networks".

The combination of profound theoretical knowledge and practical skills necessary research and design of micro- and nanoelectronic devices and systems provide a high demand on the labor market and create the conditions for rapid professional growth.

## Modules

- Humanities disciplines module
- Natural sciences module
- General professional module
- Professional module with the disciplines of specialization

### **The base of industrial and/or scientific practice and employment**

The All-Russia Research Institute of Automatics (VNIIA), Research Institute of Scientific Instruments (RISI), JSC FCS&HT "SNPO "Eleron", Research Institute for System Studies of RAS, Institute of Space Instrument Making, Research Center "Module", Research Center of computer technology, PLC "MCST" and other Russian scientific centers; Rosatom; RAS institutes.

### **Specializations within this programme**

#### **Objects of the professional activity**

Work in the research and design organizations and enterprises of nuclear, aerospace, electronic and allied industries as professionals - research and development of new types of micro- and nanoelectronic devices and electronic systems for various applications, including systems implemented on the chip.