Extremal High-performance Electronics for Physical Installations

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**

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Goals of the Program

Training of masters for fundamental research, organizational and management activities in areas related to the research and experimental studies, the development of new electronic components increased performance and durability, including micro- and nanoelectronic systems based on new physical principles, creation and operation on the basis of their devices and systems.

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

- research and design of new operation principles of microelectronic devices, creation of the technigues and means of their design and manufacture;
- research of the properties of microelectronic devices and sensors, organization of their operation in measuring and control systems;
- development of theoretical models for taking into account the effect of ionizing, laser and electromagnetic radiation on electronic egnipment;
- development of the systems of control, data acquisition and processing, based on up-to-date microprocessor, programmable logic ICs, analog circuits, optoelectronic and nanoelectronic devices;
- design of new types of ICs, systems on clip, sensor and transducers, nanoelectronic devices and circuits;
- design and manufacture of up-to-date microelectronic devices and circuits including the creation of radiation-hard articles;
- development of asynchronous analog-digital architectures of a new generation of read-out electronics for supermulti-channel radiation ditectors.

Brief description of the curriculum

The curriculum includes basic and special disciplines, relevant educational standards, laboratory workshops on microelectronics, computer circuitry and CAD, high-performance computing systems, research work and practice at the head of branch enterprises.

The educational plan schedule includes theoretical studies, preparation and defence of a graduate project. The educational process is combined with an active research work under the leadership of experienced specialists in the Departments scientific labs and basic enterprise. The basic fundamental and special disciplines: “Fundamentals of amplifying circuits”, “Microprocessor systems”, “Physics of semiconductor devices”, “Physical installations”, “Physical fundamentals of nanoelectronics”, “Rad-hard and fault-tolerant systems”, “Micro- and nano-electronic sensors”, “Contemporary micro- and nanoelectronic technologies”, “Reliability and radiation hardness of microelectronic devices and systems”.

Part of the curriculum is also implemented in English.

The combination of a profound theoretical training with necessary practical skills in the research and design of

microelectronic devices and systems will ensure for high reguestability on the labour market and create the conditions for a fast professional growth.

The base of industrial and/or scientific practice and employment

- Dukhov All-Russia Research Institute of Automatics,
- Research Institute of Instruments,
- Eleron Special Research and Production Association,
- SRISA of the Russian Academy of Sciences,
- Institute of Space Instrument Engineering,
- Module Research Center,
- Research Center of Computer Technology,
- JSC Russian Space Systems.

Specializations within this programme

Objects of the professional activity

Characteristics of the field and objects of the professional activity of expected graduates: employment in research and design institutions and enterprises of the nuclear, aero-space, radio-electronic industries and adjoining branches in the capacity of masters-researchers and designers of new type microelectronic devices and systems of various purposes, including the systems, implemented on chip.