

Laser photonics, electronics and engineering of nanosystems

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

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

Language of study: **Russian**

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

Duration: **4 years**

Availability of free education: **yes**

Price: **316 290 rubles per semester**

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Goals of the program "Laser photonics, electronics and engineering of nanosystems":

The program prepares bachelors able to work successfully in the activities related to fundamental and applied aspects of physics of nanostructures and nanophotonics, organic electronics and sensor nano-hybrid systems, and nuclear physics in relation to the problems of security of the State, a highly sensitive detection in the field of ecology, biology and medicine with competence promoting social mobility and stability in the labor market with the possibility to continue their studies in master.

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

Research, development and technology in the field of condensed matter physics; studies of nonequilibrium processes of distribution and interaction of radiation with objects, processes initiated by radiation in nanostructures; creation and use of devices and systems for the study of micro- and nano-structured materials, including photoprocesses at the nanoscale; development of advanced methods and tools for highly sensitive analysis of air and surface phase with the use of nanostructures, quantum dots, and sensors.

Brief description of the curriculum

The special feature of the curriculum of the educational process for the program is the combination of the basic fundamental physical and mathematical and engineering training, which is complemented by profile preparation in courses "Physics of micro- and nanosystems", "Physics of nanostructures and nanophotonics", "Spectral methods of research" and others and a workshop on the specialty. The training program also includes courses in information security, modern languages and programming methods, mathematical modeling of physical processes. The approach used allows logically connect and mutually complement the theoretical and experimental courses of academic disciplines taking into account the specifics of a possible future professional activity of students (research and development, production and technology, design, organization and management).

Modules

1. Basic Module (basic training in the humanities, natural sciences, and general professional disciplines for all-round development of the personality).
2. Professional Module (special courses for mastering the basics of the profession).

The base of industrial and/or scientific practice and employment

Scientific research institute of special equipment, the State Research Center 'Institute of High Energy Physics'

(Protvino), Institute of General Physics, Russian Academy of Sciences, Research Institute "Polyus", Federal State Unitary Enterprise "Research Institute of Biological Instrument", Center for microtechnology and diagnostics St. Petersburg State Technical University "LETI", SSC "Kurchatov Institute". Graduates of the department of "Physics of micro- and nanosystems" work in leading research centers in the country and abroad (USA, Germany, France, UK and so on). They are also demanded in the high-tech enterprises of the industrial sector in Russia. They are able to participate in programs of innovative development of the country's leading enterprises.

Specializations within this programme

Nuclear physics and technologies

Objects of the professional activity

Semiconductor, organic and hybrid nanomaterials, semiconductor nanoparticles, organic solar cells and LEDs, photonic crystals, thin films, nanopowders, sensors and sensor elements microcavities; their development and application for solving problems in the field of medicine, biology and safety.

The training program includes the achievement by the graduates of a wide spectrum of competencies that make it possible to conduct research and to solve problems in the physics of nanostructures, nanophotonics, laser physics, in the field of condensed matter, nanotechnology, physics of fast processes, in the field of medical physics and biophysics, nuclear and radiation safety control systems and automated control of nuclear physics facilities.