

# Mathematical modeling in condensed matter physics

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**

Duration: **4 years**

Availability of free education: **yes**

Price: **213 460 rubles per semester**

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## Goals of the Program

The purpose of the program is the training of skilled workers for scientific and industrial organizations, where researchers with fundamental physical and mathematical education and with skills of specialists in the field of the applied mathematics and informatics are needed.

## Basic department

Department of Condensed Matter Physics

## Brief description of the curriculum

Curriculum of Bachelor program "Applied Mathematics and Computer Science" focuses on the physical and mathematical disciplines and development ability of listeners in the area of information technology. An attractive aspect of the program is the in-depth study of the theory in the field of mathematical modeling and information technology (programming languages, databases, computer networks, etc.).

*The curriculum consists of two stages:*

1. basic training, which is unified for the faculty of Experimental and Theoretical Physics, in the humanities, natural sciences, and general professional disciplines within two years;
2. the main series of special disciplines (the 3rd and 4th courses): "Theory of Field," "Quantum Mechanics," "Statistical Physics," "Introduction into Quantum Information Science," "Theory of Probability and Mathematical Statistics," "Discrete Mathematics," "Languages, Programming and Translation Methods: Instrumental Methods of Mathematical Modeling," "Workshop on the Computer: The Modern Means of Computer Simulation," "Numerical Methods: Numerical Methods and Mathematical Modeling," "Workshop on the Computer: Computer Geometry and Visualization," "Optimization Techniques," etc.

In addition to the main special subjects, special courses are taught in 4th year of the undergraduate (and, thereafter, master's degree) school by specialized authors on several fronts, deepening knowledge in the field of relevant research: "Asymptotic Methods," "Interaction of Radiation with Matter," "Physics of semiconductors," "Transport and Recombination of Charge Carriers in Disordered Organic Materials," "Computer Modeling of Physical Processes," and "Introduction into Physics of Nanostructures."

*Practices:*

1. Workshop on the computer (teaching practice is carried out in semesters 6-8);
2. Research work of students is held in semesters 6-8);
3. Pre-diploma practice (held for 6 weeks: from April 25 till June 6 for the 4th year bachelors)"

## **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 course for mastering the basics of the profession).

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

National Research Centre “Kurchatov Institute”, Russian Federal Nuclear Center – All-Russia Research Institute of Experimental Physics (Sarov), Dukhov All-Russia Research Institute of Automatics, Center for Photochemical Sciences of the Russian Academy of Sciences, etc.

Graduates are currently required in a variety of businesses and research organizations of the Rosatom State Corporation, federal nuclear centers, the Russian Academy of Sciences, etc., including Ioffe Physical and Technical Institute of the Russian Academy of Sciences and Scientific and Engineering Centre for Nuclear and Radiation Safety.

## **Additional information**

Personnel trainings are planned for the following programs: "Personnel Training for Russian Scientific Centers", "Training of Personnel for the Federal Nuclear Centers," "Program of Innovative Development of State Corporation Rosatom," etc.

## **Specializations within this programme**

### **Applied Mathematics and Informatics**

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

Academic, research and departmental organization related to solving scientific and technical problems; research and computing centers; research and production associations; educational organizations of secondary professional and higher education; state government; organization of Ministries of the Russian Federation; organization of various forms of ownership, industry and business engaged in the development and use of information systems, scientific achievements, products and services in the field of applied mathematics and Informatics.