

# Protected High Performance Computing Systems

## National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

Degree or qualification is awarded: **Master's degree**

Language of study: **Russian**

Mode of study: **full-time**

Duration: **2 years**

Availability of free education: **yes**

Price: **123 700 rubles per semester**

Programme curator: **Aleksandr B. Vavrenyuk**

Tel.: **Contact name: Olga N. Petukhova, Phone number. +74957885699, ext. 8045**

E-mail: [ONPetukhova@mephi.ru](mailto:ONPetukhova@mephi.ru)

**Program manager:** Head of the Department, Doctor of Technical Sciences, Professor Ivanov Mikhail Alexandrovich

**Contact person:** Vavreniuk Alexander Borisovich, [abvavrenyuk@mephi.ru](mailto:abvavrenyuk@mephi.ru)

### **PROGRAM DESCRIPTION The purpose of the program:**

Training in the interests of scientific and manufacturing enterprises, scientific organizations and government agencies, industrial enterprises and enterprises of defense industry complex (DIC) of qualified specialists for research and development and design and technological activities in the field of creation and operation protected high-performance computing systems.

### **Abstract:**

The program provides the formation of competencies in the field of high-performance computing (including the use of hybrid supercomputer technologies), development of digital equipment using advanced methods and tools of FPGA design. Master's degree graduates also have competences in the field of information systems architecture, development of secure system and application software (including for mobile devices) using CASE-technologies. Much attention is paid to the training of competitive personnel in the interests of informatization of high-tech industries in the globalization of the world information space.

**The field of professional activity of graduates** under the master's program "Protected high performance computing systems" includes: creation and operation of protected computer systems and networks, design of digital equipment on FPGA, development of system and applied software, complex analysis of information systems security.

**Objects of professional activity of masters are:** protected high-performance computing systems, mathematical, information, technical, linguistic, software, ergonomic, organizational and legal support of systems. Protected high-performance computing systems are complex computing systems designed for high-performance processing of large data arrays. The theory, methods and means of designing such systems form the basis of professional activity of masters.

After mastering the program graduates possess knowledge in the field of designing and operation of modern high-performance computer systems, their software, and also methods of processing of the big data files. The curriculum of the program combines theoretical preparation and performance of research works within the limits of industrial practices which subjects is formed proceeding from scientific interests of the future master, and also considers requirements of the enterprises at target preparation.

Research work (R&D) is an independent work of future masters and is a theoretical and experimental study related to the solution of individual, specific problems determined by the peculiarities of training on the master's program "Protected high performance computing systems". Research topics are aimed at researching methods of solution and solving a specific practical or scientific problem. Master's program takes into account the requirements of professional standards in the field of communications, information and communication technologies.

### **Actuality of the program:**

Experts with knowledge of features of designing and operation of the protected high-efficiency computer systems are demanded more than ever in the labor market. Competencies obtained by the graduates of the program in the study of professional disciplines, as well as in the performance of research and development / practice, prepare future masters for successful work in all high-tech areas where it is required to apply modern secure information technologies. Graduates of MEPhI traditionally have wide opportunities for professional and career growth in the leading companies-developers of computer systems and research and innovation centers.

### **Basic disciplines:**

Information systems architecture	Circuit base of digital devices
Cryptographic methods of information security	Operating system architecture
Computer systems	Hybrid supercomputer technologies
Intelligent systems	Data science and big data analysis

## **PROFESSIONAL ACTIVITY**

### **Graduates' competencies:**

During the training the graduates of the master's program form professionally specialized competences in the field of creation and maintenance of protected high-performance computing systems and their software. The graduates of the program are able to design, create, use and operate protected high-performance computing systems, as well as assess, control and manage the process of software development, organize the work on the interface of hardware and software.

### **Demand in the labor market:**

Our graduates successfully carry out the professional activity in such well-known organisations, establishments as:

- MEPhI;
- at the leading enterprises of the state corporation ROSATOM;
- JSC "MTSST";
- at the leading enterprises of the defense industry (JSC Concern Air Defense "Almaz-Antey", etc.);
- at the leading institutes of the Russian Academy of Sciences.

### **Practice and internships:**

Within the framework of their training, master's students undergo practical training and carry out research and development work at the enterprises of the state corporation ROSATOM, large IT-companies, MEPhI and target enterprises and partner enterprises, such as Almaz-Antey Air Defense

Concern OJSC, ICST JSC.

## **Specializations within this programme**