Program Supercomputer Technologies in Engineering and Physical Modeling

Level: 03.03.01 Bachelor's Degree Subject: APPLIED MATHEMATICS AND PHYSICS

Mode of study: full-time Duration: 4 years

Graduation department: the program is implemented at the Department "Supercomputer modeling of engineering and physical processes" (№97) of the Institute for Laser and Plasma Technologies of the MEPhI University.

Program supervisor PhD Vladimir A. Shargatov, Director of the Center for Multiphysics Simulation and Supercomputer Modelling

Program aim:

The aim of the program is the training of highly qualified specialists in the field of mathematical modelling using high-performance computing (HPC) systems. Graduates of the program acquire unique skills and knowledge to implement the conception of the digital twin in the development and exploitation of complex engineering physics systems and technologies.

Curriculum features:

The education program possesses a multidisciplinary format and is on an intersection of such fields of science as mathematics, physics, and programming. The curriculum includes basic and specialized disciplines, academic, research, production, and undergraduate practices, as well as preparation of bachelor's project. The basic part of the program includes fundamental courses on theoretical physics and applied mathematics together with modern methods of mathematical simulation of physical processes. The specialized one includes unique courses on computing system architecture, scientific visualization, parallel programming, and modelling methods using modern supercomputer technologies and software for multiphysics simulation.

Competences:

The result of education is a fundamental understanding of physical principles of engineering systems and technologies, skill to formulate mathematical models of processes taking place in them, the ability to provide numerical experiments on that basis in applied software, and to analyze their results. Competences acquired during education have an applied nature and in demand in the service market of knowledge-intensive products.

Infrastructure:

The educational process uses the advanced infrastructure of Center for Engineering Physics and Supercomputer Simulation. During education, our students have an opportunity to apply skills and knowledge obtained for solving actual applied problems in the student research laboratory with a priority access to the cutting-edge supercomputer resources of Russia.

Partners and employment:

The distinctive feature of the education program is the involvement of highly qualified specialists in computational mathematics from the leading research institutes of Russian Academy of Sciences and uninterrupted collaboration with high-technological companies for actual applied problem solving. The partners of the program are knowledge-intensive companies in such branches of industry as aviation, aerospace industry, mechanical engineering, shipbuilding and automotive industry, nuclear and laser technologies.