

# Fundamental and Applied Physics (together with HSE, Moscow)

Far Eastern Federal University

Degree or qualification is awarded: **Bachelor**

Language of study: **Russian**

Mode of study: **full-time**

Duration: **4 years**

Availability of free education: **yes**

Price: **210 000 rubles in year**

Programme webpage at the university website:

[https://www.dvfu.ru/upload/medialibrary/fec/m3lo4ln4ogad8tovyn2u74lhcllzk4np/%D0%9F%D0%B0%D1%81%D0%BF%D0%BE%D1%80%D1%82%20%D0%9E%D0%9F%2003.03.02\\_%D0%A4%D1%83%D0%BD%D0%B4%D0%B0%D0%BC%D0%B5%D0%BD%D1%82%D0%B0%D0%BB%D1%8C%D0%BD%D0%B0%D1%8F%20%D0%B8%20%D0%BF%D1%80%D0%B8%D0%BA%D0%BB%D0%B0%D0%B4%D0%BD%D0%B0%D1%8F%20%D1%84%D0%B8%D0%B7%D0%B8%D0%BA%D0%B0\\_2022.pdf](https://www.dvfu.ru/upload/medialibrary/fec/m3lo4ln4ogad8tovyn2u74lhcllzk4np/%D0%9F%D0%B0%D1%81%D0%BF%D0%BE%D1%80%D1%82%20%D0%9E%D0%9F%2003.03.02_%D0%A4%D1%83%D0%BD%D0%B4%D0%B0%D0%BC%D0%B5%D0%BD%D1%82%D0%B0%D0%BB%D1%8C%D0%BD%D0%B0%D1%8F%20%D0%B8%20%D0%BF%D1%80%D0%B8%D0%BA%D0%BB%D0%B0%D0%B4%D0%BD%D0%B0%D1%8F%20%D1%84%D0%B8%D0%B7%D0%B8%D0%BA%D0%B0_2022.pdf)

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The Bachelor's degree program "Fundamental and Applied Physics" (Together with the Higher School of Economics, Moscow) is based on a combination of intensive fundamental training of students in mathematics, general, theoretical, computational physics and special training of students with their gradual inclusion in real research work. Graduates of the program will acquire the necessary skills of researchers and gain in-depth knowledge in the field of natural sciences. In the course of training, students will form physical and mathematical thinking, receive a high-quality and modern education with a set of competencies that ensure the practical implementation of acquired knowledge in the fields of science, production, education and entrepreneurship, prepare for activities in the field of research, analysis and modeling of physical phenomena at micro-, macro- and mega-levels.

Students will be able to choose special courses close to their professional preferences, develop theoretical models, conduct experiments, process results and compile reports, learn how to solve problems posed by both modern physics and various branches of science and technology.

Key disciplines and modules:

Module of general physics (mechanics, molecular physics, electricity and magnetism, optics, atomic physics, physics of the atomic nucleus and elementary particles);

Mathematical module (mathematical analysis, linear algebra and analytical geometry, vector and tensor analysis, differential and integral equations, calculus of variations, probability theory and mathematical statistics, elements of functional analysis, group theory);

Module of theoretical physics (theoretical mechanics, continuum mechanics, electrodynamics, quantum mechanics, thermodynamics and statistical physics, condensed matter physics, methods of mathematical physics, semiconductor physics, physics of magnetic phenomena);

Specialization module "Theoretical Physics" (geometric principles of modern physics, vibrations and waves, theory of phase transitions, theory of gravity, introduction to astrophysics, quantum field theory, method of functional integration in quantum theory);

Module of specialization "Optics and spectroscopy" (laser physics and nonlinear optics, modern fundamentals of atomic and molecular spectroscopy, interaction of laser radiation with matter, laser spectroscopy, modern medical and bioengineering physics, remote methods of studying the environment, quantum modeling and molecular design, 1

symmetry in physics and the structure of matter);

Specialization module "Nanophysics" (methods of synthesis and research of nanostructures and nanomaterials, processes of obtaining nanoparticles and nanomaterials; nanotechnology, phase transformations in metals and alloys, crystallography and crystallophysics, fundamentals of micromagnetism, spintronics, fundamentals of spin-orbitronics and skyrmionics).

The most important element of training is laboratory workshops, which take place in the FEFU research laboratories, institutes of the Far Eastern Branch of the Russian Academy of Sciences and other organizations that are part of the Integration consortium. Starting from the third year, students are assigned to departments that specialize in narrower areas in accordance with their wishes and abilities.

## **Specializations within this programme**