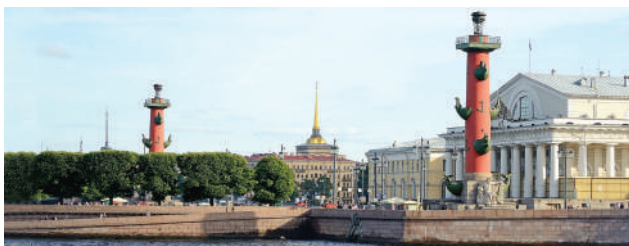




KEY FACTS

▶ Admission requirements	Candidates are required to hold a Bachelor's degree in Physics, Engineering Physics, Applied Physics, Materials Science or similar. All applicants must demonstrate B+ level English skills.
▶ Admission tests	Examination in the field of Physics and interview with program coordinator.
▶ Admission procedure	Written on-line application. Application deadline: June, 30. The additional information is available at the official web-site www.eng.spbstu.ru
▶ Program starts	Autumn semester – September, 1st
▶ Program duration	2 years
▶ Degrees awarded	Master of science (MSc)
▶ Tuition fee	for Russian students — 150 000 RUB / year for foreign students — 210 000 RUB / year



CONTACT INFORMATION

Peter the Great St. Petersburg Polytechnic University,
Tel.: +7 (812) 552-77-90
Fax: +7 (812) 552-75-74
E-mail: polozkov@tuexph.stu.neva.ru
Address: Polytechnicheskaya, 29, Main University building
195251 St.Petersburg, Russia

Program coordinators:
Prof. DSc. Vadim Ivanov
e-mail: ivanov@tuexph.stu.neva.ru
Acc. Prof. Dr. Roman Polozkov
e-mail: polozkov@tuexph.stu.neva.ru

MASTER OF SCIENCE IN PHYSICS

MESOSCOPICS AND ADVANCED MATERIALS

International Master's Degree Program in English

Key information about the study program in Saint-Petersburg, Russia



www.eng.spbstu.ru

- World-class professors from SPbPU and leading universities. We work with professionals to make sure that our courses are current and meet professional and high technology standards.
- The program gives you a detailed knowledge of state-of-the-art materials systems, and of how their structure is engineered from the nanoscale upwards. You will get the essential skills needed to select and design the next generation of high technology materials of the 21st century.
- A MSc in Physics degree helps prepare you to do almost anything. An incredible range of careers benefit from the analytical skills – the problem solving skills of physics, and from an understanding of the fundamentals behind science and technology that a physics degree provides.
- Unique opportunity for international mobility. Possible semester abroad at academic partners of the program and other SPbPU partners.
- You will have a chance to discover the magic of St. Petersburg, one of the world's most beautiful cities.



Peter the Great St. Petersburg Polytechnic University

SPbPU was founded in the year of 1899 and since then it has been one of the Russian leaders in the field of physics, mathematics and higher engineering education. Nobel Prize winners Peter Kapitsa, Nikolay Semenov, Zhores Alferov are just a few names among hundreds of talented scientists whose activities are connected with Polytechnical University.

Institute of Physics, Nanotechnology and Telecommunications, founded in 2013 after the reorganisation of SPbPU, includes 3 study areas: Physics and Nanotechnologies, Electronics and Telecommunications, and Medical Physics and Bioengineering. The scientific guide of the Institute is Nobel Prize winner academician Zhores Alferov. Focus areas of research at the Institute include nanotechnology, biotechnology, materials physics, high energy physics, laser physics, integrated optics, telecommunications and others.

Curriculum

1st SEMESTER	
▶ Core courses (20 ECTS)	<ul style="list-style-type: none"> Philosophy of natural science (4 ECTS) Physics of condensed matter (4 ECTS) Nanomechanics of materials and systems (4 ECTS) Dimensional quantisation phenomena (4 ECTS) Computer modelling of the atomic clusters and fullerenes (4 ECTS)
▶ Elective courses (3 ECTS)	<ul style="list-style-type: none"> Electronic paramagnetic resonance: fundamentals and applications / Physics of disordered nanosystems (3 ECTS)
▶ Communication skills (4.5 ECTS)	<ul style="list-style-type: none"> LaTeX (2 ECTS) Presentation skills (2.5 ECTS) Optional Russian language (for foreign students) (2 ECTS)
2nd SEMESTER	
▶ Core courses (17 ECTS)	<ul style="list-style-type: none"> Spectroscopy of atoms, molecules and clusters 4 ECTS Technology of advanced materials and structures, (4 ECTS) Fundamentals of modern techniques to study nanomaterials and nanostructures (4 ECTS) Practical characterisation of solid state surfaces with electron spectroscopy (3 ECTS) Computer modelling of light interaction with metal nanostructures (2 ECTS)
▶ Elective courses (6 ECTS)	<ul style="list-style-type: none"> Nonequilibrium processes in low-dimensional systems / Fractals and chaos in condensed matter (3 ECTS) Advanced glassy materials / Plasmonics (3 ECTS)
▶ Research and training (9.5 ECTS)	<ul style="list-style-type: none"> Personal research project, 5 ECTS Professional training, 4.5 ECTS Optional Russian language (for foreign students) (2 ECTS)
3rd AND 4th SEMESTERS	
▶ Core courses (8 ECTS)	<ul style="list-style-type: none"> Advanced problems in physics (5 ECTS) History and methodology of physics (3 ECTS)
▶ Elective courses (6 ECTS)	<ul style="list-style-type: none"> Theoretical physics of bio-nanosystems / Quantum many-body theory (3 ECTS) Surface physics / Optical properties of nanostructures (3 ECTS)
▶ Research and training (25 ECTS)	<ul style="list-style-type: none"> Personal research project (2.5 ECTS) Professional training (22.5 ECTS)
▶ MSc thesis (21 ECTS)	<ul style="list-style-type: none"> Final project work (19.5 ECTS) MSc thesis presentation (1.5 ECTS)

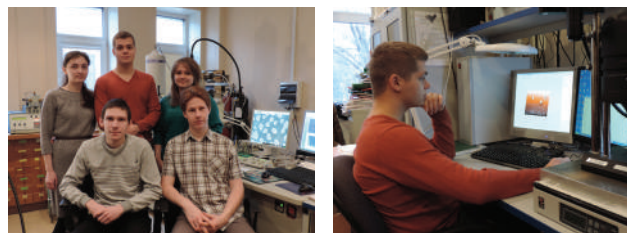
Master's Thesis has to be defended in front of the committee consisting of professors and corporate representatives.

MSc in Physics

The program is delivered by professors and associate professors of Peter the Great St. Petersburg Polytechnic University as well as invited lecturers from top-level world-wide universities. Within the program all the lectures and tests are provided in English.

Objective of the program

The program MSc in Physics is tailored to BSc graduates who wish to deepen their knowledge of physics and who are looking to pursue a research career within a university, industrial or research laboratory. The program provides professional knowledge and practical skills in the prospective areas of modern physics: mesoscopics and physics of advanced materials possessing unique properties. Upon graduation students will have acquired qualification needed for successful career in the field of design and applications of novel optical materials, including metamaterials and heterogeneous nanomaterials, as well as R&D in nanotechnologies.



KEY ADVANTAGES

fundamental background in the top of modern physics;

excellent analytical, critical and problem solving skills;

communication and study skills: ability to write an internally consistent scientific document, to manage their own learning and to make use of primary research sources and reviews;

transferable skills necessary for employment: initiative, decision making and ability to undertake further professional training.

Duration and format

2 years, full-time

Total workload

120 ECTS

TEACHING METHODS

Teaching methods include lecturing, seminars, labs and computer modeling of physical processes, combining practical skills and fundamental knowledge. Research in international scientific teams and participation in international research projects are also possible.

PROGRAM PARTNERS

1. Frankfurt Institute for Advanced Studies, Frankfurt, Germany



The Frankfurt Institute for Advanced Studies (FIAS) brings together researchers in the areas of physics, mathematics, brain research, life science, and computer science. As a platform for integrating the sciences, FIAS provides a foundation for decisive progress in research through cooperation, exchanging ideas, and overcoming structural barriers between the disciplines.

2. Science Institute, University of Iceland, Reykjavik, Iceland

The University of Iceland is a progressive educational and scientific institution, renowned in the global scientific community for its research.

It is a state university, situated in the heart of Reykjavik, the capital of Iceland. A modern, diversified and rapidly developing institution, the University of Iceland offers opportunities for study and research in almost 400 programs spanning most fields of science and scholarship: Social Sciences, Health Sciences, Humanities, Education, Natural Sciences and Engineering.

3. Nanyang Technological University (NTU), Singapore



NTU is the fastest-rising Asian university among the world's top 50 universities. Ranked 41st in the world, it is also placed 2nd globally among young elite universities. In research,

the university is ranked among Asia's top 50 universities for research citations per paper, a reflection of the high quality of the research by its professors and researchers.

4. The University of Tennessee, Knoxville, TN, USA



Through the combined force of its education, research and outreach, the University of Tennessee serves students, business and industry, schools, governments, organisations and citizens throughout the state.

Statewide, the University provides a range of accessible and affordable educational opportunities at the undergraduate and graduate levels, as well as highly regarded professional schools.