



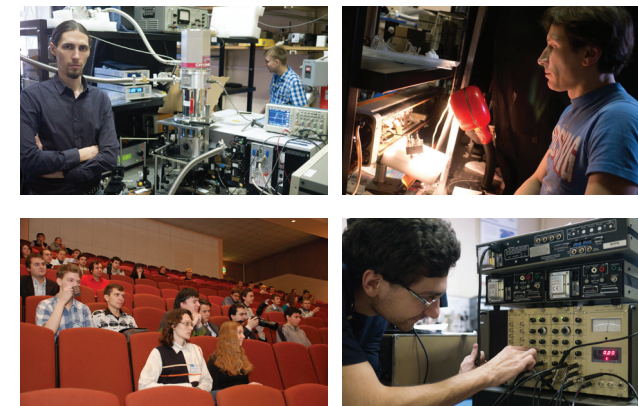
Why Master's degree program in Photonics and Nanoelectronics at Peter the Great St. Petersburg Polytechnic University?

- Nowadays the main feature of electronics development is the high rate of realization of scientific ideas into industrial products. The Program Photonics and Nanoelectronics provides students with knowledge and skills required for the implementation of physical principles into electronic and photonic devices.

- The Program combines profound knowledge of physics and mathematics with practical skills to build a chain planning – designing – industry – application.

- Graduates of the Program are ready for quick adaptation to work in a research team.

- The Program "Photonics and Nanoelectronics" gives the students an opportunity to apply their knowledge and perform research projects in scientific or industrial environment.



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 Polytechnic University.

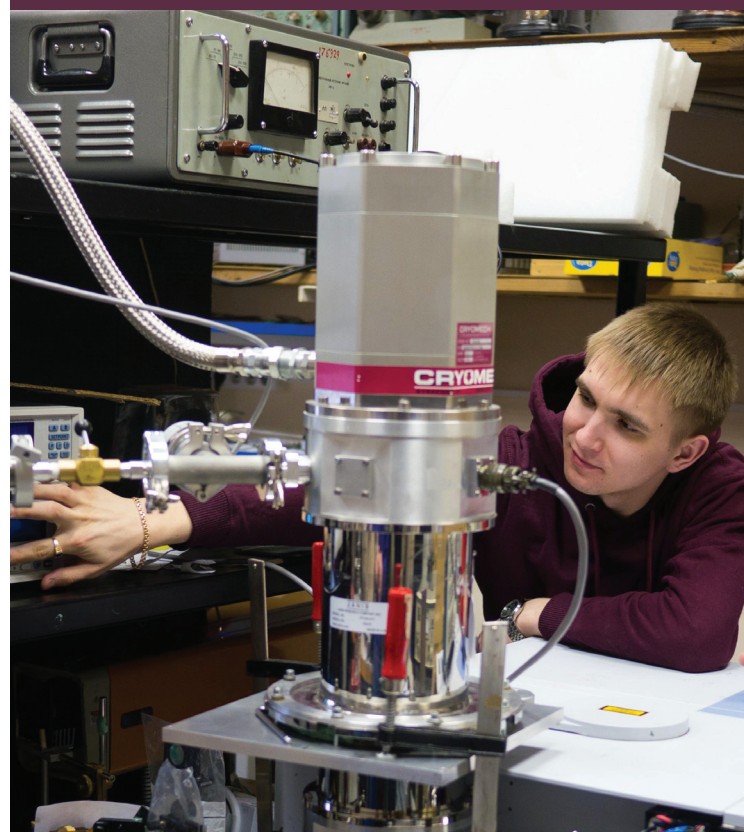
Institute of Physics, Nanotechnology and Telecommunications, founded in 2013 after the reorganization of SPbPU, includes 3 study areas: Physics and Nanotechnologies, Electronics and Telecommunications, and Medical Physics and Bioengineering. The scientific guide of the Institute is Nobel Prize winner 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.

MASTER OF SCIENCE IN ELECTRONICS AND NANO ELECTRONICS

PHOTONICS AND NANO ELECTRONICS

International Master's Degree Program in English

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



www.eng.spbstu.ru

KEY FACTS

► Admission requirements

Candidates are required to hold a Bachelor in Physics, Applied Physics, Material Science or similar. A background in solid state or semiconductor physics is highly preferable. All applicants must demonstrate English proficiency at B+ level. Candidates are required to hold a Bachelor in Physics, Applied Physics, Material Science or similar. A background in solid state or semiconductor physics is highly preferable. All applicants must demonstrate English proficiency at B+ level.

► Admission tests

Examination in the field of physics and interview with the program coordinator (optional via Skype).

► Admission procedure

Written on-line application. Application deadline – June, 30. The additional information is available at the official web-site <http://eng.spbstu.ru/>.

► Program starts

September, 1

► Program duration

2 years

► Total workload

120 ECTS

► Degrees awarded

Master of Science (MSc)

► Tuition fee

for Russian students — 150 000 RUB / year
for foreign students — 210 000 RUB / year

FOR FURTHER INFORMATION PLEASE CONTACT:

Peter the Great St. Petersburg Polytechnic University

Tel.: +7 (812) 552-96-71

Fax: +7 (812) 552-95-16

E-mail dmfir@rphf.spbstu.ru

Address: Polytechnicheskaya, 29, Building 2
195251 St.Petersburg
Russia

Program coordinator

Prof. DSc. Dmitry Firsov

e-mail dmfir@rphf.spbstu.ru

Curriculum

Year 1, 60 ECTS

| 1st semester | |
|---|---|
| ▶ Core courses, 16 ECTS | <ul style="list-style-type: none"> • Computer technology in scientific research, 2 ECTS • Optical waves in crystals, 2 ECTS • Optical properties of semiconductors, 3 ECTS • Electron transport phenomena in semiconductor nanostructures, 3 ECTS • Epitaxial growth of nanostructures, 3 ECTS • Dimensional quantization phenomena, 3 ECTS |
| ▶ Elective courses, 2 ECTS | <ul style="list-style-type: none"> • Electronic paramagnetic resonance: fundamentals and applications/Physics of disordered nanosystems, 2 ECTS |
| ▶ Scientific and research work, 8 ECTS | |
| 2nd semester | |
| ▶ Core courses, 15 ECTS | <ul style="list-style-type: none"> • Methods of mathematical modeling, 2 ECTS • Actual aspects of modern electronics and nanoelectronics. Basics of nanotechnologies, 3 ECTS • Design and technology of electronic components, 5 ECTS • Fundamentals of modern techniques to study nanomaterials and nanostructures, 2 ECTS • Semiconductor lasers, 3 ECTS |
| ▶ Elective courses, 6.5 ECTS | <ul style="list-style-type: none"> • Photonic glasses/Fractals and chaos in condensed matter, 2 ECTS • Seminar on nanoelectronics /Seminar on nanophotonics, 1.5 ECTS • Semiconductor devices / Plasmonics, 3 ECTS |
| ▶ Research and training, 12.5 ECTS | <ul style="list-style-type: none"> • Scientific and research work, 8 ECTS • Professional training, 4.5 ECTS |

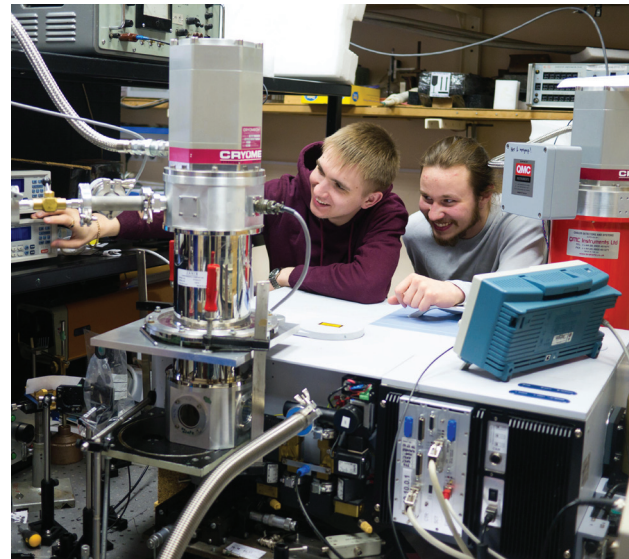
Year 2, 60 ECTS

| 3rd semester | |
|---|--|
| ▶ Core courses, 15 ECTS | <ul style="list-style-type: none"> • History and methodology of electronics, 4 ECTS • Optical phenomena in nanostructures, 4 ECTS • Nanophotonics, 4 ECTS • Wide-band semiconductors, 3 ECTS |
| ▶ Elective courses, 5.5 ECTS | Seminar on nanophotonics /Seminar on nanoelectronics, 2.5 ECTS Ultracompact light sources and controllers / Optical waveguides and microresonators, 3 ECTS |
| Research and training, 8 ECTS | |
| 4th semester | |
| ▶ Trainings, 25.5 ECTS | <ul style="list-style-type: none"> • Professional training, 21 ECTS • Teaching training, 1.5 ECTS • Master's Theses training, 3 ECTS |
| ▶ Master's Thesis completion, 6 ECTS | |

MSc in Electronics and Nanoelectronics

Objective of the Program

Photonics and Nanoelectronics are the disciplines that will play a key role in the technology development of the future. The Master's degree program "Photonics and Nanoelectronics" is designed to give students a comprehensive knowledge of the state of the art in experimental techniques and theoretical methods in this area. Major activities are based around modern optics, electronics, laser development, semiconductor physics, and materials technology. Graduates of this course will have acquired a qualification needed to apply their knowledge in a variety of industries and Research & Development centers. Addressed to international audience, the Master's degree program "Photonics and Nanoelectronics" is fully taught in English.



KEY ADVANTAGES

- basic background in the top of modern physics
- excellent analytical, critical and problem solving skills
- chance to undertake a self-study project in an area of your choice
- employment with a variety of careers in industry and ability to move on to doctoral studies

Duration and format

2 years, full-time

Total workload

120 ECTS

TEACHING METHODS

The Program offers a wide range of core and optional courses, taught by experts in the field, including lectures, seminars, labs and computer modeling of photonic and nanoelectronic devices. A self-study activity assessed by an oral presentation is intended to encourage initiative and self-sufficiency in the learning process. Research work in international scientific teams and participation in international research projects are also possible.

PROGRAM PARTNERS



LUT Lappeenranta University of Technology, Lappeenranta, Finland
Lappeenranta University of Technology (LUT) is a pioneering science university in Finland, bringing together the fields of science and business since 1969. The international community is composed of approximately 6,500 students and experts engaged in scientific research and academic education. The university is constantly expanding its networks in both the business and the academic community.



University of Eastern Finland, Joensuu, Finland
The University of Eastern Finland is a multidisciplinary university, which offers teaching in more than

100 major subjects. The university's key interdisciplinary research areas are built around four global challenges: Ageing, lifestyles and health; Learning in a digitised society; Cultural encounters, mobilities and borders; and Environmental change and sufficiency of natural resources. The university has extensive international relations and it is involved in several international networks. The University of Eastern Finland seeks to be among the leading 200 research universities in the world.



Aalto University, Helsinki, Finland
Aalto University was created as a merger of three leading Finnish universities: the Helsinki University of Technology (established 1849), the Helsinki School of Economics (established 1904), and the University of Art and Design Helsinki (established 1871). The university comprises six schools with over 19,000

students and 5,000 staff members, thus being Finland's third-largest university. Aalto University is all about cross-disciplinary projects and learning in practice. Aalto University works towards a better world through top-quality research, interdisciplinary collaboration, pioneering education, surpassing traditional boundaries, and enabling renewal.