Get to know ENGINEERING PHYSICS

This program allows students to apply the knowledge of fundamental physical principles underlying modern technology and processes. You will study a strategic combination of math, physics, and engineering courses from a chosen specialty area. Courses in quantum mechanics, laser optics, and nanotechnology will help prepare you for an engineering career at the leading edge of technology. You will acquire advanced problem-solving and instrumentation skills, and will be able to apply your superior mathematical, analytical, and abstract-thinking ability to modern engineering challenges.

Degree OPTIONS

Bachelor of Applied Science in Engineering
Bachelor of Applied Science in Engineering with Professional Internship

All students in Engineering Physics specialize by taking one of 4 options: Mechanical, Computing, Electrical or Materials Engineering. Students in each option take a significant number of courses at the same level as those in the engineering major. Graduates of these specializations can work as engineers in their chosen specialization or continue to graduate school in either physics or their engineering option.

Smith Engineering ADMISSIONS

Students apply to Smith Engineering (QE) through the OUAC (Ontario University Application Centre) website. Secondary School prerequisites include these five 4U courses, English 4U, Calculus and Vectors 4U, Advanced Functions 4U, Chemistry 4U, and Physics 4U. Applicants outside of Ontario may have additional requirements.

Course HIGHLIGHTS

In addition to a variety of technical courses in their engineering option, Engineering Physics students have the opportunity to take a wide range of physics courses to help prepare them for many possible career destinations. Such courses including:

- Laser Optics
- Nanoscience and Nanotechnology
- Nuclear Physics
- Medical Physics
- Solid State Devices
- General Relativity
- Mathematical Methods in Physics
- High Performance Computing for Engineering Physics
- Advanced Mechanics
- Quantum Physics (Mechanics or Theory)

Students also do sophisticated experiments and work together in engineering design through all four years of the program.

“Queen’s Physics Professor Emeritus Dr. Arthur B. McDonald was awarded the 2015 Nobel Prize in Physics with Takaaki Kajita of Japan. His research, leading the Sudbury Neutrino Observatory, unlocked the mystery of neutrinos - fundamental particles created in the Sun’s core. Engineering Physics students have been involved in this research since its beginning, and continue to collaborate in world leading experiments and research during their studies.”

Acquire Skills. Gain Experience. Go Global. That is a degree from Queen’s.

queensu.ca/physics
2023-2024
Engineering Physics MAJOR
BACHELOR OF APPLIED SCIENCE | BACHELOR OF APPLIED SCIENCE WITH PROFESSIONAL INTERNSHIP

1ST YEAR
Smith Engineering first year is common – courses include: Physics, Chemistry, Calculus, Algebra, Graphics, Computing, and Earth Systems Engineering.

Also APSC10x, the entry level course in our Engineering Design and Practice Sequence (EDPS), focusing on problem solving, experimentation principles, and finishing off with a team-based engineering project.

Discipline selection will take place in February!

GET RELEVANT EXPERIENCE
Join teams or clubs on campus, or an engineering design team such as Queen’s University Experimental Sustainability Team, Queen’s Space Engineering Team, Queen’s Solar Design Team, and the Mostly Autonomous Sailboat Team.

See the AMS Clubs Directory or the Queen’s Get Involved page for more ideas.

GET CONNECTED WITH THE COMMUNITY
Volunteer on or off-campus with different community organizations, such as Let’s Talk Science (LTS), Women in Science and Engineering, Science Rendezvous, and Queen’s Students for Systems Change (SSC).

GET THINKING GLOBALLY
The Queen’s University International Centre is your first stop to learn how to internationalize your degree or to leverage your existing cross-cultural experience.

Speak to a QUIC advisor or get involved in their programs, events, and training opportunities.

GET READY FOR LIFE AFTER GRADUATION
Grappeling with program decisions? Go to the Orientation Evenings held by different Engineering departments and attend the various Career Fairs during the year.

Get some help deciding by visiting Career Services.

2ND YEAR
You will take a second engineering design course - APSC 200 - where we connect the physics you learn to the technology that helps society. More hands-on experience comes in laboratory and data management classes.

You start taking courses in your option (Mechanical, Materials, Electrical or Computer engineering) alongside your courses in physics, which will include Relativity & Quanta, Electricity & Magnetism, and Computational Engineering Physics.

GET RELEVANT EXPERIENCE
Look into summer jobs related to Engineering Physics or your engineering option by talking to the department or Career Services about work through SWEP or NSERC.

Take more responsibility within different clubs or extracurriculars. Consider entrepreneurial opportunities at programs like the Queen’s Innovation Connector Summer Initiative.

GET CONNECTED WITH THE COMMUNITY
Get involved with the Engineering Society (ENGSOC) and the Alma Mater Society (AMS). Start or continue volunteering with organizations such as the Commerce & Engineering Environmental Conference (CEEC).

GET THINKING GLOBALLY
Is an exchange in your future? Start thinking about where you would like to study abroad. Queen’s facilitates exchanges with some of the top schools for physics in the world: University of NSW, and Delft University, among others.

If exchange isn’t for you, come talk to QUIC about other options to gain international experience.

GET READY FOR LIFE AFTER GRADUATION
Explore different careers of interest in the Career Services Career Advising and Resource Area. For more information check out Career Cruising or by finding and connecting with alumni on Queen’s Connects.

3RD YE.
Courses deep from both a technical and a third EDPS design course.

Take 5-6 courses, focus on improving mathematical and computing skills.

Apply for NSER and internships at Queen’s or other engineering programs.

Consider applying for a research assistantship in the Quantic Laboratory.

Do some targeted networking with alumni in your chosen career of interest and start focusing on educational requirements for careers of interest.

Build your int getting involved in extracurricular activities. Consider joining QUIC or other community clubs.

How to use this map
Use the 5 rows of the map to explore possibilities and plan for success in the five overlapping areas of career and academics. The map just offers suggestions – you don’t have to do it all! To make your own custom map, use the My Major Map tool.
**OR MAP**

**YEAR**

- Deepen your knowledge of physics on a theoretical and practical side. Your 3rd year ENPH 354 design course deepens your ability to work as a team taking on technologies.
- Courses with engineering students in your option. Courses range from digital calculations to materials processing. From your chosen option.
- Applying to the Accelerated Master’s program.
- Consider applying to the Accelerated Master’s program for graduate school, look into the Accelerated Masters program where you start the Accelerated Masters program after your third and fourth year.
- Investigate requirements for full-time jobs or other opportunities related to careers of interest.
- Assess what experience you’re lacking and fill in gaps with volunteering, clubs, or internships – check out Career Services workshops for help.

**3RD YEAR**

- Consider joining professional associations like Canadian Association of Physics, American Physical Society, Institute of Electrical and Electronic Engineers, and American Society of Mechanical Engineers.
- Join groups on LinkedIn reflecting specific careers or topics of interest in Engineering Physics.
- Intercultural competence by being involved with other cultures or improving your language skills. Consider taking the Intercultural Awareness Training Certificate hosted by Smith Engineering.
- Prepare for work or studies in a multi-cultural environment by taking the Intercultural Awareness Training Certificate and research possible immigration regulations.
- International students interested in staying in Canada can speak with an International Student Advisor.

**4TH OR FINAL YEAR**

- All Eng Phys students participate in the “capstone” EDPS team-based project course – ENPH 454, in addition to an individual engineering thesis, an advanced laboratory course, and a high-level electromagnetic theory course.
- Choose technical elective courses from a huge range, including Laser Optics, Robotics, Computer Vision, High Performance Computing in Engineering Physics, Aerodynamics, and General Relativity.
- Investigate requirements for full-time jobs or other opportunities related to careers of interest.
- Assess what experience you’re lacking and fill in gaps with volunteering, clubs, or internships – check out Career Services workshops for help.

**CONSIDER A 12-16 MONTH QUIP INTERNSHIP**

- Apply to jobs or future education, or make plans for other adventures. Get help from Career Services with job searching, resumes, interviews, grad school applications, or other decisions.

### Employability skills

Smith Engineering will give you valuable skills to boost your employability:

- **Proficiency in mathematics and numerical modelling** with courses in math and physics
- **Time and resource management** – taught formally in class and then applied in your projects
- **Work independently and in a team on a project** – a group design project is undertaken every year and a thesis in the final year
- **Able to solve complex problems** using your broad scientific knowledge
- **You gain practical skills as an engineer**, and back them up with the deep knowledge of a scientist
- **Ability to make careful measurements**
- **Proficiency with modern physics**
- **Laboratory classes**
- **Modern and research possible equipment**

### Where could I go after graduation?

- Aerospace engineer
- Automotive industry
- Astrophysics
- Atmospheric science
- Biophysics
- Biomedical science
- Management consulting
- Medicine
- Nanotechnology
- Nuclear engineering
- Oceanography
- Quantum Physics
- Semiconductor and electronics
- Software engineering

Taking time to explore career options, build experience, and network can help you have a smoother transition to the world of work after graduation.
Get started thinking about the future now – where do you want to go after your degree? Having tentative goals (like careers or grad school) while working through your degree can help with short-term decisions about courses and experiences, but also help you keep motivated for success.

Get the help you need

Queen's provides you with a broad range of support services from your first point of contact with the university through to graduation. At Queen's, you are never alone. We have many offices dedicated to helping you learn, think and do.

Ranging from help with academics and careers, to physical, emotional, or spiritual resources – our welcoming living and learning environment offers the programs and services you need to be successful, both academically and personally. Queen's wants you to succeed! Check out the Student Affairs website for available resources.

Why study in Kingston?

For over 175 years, our community has been more than a collection of bright minds – Queen's has attracted students with an ambitious spirit. Queen's has the highest retention rates, the highest graduation rates, and one of the highest employment rates among recent graduates. We are a research-intensive university focused on the undergraduate experience. The BBC has identified Kingston as one of the GREATEST UNIVERSITY TOWNS in the world – and it is often identified as the safest city in Canada. It is a university city at the core; just a quick drive to Toronto, Montreal, Ottawa and even New York. At a university with more clubs per capita than any other university in Canada, and in a city with more restaurants per capita than any other city in North America, you will have the experience of a lifetime at Queen's – and graduate with a degree that is globally recognized among the best.