

Engineering Physics

Queen's
UNIVERSITY

FACULTY OF
ENGINEERING AND
APPLIED SCIENCE

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.

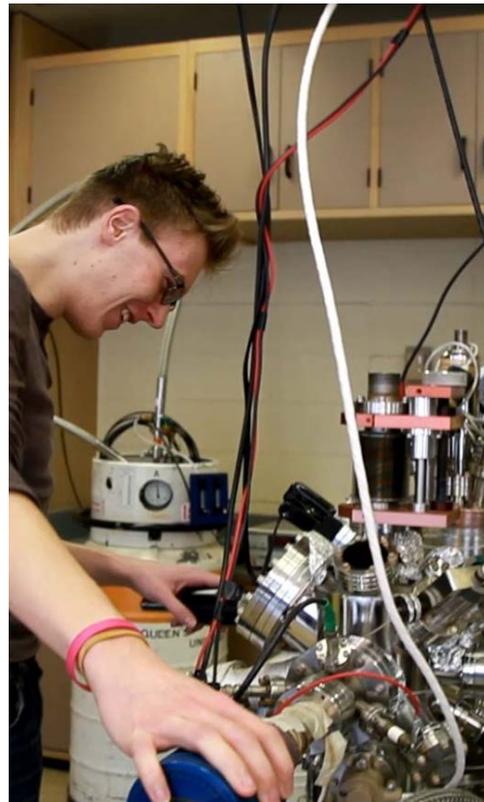
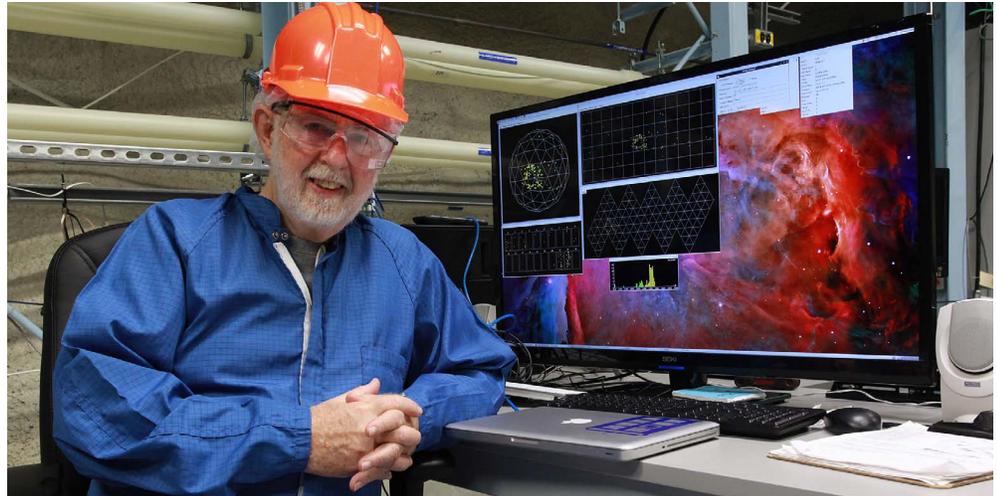


Photo by: Bernard Clark Photography



"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."

Degree **OPTIONS**

Bachelor of Science in Engineering

Bachelor of Science in Engineering with Professional Internship

Specialization in Mechanical / Computing / Electrical / Materials Engineering

Queen's **ADMISSIONS**

Students apply to Queen's Engineering (QE) through the OUAC (Ontario University Application Centre) website. Secondary School prerequisites include six 4U and 4M courses, one of which must be English 4U. Calculus and Vectors 4U, Chemistry 4U, and Physics 4U are all required along with one of Advanced Functions 4U, Biology 4U, Data Management 4U, Computer Science 4U, Earth and Space Science 4U. A final grade of 70% must be obtained in English 4U. Applicants outside of Ontario may have additional requirements.

A Common **START**

Queen's is unique in offering a common First Year along with an open discipline choice. When you do choose your program, you don't have to worry about caps or quotas. Provided you pass all of your First Year courses, you are guaranteed a place in your engineering program of choice. Queen's also offers J-Section, a special extended program for students struggling with First Year courses. Take things at a slower pace and recover in time for Second Year.

Course **HIGHLIGHTS**

Engineering Physics students have the opportunity to take a wide range of technical courses to help prepare them for the many possible career destinations available. Such courses including:

- Laser Optics
- Nanoscience and Nanotechnology
- Nuclear Physics
- Medical Physics
- Solid State Devices

Acquire Skills. Gain Experience. Go Global.
That is a degree from Queen's. physics.queensu.ca

2016 - 2017 Engineering Physics MAJOR MAP

BACHELOR OF APPLIED SCIENCE | BACHELOR OF APPLIED SCIENCE WITH PROFESSIONAL INTERNSHIP



1ST YEAR

2ND YEAR

3RD YEAR

4TH OR FINAL YEAR

GET THE COURSES YOU NEED

Queen's Engineering first year is common – courses include: Physics, Chemistry, Calculus, Algebra, Graphics, Computing and Earth Systems Engineering.

Also APSC100, 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!

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.

Courses deepen your knowledge of physics from both a theoretical and practical side. Your third EDPS design course (ENPH 354) deepens your ability to work as a team taking on technical challenges.

Take 5-6 courses with engineering students in your chosen option. Courses range from digital communications to materials processing. From operating systems to heat transfer - depending on your chosen option.

Consider applying to the Accelerated Master's program. In this program, students start research in the summer after their third year, and take graduate courses concurrently with the fourth year program.

All Eng Phys students participate in the "capstone" EDPS team-based project course – ENPH454, 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, Nuclear Reactors, Aerodynamics and General Relativity.

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.

Look into summer jobs related to electrical engineering 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 \(QICSI\)](#).

Apply for [NSERC USRA](#) summer research positions at Queen's or across Canada - in physics or engineering.

Consider applying to do a 12-16 month [QUIP internship](#) between your third and fourth academic year.

Get a feel for whether you want to continue to graduate school or enter the workforce directly after graduation.

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 the Career Services skills [workshop](#) for help.

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 [Engineers without Borders \(EWB\)](#).

Get involved with the [Engineering Society \(ENGSOCS\)](#) and the [Alma Mater Society \(AMS\)](#). Start or continue volunteering with organizations such as the [Commerce & Engineering Environmental Conference \(CEEC\)](#).

Do some targeted networking with alumni working in careers of interest by joining the LinkedIn group [Queen's Connects Career Network](#).

Consider joining professional associations like [Canadian Association of Physics \(CAP\)](#), [American Physical Society \(APS\)](#), [Institute of Electrical and Electronic Engineers \(IEEE\)](#), and [American Society of Mechanical Engineers \(ASME\)](#).

Join groups on LinkedIn reflecting specific careers or topics of interest in Engineering Physics.

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.

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 some other options to gain international experience.

Build your intercultural competence by getting involved with other cultures or by practicing or improving your [language skills](#). Check [QUIC's resources](#) for ideas to go abroad, and [volunteer](#) or attend one of their events.

Prepare for work or studies in a multi-cultural environment by taking QUIC's [Intercultural Competency Certificate](#), and research possible immigration regulations.

International students interested in staying in Canada can speak with an [International Student Advisor](#).

GET READY FOR LIFE AFTER GRADUATION

Grappling 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](#).

Explore different careers of interest by reading books in the Career Services Career Advising and Resource Area, such as [Career Opportunities in Engineering](#). For more information check out [Career Cruising](#) or by finding and connecting with alumni on [LinkedIn](#).

Start focusing on areas of interest. Research education requirements for careers of interest. If needed, prepare to take any required tests (like the LSAT or GMAT) and get [help thinking about grad school](#) from Career Service.

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.

CONSIDER A 12-16 MONTH QUIP INTERNSHIP

Where could I go after graduation?

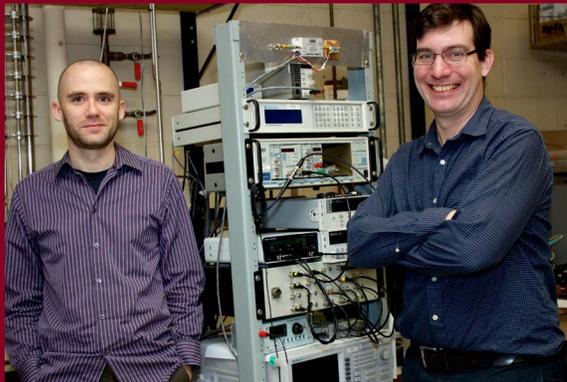
- Acoustics
- Aerospace engineer
- Astronaut
- Automotive industry
- Astrophysics
- Atmospheric science
- Biophysics
- Computer engineering
- Education
- Engineering consulting
- Energy (nuclear, solar, wind, etc.)
- Entrepreneurship
- Environmental management
- Environmental conservation
- Financial modelling
- Forensic science
- Geophysics
- Imaging
- Patent law
- Management consulting
- Medical physicist
- Medicine
- Nanotechnology
- Nuclear engineering
- Oceanography
- Occupational health and safety
- Radiology
- Remote sensing
- Semiconductors and electronics
- Software engineering

*some careers may require additional training

Visit careers.queensu.ca/majormaps for the online version with links!

Engineering Physics

MAJOR MAP



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.

A balanced approach leads to long-term success. While you will learn a lot from your studies, taking time to get relevant experience outside of the classroom, build your network, and gain international experience, will position you to be more competitive in your job search or grad school applications.

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, and Queen's wants you to succeed! Check out the [Student Affairs website](#) for available resources.

Succeed in the workplace

What employers want

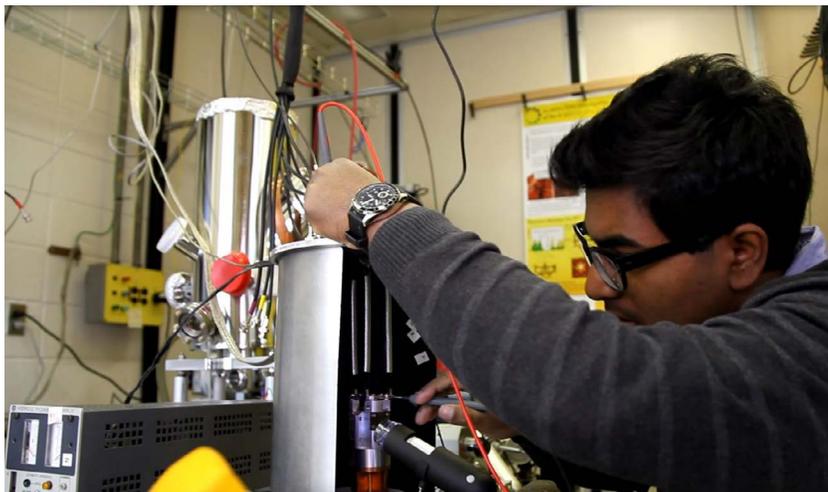
The Canadian Council of Chief Executives list the top 6 skills sought by employers as:

- 1 People skills
- 2 Communication skills
- 3 Problem-solving skills
- 4 Analytical abilities
- 5 Leadership skills
- 6 Industry-specific knowledge

Take the time to think about the unique skills you have developed at Queen's, starting with the skills list here for ideas. Explaining your strengths with compelling examples will be important for applications to employers and further education. For help, check out the [Career Services skills workshop](#).

What can I learn studying ENGINEERING PHYSICS?

- **Proficiency in mathematics and numerical modeling 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 with sophisticated equipment in laboratory classes**
- **Proficiency with modern physics allowing you to work with tomorrow's technologies**



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DEPARTMENT OF
ENGINEERING
PHYSICS

Faculty of Engineering and
Applied Science
Stirling Hall
64 Bader Lane
613.533.2707
physics.queensu.ca