Engineering Physics

Get to know ENGINEERING PHYSICS

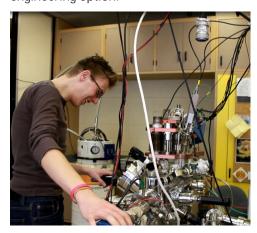
This program allows students to apply the knowledge of fundamental physical principles underlying modern technology and processes. You will study a strategic combination of math, physics, and engineering courses from a chosen specialty area. Courses in quantum mechanics, laser optics, and nanotechnology 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.

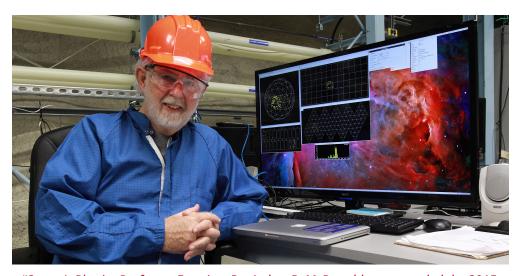
Degree OPTIONS

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.





"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."

Queen's ADMISSIONS

Students apply to Queen's 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.

A Common START

Queens 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 Section 900, 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

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. These courses include:

- Laser Optics
- Nanoscience and Nanotechnology
- Nuclear Physics
- Medical Physics
- Plasma Physics
- Cryogenics
- 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.

Acquire Skills. Gain Experience. Go Global.

That is a degree from Queen's.

queensu.ca/physics

Engineering Physics MAJOR MAP

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



2ND YEAR

3RD YEAR

Knowledge & Workplace Skills

Your time at Queen's will give you valuable skills to boost your employability, including:

- 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 with sophisticated equipment in laboratory classes
- Proficiency with modern physics allowing you to work with tomorrow's technologies

Career Possibilities

Aerospace engineer

Atmospheric science

Computer engineering

Management consulting

Financial modeling

Forensic science

Energy (nuclear, solar, wind, etc.)

Environmental management

Automotive industry

Astrophysics

Biophysics

1ST YEAR

4TH OR FINAL YEAR

All Eng Phys students participate in

project course – ENPH454, in addition

to an individual engineering thesis, an

advanced laboratory course, and a high-

the "capstone" EDPS team-based

level quantum mechanics course.

Choose technical elective courses

from a huge range, including Laser

Physics, Aerodynamics, and General

Relativity.

Z

Optics, Robotics, Computer Vision, High

Performance Computing in Engineering

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 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!

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 will take a second engineering design

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, Waves and Optics, and Computational Engineering 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 4-5 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

Apply for **NSERC USRA** summer research positions

at Queen's or across Canada - in physics or

internship between your third and fourth

research the summer after year 3!

Consider applying to do a 12-16 month QUIP

If you are considering graduate school, look into

the Accelerated Masters program where you start

engineering.

academic 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.

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.

Volunteer on or off-campus with different

Talk Science (LTS), Women in Science and

Queen's Students for Systems Change (SSC).

community organizations, such as Let's

Engineering, Science Rendezvous, and

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 involved with the **Engineering Society**

(AMS). Start or continue volunteering with

Engineering Environmental Conference (CEEC).

organizations such as the Commerce &

(ENGSOC) and the Alma Mater Society

Do some targeted networking with alumni working in careers of interest through LinkedIn.

Build your intercultural competence by

getting involved with other cultures or

skills. Consider taking the Intercultural

by practicing or improving your language

Awareness Training Certificate hosted by

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.

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.

Apply to jobs or future education, or make plans for other adventures. Get help from <u>Career Services</u> with job searching, resumes, interviews, grad

Find impactful work that aligns with your values using the Queen's Career Guide to the UN Sustainable Development Goals.

school applications, or other decisions.

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.

QUIC.

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 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.

GET ENGAGED GLOBALLY

GET RELEVANT

GET ENGAGED

COMMUNITY

WITH THE

EXPERIENCE

The Queen's University International Centre is your first stop to learn how to internationalize your degree or to leverage your existing crosscultural experience.

GET CAREER READY

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.

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.

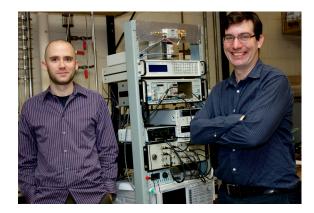
Medicine

- Nanotechnology
- Nuclear engineering
- Oceanography
- Quantum Physics
- Semiconductors 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.



Engineering Physics



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.



Department of Physics, Engineering Physics & Astronomy

Stirling Hall 64 Bader Lane (613) 533-2707 queensu.ca/physics

QUEEN'S UNDERGRADUATE INTERNSHIP PROGRAM

START DATES in May, September, or January POSITIONS are paid and full-time **WORK TERMS**

are 12-16 months

PROGRAM OVERVIEW

- Graduate with "Professional Internship" on your degree
- Learn about current advances, practices and technologies in business and industry
- Explore a career path, earn a salary, and build workplace skills

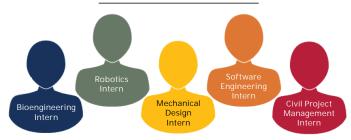
ELIGIBILITY

- Complete 1st year before you register
- Complete 2nd or 3rd year before your internship
- Minimum GPA of 1.9
- Return to Queen's after your internship to finish your degree

WHY QUIP?

- Gain a year of career-related work experience
- Build network connections
- Receive support from Queen's staff in job search and during internship

SAMPLE PAST INTERNSHIPS



For more information, contact quip@queensu.ca or visit the Program Website.

Why study in Kingston?

Since 1841, 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

noie doser than you to 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 London / 7 hrs of a lifetime at Queen's CANADA Oueen's Beijing / 15 hrs - and graduate Dubai / 14 hrs with a degree Calgary / 4 hrs Vancouver / 5 hrs that is globally recognized Halifax / 2 hrs San Francisco / 5.5 hrs Kingston among the Denver/3 hrs best. New York / 1.5 hrs UNITED STATES Dallas / 3.5 hrs

Atlanta / 2 hrs

Bermuda / 2 hrs