# Engineering Physics

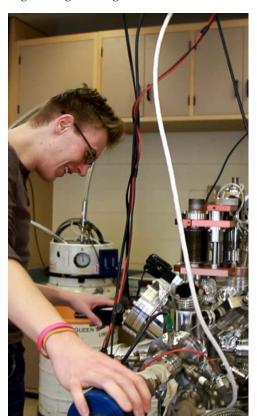


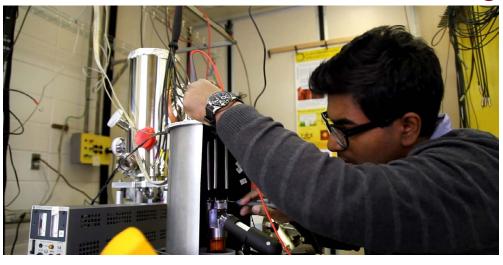
#### MAJOR MAP FOR UNDERGRADUATES



### 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.





"With a focus on fundamental physics principles and a strong mathematical component, this program is designed to produce engineers with excellent problem solving and analytical skills, coupled with broad knowledge of engineering science and technology."

#### Degree **OPTIONS**

**Bachelor of Science in Engineering** 

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

Specialization in Mechanical / Computing / Electrical / Materials Engineering

#### Oueen'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 include:

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

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

engphys.appsci.queensu.ca

## Engineering Physics MAJOR MAP

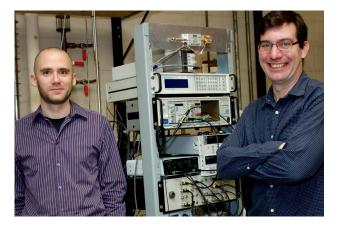
BACHELOR OF SCIENCE IN ENGINEERING | BACHELOR OF SCIENCE IN ENGINEERING WITH PROFESSIONAL INTERNSHIP



|                                           | 1ST YEAR                                                                                                                                                                                                                                                                                                                                                                                                               | 2ND YEAR                                                                                                                                                                                                                                                                                                                                       | 3RD YEAR                                                                                                                                                                                                                                                                                     | 4TH OR FINAL YEAR                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                 |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| GET THE<br>COURSES<br>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. | Courses include: Mechanics, Waves and Vibrations, Electricity and Magnetism, Circuits, and two Math courses.  You will take the second EDPS course – APSC200, in addition to physics laboratory and data management courses. Your other 3 courses depend on your option.                                                                       | Courses include: two Quantum mechanics courses, an advanced laboratory course, more mathematics, engineering economics and the third EDPS course (ENPH354).  You will also take 5-6 courses from your option – anything from Signals and Systems to Thermodynamics to Computer Architecture. | 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. | Where could I go after graduation?  Acoustics Aerospace engineer Astronaut Automotive industry Astrophysics Atmospheric science |
| GET RELEVANT<br>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 Co-Curricular Opportunities Directory or AMS Clubs Directory 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).            | Stay during the summer as an assistant to a faculty member or apply for external research opportunities. Apply for NSERC USRA positions in the department of physics.  Consider applying to do a 12-16 month QUIP internship between 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 the Career Services skills workshop for help.                                                                                                                                 | Biophysics Computer engineering Education Engineering consulting Energy (nuclear, solar, wind, etc.) Entrepreneurship           |
| 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 (ENGSOC) 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.                                                      | Environmental management Environmental conservation Financial modelling Forensic science Geophysics Imaging for Patent law      |
| GET THINKING<br>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.                                                                                                                    | Management consulting Medical physicist Medicine Nanotechnology Nuclear engineering Oceanography Occupational health and safety |
| GET READY<br>FOR LIFE AFTER<br>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 <i>Career Opportunities in Engineering</i> . 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.                                                                                                                                                                                                   | Radiology Remote sensing Semiconductors and electronics Software engineering *some careers may require additional training      |

## **Engineering Physics**

#### **MAJOR MAP**



#### How to use this map

- Got questions about careers and classes?
- Feeling a little lost or overwhelmed by choices?
- Wondering what you are "supposed" to be doing?

Use this map to plan for success in five overlapping areas of career and academic life. Each map helps you explore possibilities, set goals and track your accomplishments. To make your own custom map, use the My Major Map tool.

Don't stress if you haven't done all of the suggested activities. The map is not a prescription – it's a tool for finding your own way at Queen's.

Personal and Physical Health nletics and Recreation

Studetn Wellness Services

Socio Cultural and
Spiritual Health
Aboriginal Student Centre

International Centre
Chaplain
Outreach Counsellor
Cross-Cultural Counsellor
Student Community
Relations

Career and
Professional
Health
Career Services

Career Services
AMS

Emotional and Mental Health

Student Wellness Services
Peer Support Centre

Support for Student Success

Academic and
Intellectual Health
Student Academic Success
Services: Learning
Strategies and the Writing Centre
Academic Advising
Adaptive Technologies

**Learning Commons** 

Social and Interpersonal Health AMS

Rector Residence Life Student Experience Office Queens Legal Aid

## Getting what you need to succeed in the workplace

## WHAT DO EMPLOYERS WANT?

In a recent survey from the Canadian Council of Chief Executives the top 6 skills sought by employers were:

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

## HOW DO I GET THE SKILLS I NEED?

It is important to develop a balanced skill set – many of which you will develop during your studies. To stand out, take advantage of experiential learning through the multitude of clubs and activities in and around Queen's. Check out the Get Relevant Experience section of this map.

## WHAT CAN I LEARN STUDYING ENGINEERING PHYSICS AT OUEEN'S?

- 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

## WHAT MAKES ME SPECIAL?

No one will get exactly the same experience as you. Take the time to think about what skills you have developed to be able to best explain them with compelling examples in future applications to employers and further education. For help with this, check out the Career Services skills workshop.



## Physics, Engineering Physics • and Astronomy

Faculty of Engineering and Applied Science Stirling Hall 64 Bader Lane 613.533.2707