Electrical Engineering

Get to know
ELECTRICAL ENGINEERING

Electrical engineers are specialists who provide essential support for the conveniences and services related to electric power and communications, and take leading roles in the design of new products and services. As an electrical engineering student, you will study electric circuits and motors, electromagnetics, microelectronics, signal processing, communications, robotics and control, digital logic, and microprocessors. You will build on a base of applied mathematics and physics, and learn to use the laws of physics that govern electrical systems to design new products and services.

Degree OPTIONS

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

Specialization in Biomedical Engineering / Communications & Signal Processing / Communications Systems & Networks / Microelectronics & Photonics / Mechatronics / Power Electronics & Systems / Robotics & Control

Queen’s ADMISSIONS

Students apply to Queen’s Engineering (QE) through the OUAC (Ontario University Application Centre) website. Secondary School prerequisites include five 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 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

Electrical Engineering 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:

- Biomedical Signal and Image Processing
- Introduction to Robotics
- Bioinformatic Analytics
- Fiber Optic Communications
- Machine Vision
- Microwave and RF Circuits and Systems
- Energy and Power Systems
- Wireless Communications

ECEi - INNOVATION STREAM

Consider Queen’s Electrical & Computer Innovation Stream, focused on developing entrepreneurial skills, alongside the in-depth, world-class technical education that is the hallmark of Queen’s Engineering. Students apply directly from OUAC with admission requirements for ECEi being the same as QE.

With admission limited to 50 students, you will receive an enriched curriculum that builds on Engineering’s common first year, participate in team-based learning that focuses on product development and prototype demonstration, and network with like-minded students and present your unique ideas. If you pass all of your first year courses you are guaranteed a place in 2nd year in either the Electrical Engineering Innovation (EEi) stream or Computer Engineering Innovation (CEi) stream.

“If you can imagine working with robots or solar-powered vehicles, or envision a career in the field of power engineering or high-tech communications - you are in the right place!”
**Electrical Engineering MAJOR MAP**

**1ST 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 (IDPS), 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 such as Queen's First Robotics Team and the Solar Design Team (QSDT).
  - Apply to committees and positions that are open to first year students, such as the ENGSOC Communications Team or First Year Project Coordinators. 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 EngWeek Committee or the ENGSOC Committee on Inclusivity.

- **Get Thinking Globally**
  - Speak to a QUIC advisor or get involved in their programs, events and training opportunities.
  - Prepare for work or studies in a multi-cultural environment by taking QUIC's Intercultural Competency Certificate, and research possible immigration regulations.

- **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.

**2ND YEAR**

- **Get the Courses You Need**
  - You will take the second IDPS course - APSC200, plus one Complementary Studies course. EEi students take Introduction to Business for Entrepreneurs as their Complementary Studies (CS) course.

- **Get Relevant Experience**
  - 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).

- **Get Connected with the Community**
  - Get involved with the Engineering Society (ENGSOC).
  - Consider joining the Queen's Electrical and Computer Engineering Club and attending events such as the ECE Lunch with Profs.
  - Join the Queen’s student branch of the Institute of Electrical and Electronics Engineers.

- **Get Thinking Globally**
  - Is an exchange in your future? Start thinking about where you would like to study abroad. Apply in January for a 3rd year exchange through your faculty's International Office.

- **Get Ready for Life After Graduation**
  - Explore different careers of interest by reading books in the Career Services Career Advising and Resource Area, such as Vault Guide to Technology Careers, talking to people whose jobs interest you, or finding engineering alumni on LinkedIn.

**3RD YEAR**

- **Get the Courses You Need**
  - You will also need to take 2 Technical Electives plus one CS course. For EEi, Entrepreneurial Sales and Marketing and Financing New Ventures are required CS courses.

- **Get Relevant Experience**
  - Stay during the summer as an assistant to a faculty member or apply for an external summer research opportunity.
  - Consider applying for the combined BASc/MASc program, if you meet the minimum requirements.
  - Consider applying to do a 12-16 month QUIP internship between your third and fourth year.

- **Get Connected with the Community**
  - Do some targeted networking with alumni working in careers of interest by joining the LinkedIn group Queen’s Connects Career Network.
  - Attend conferences like the Queen’s Engineering Competition (QEC) and the Electrical and Computer Engineering Competition.

- **Get Thinking Globally**
  - International students interested in staying in Canada can speak with an International Student Advisor.

- **Get Ready for Life After Graduation**
  - 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.

**4TH OR FINAL YEAR**

- **Get the Courses You Need**
  - All Electrical Engineering students follow up their ELEC 390 course with the Electrical Engineering Project course (ELEC 490). EEi students follow up their Entrepreneurial ECE Design course with the Entrepreneurial Electrical Engineering Project. You will also need to choose approximately 7 Technical Electives (totaling 21.25 units), plus one Complimentary Studies course.

- **Get Relevant Experience**
  - 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.

- **Get Connected with the Community**
  - Consider joining professional associations like the Institute of Electrical and Electronics Engineers and Professional Engineers Ontario. Join groups on LinkedIn reflecting specific careers or topics of interest in Electrical Engineering.

- **Get Thinking Globally**
  - International students interested in staying in Canada can speak with an International Student Advisor.

- **Get Ready for Life After Graduation**
  - 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.

**Where could I go after graduation?**

- Autonomous navigation
- Autonomous robotics
- Ambient intelligence
- Air traffic control architecture
- Aviation and aerospace design
- Bionics
- Biotechnology
- Business infrastructure
- Communications technology
- Component design engineer
- Computer-assisted surgery
- Consumer electronics
- Data processing
- Digital systems design
- Embedded systems
- Electrical distribution engineer
- Fibre and laser electro-optics
- Game development/design
- Green power systems
- Information architecture
- Internet and computer technologies
- Manufacturing and automation
- Mechatronics
- Microwave circuitry
- Microcontrollers
- Patent law
- Robotics
- Sensory systems engineer
- Semiconductor design
- Security systems
- Wearable technology

*Some careers may require additional training. Listed careers are suggestions. Where could I go after graduation?*
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 Career Services workshops.

What can I learn studying ELECTRICAL ENGINEERING?

- Understanding of electronic circuit design, network analysis and object-oriented programming
- Data analysis skills - use current software to analyze data and model processes
- Proficiency in mathematics
- Attention to detail
- Research skills - conduct scientific research and analyze quantitative information
- Problem solving - approach problems from different perspectives and analyze individual facets of a problem
- Ability to work independently and in a team on a project
- Oral and written communication – write clearly on technical topics and give presentations
- Time and resource management

Why study in Kingston?

For 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 us as one of the GREATEST UNIVERSITY TOWNS in the world – and is often awarded the safest city in Canada. We are a university city at the core; just a quick drive to Toronto, Montreal, Ottawa and even New York. A university with more clubs per capita than any other university in Canada, and 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.