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

Specialisation 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

"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!"

ECE - 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 ECE 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 (EIE) stream or Computer Engineering Innovation (ECIE) stream.


ece.queensu.ca
### 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 (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 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 ENGSO 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 ENGSO Committee on Inclusivity.

#### GET THINKING GLOBALY

- Speak to a QUC advisor or get involved in their programs, events and training opportunities.
- Prepare for work or studies in a multi-cultural environment by taking the QUC and Four Directions Aboriginal Student Centre's Training 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

- Courses include: Electric Circuits, Digital Systems, Information Structures, Mechatronics Project, Electronics I, Numerical Methods & Optimization, Computer Architecture, Electromagnetics, Differential Equations, and Complex Analysis. You will take the second EDPS course – APSC200, plus one Complementary Studies course. EEi students take Introduction to Business for Entrepreneurs as their Complementary Studies (CS) course. You will also need to take 2 Technical Electives plus one CS course. For EEl, Entrepreneurial Sales and Marketing and Financing New Ventures are required CS courses.

#### 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 (QICS).

#### GET CONNECTED WITH THE COMMUNITY

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

#### GET THINKING GLOBALY

- 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

- Courses include: Signals & Systems, Electronics I, Microprocessor Interfacing & Embedded Systems, Electromagnetics, Probability & Random Processes, Engineering Economics, and Solid State Devices. You will take either the Electrical and Computer Engineering Design Course (EEC 390) or the Entrepreneurial Electrical and Computer Engineering Design Course (for EEl students). 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 QUP 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 GLOBALY

- Build your intercultural competence by getting involved with other cultures or by practicing or improving your language skills.

#### GET READY FOR LIFE AFTER GRADUATION

- 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.

### 4TH OR FINAL YEAR

#### GET THE COURSES YOU NEED

- All Electrical Engineering students follow up their EEC 390 course with the Electrical Engineering Project course (EEC 490). EEl students follow up their Entrepreneurial ECE Design course with the Entrepreneurial Electrical Project. You will also need to choose approximately 7-8 Technical Electives (totaling 21.25 units), plus one Complementary Studies course. For EEi, this Complimentary Studies course is Pitching and Launching your Venture.

#### 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 GLOBALY

- 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.

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### Employability skills

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

- 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

### Where could I go after graduation?

- Autonomous robotics
- Ambient intelligence
- Aviation and aerospace design
- Biotechnology
- Component design engineer
- Consumer electronics
- Digital systems design
- Electrical distribution engineer
- Fibre and laser electro-optics
- Game development/design
- Green power systems
- Information architecture
- Manufacturing and automation
- Sensory systems engineer
- Semiconductor design
- Security systems
- Wearable technology

Taking time to explore career options, build experience, and network can help you have a smoother transition to the world of work after graduation.

*Some careers may require additional training. Listed careers are suggestions.

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

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