

# 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, mechatronics, 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

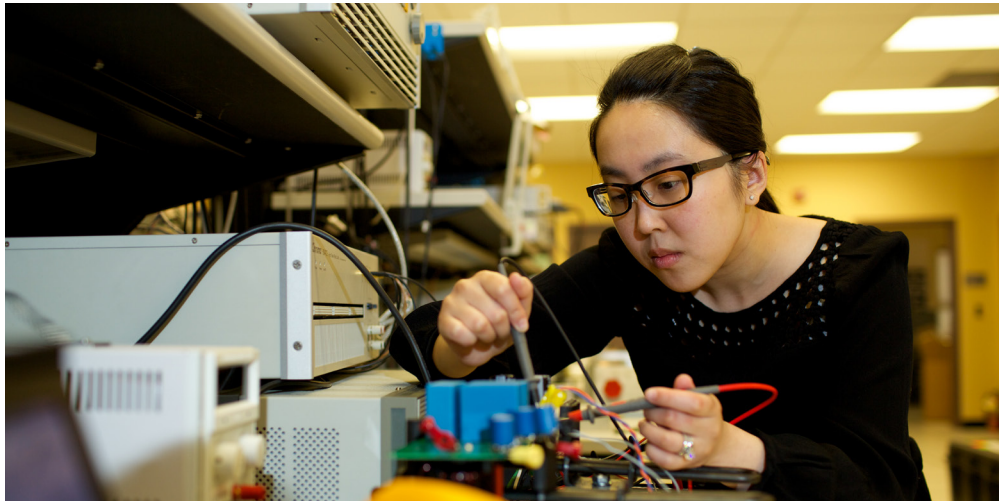
Bachelor of Applied Science in Engineering

Bachelor of Applied Science in Engineering with Professional Internship

*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 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.



*"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!"*

## 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

## Design, Innovation, and AI Integration

Queen's Electrical Engineering fosters hands-on design and innovation, with project courses spanning second year, third year, and the final-year capstone. Students can join design teams like Queen's Robotics and the Queen's Solar Design Team for real-world experience. For broader innovation and business skills, students can also take the Introduction to Business for Entrepreneurs or join the Queen's Founders and Innovator Initiative (QFII).

The program integrates artificial intelligence (AI) into the curriculum through upper-year electives, which cover AI algorithms and applications. Electrical Engineering students are prepared to work with emerging AI-driven technologies, gaining the skills to responsibly integrate AI into intelligent devices, smart systems, robots, and advanced communication networks.

## Acquire Skills. Gain Experience. Go Global.

That is a degree from Queen's.

[ece.queensu.ca](http://ece.queensu.ca)

# Electrical Engineering 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 APSC101, 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 ENGSOC Communications Team or First Year Project Coordinators. See the [AMS Clubs Directory](#) or the [Queen's Get Involved page](#) for more ideas.

GET ENGAGED WITH THE COMMUNITY

Volunteer on- or off-campus with different community organizations, such as [EngWeek Committee](#) or the [ENGSOC Committee on Inclusivity](#).

GET ENGAGED 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 the Intercultural Awareness Training Certificate hosted by QUIC and FDISC, and research possible immigration regulations.

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](#).

Courses include: Signals & Systems I, Electric Circuits, Digital Systems, Information Structures, Data Science, Electronics I, Numerical Methods & Optimization, Computer Architecture, Electromagnetics, Differential Equations, and Complex Analysis.

You will take the second EDPS course – ELEC290, plus one Complementary Studies course.

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 Founders and Innovators Initiative](#) (QFII).

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](#).

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.

Explore different careers of interest in the Career Services [Career Advising and Resource Area](#), by talking to people whose jobs interest you, or finding engineering alumni on [LinkedIn](#).

Courses include: Signals & Systems II, Electronics II, Microprocessor Interfacing & Embedded Systems, Electromagnetics, Probability & Random Processes, Engineering Economics, and Solid State Devices.

You will also need to take 2 Technical Electives plus one CS course.

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.

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

Attend conferences like the [Queen's Engineering Competition](#) (QEC) and the [Electrical and Computer Engineering Competition](#).

Build your intercultural competence by getting involved with other cultures or by practicing or improving your [language skills](#).

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.

You will take the Electrical and Computer Engineering Design Course (ELEC 490). You will also need to choose approximately 7-8 Technical Electives (totaling 21.25 units), plus one Complimentary Studies course.

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.

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.

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 [Career Services](#) with job searching, resumes, interviews, grad school applications, or other decisions.

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

CONSIDER A 12-16 MONTH QUIP INTERNSHIP

Knowledge & Workplace 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
- **Foundational understanding of AI** - develop knowledge to engage with AI and intelligent system design
- 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**

Career Possibilities

- Autonomous robotics
- AI applications in smart systems and automation
- 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

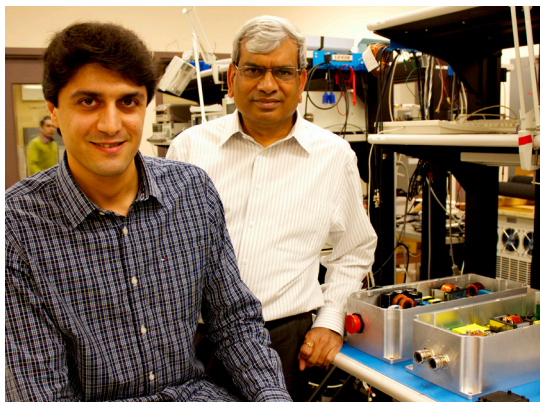
Taking time to explore career options, build experience, and network can help you have a smoother transition to the world of work after graduation.

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.



# Electrical Engineering



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.



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# QUIP

## QUEEN'S UNDERGRADUATE INTERNSHIP PROGRAM

**START DATES**  
in May, September,  
or January

**POSITIONS**  
are paid and  
full-time

**WORK TERMS**  
are 12-16 months  
long

### 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

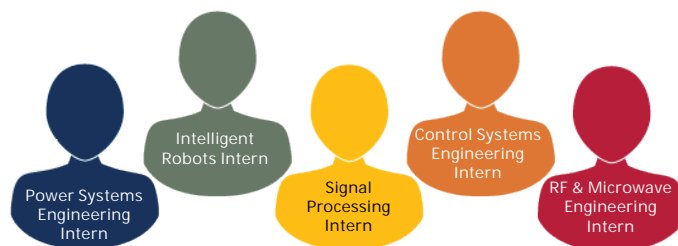
### ELIGIBILITY

- 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](mailto: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 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 of a lifetime at Queen's – and graduate with a degree that is globally recognized among the best.

*We're closer than you think.*

