Get to know
MECHATRONICS AND ROBOTICS ENGINEERING

Mechatronics is the combination of mechanical, electrical and computer engineering in the design of products and manufacturing processes.

Robotics is a subset of mechatronics – all robots are mechatronic! Robotics, however, are an elevated class of mechatronics, incorporating automation, programming, and even autonomous action.

As automation and autonomous machines become increasingly important in our society, robotics – and its parent discipline, mechatronics – are more vital than ever.

Degree OPTIONS

Bachelor of Applied Science in Engineering

Bachelor of Applied Science in Engineering with Professional Internship

Recommended concentration in Biomedical / Robotics / Automation / Intelligent Systems

Queen's ADMISSIONS

The Mechatronics and Robotics Engineering program is a direct-entry program. Students apply to Queen's Mechatronics and Robotics Engineering (QEM) through the OUAC (Ontario University Application Centre) website. Secondary school prerequisites include five required 4U or 4M courses, one of which must be English 4U. Other required courses include:

- Calculus and Vectors 4U/4M
- Advanced Functions 4U/4M
- Chemistry 4U/4M
- Physics 4U/4M

A final competitive minimum grade of 80% must be obtained for all courses. Applicants outside of Ontario may have additional requirements.

Course HIGHLIGHTS

Students in the MRE program will take newly developed courses. Experts and researchers will be invited to the classroom to teach and work with students on experiential learning projects with real-world applications. Courses include:

- Introduction to Robotics
- Intelligent Machines and Autonomous Systems
- Mechatronics Design I to IV
- Data Structures and Algorithms
- Thermodynamics and Heat Transfer
- Signals and Systems
- Fluid Mechanics and Fluid Power
- Sensors and Electric Actuators
- Automation: Machine Design and Control

From advanced physics to machine movement to artificial intelligence, the MRE program delivers a rounded and demanding four-year program that covers every aspect of the field.

Careers in MRE

An MRE degree will put students at the cusp of a rapidly growing field, in international demand as automation, controls, and systems engineers. Mechatronic and robotics engineers are needed in sectors ranging from manufacturing to aerospace; from construction to telecommunications.
MECHATRONICS AND ROBOTICS ENGINEERING MAJOR MAP

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

1ST YEAR
MRE students participate in many of the common Queen's Engineering first-year courses such as: Physics, Chemistry, Calculus, Graphics, and Linear Algebra.

MREN 103: Mechatronics Design I is an MRE-specific design course, focusing on problem solving, experimentation principles and finishing off with a team-based mechatronics engineering project.

2ND YEAR

You will take MREN 203: Mechatronics Design II, the second course in the design spine that spans the four years of the program.

3RD YEAR

You will take MREN 303: Mechatronics Design III, the third course in the design spine that spans four years of the program.

4TH OR FINAL YEAR
All MRE students take two core courses (Mechatronics Design IV and Intelligent Machines and Autonomous Systems), 2 Complementary Studies courses, 1 Primary Technical Electives, and 5 Technical Electives which can be selected from 4 recommended concentrations:

1. Automation
2. Robotics
3. Biomedical
4. Intelligent Systems

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 technologies

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 Queen's Grad Maps for the online version with links!

* This map is intended to provide suggestions for academic programs and careers, but everyone's abilities, experiences, and constraints are different. Build your own Major Map using our online My Major Map tool.

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The coronavirus pandemic may impact how some activities are delivered in 2021-2022. Please check directly with the host of any activity on the map for the latest information.

2021-2022

Mechatronics and Robotics Engineering

GET THE COURSES YOU NEED

GET RELEVANT EXPERIENCE

Join teams or clubs on campus such as the SAE-GM AutoDrive II Challenge.

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 on the ENGSOC Committee on Inclusivity.

Get involved with the Engineering Society (ENGSOC).

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).

GET THINKING GLOBALLY

Speak to a QUIC advisor or get involved in their programs, events, and training opportunities.

Prepare for work or study in a multi-cultural environment by taking the Intercultural Awareness Training Certificate hosted by QUIC and PDISC, and research possible immigration regulations.

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

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

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.

Consider applying for a 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.

C O N S I D E R A 1 2 - 1 6 M O N T H Q U I P I N T E R N S H I P

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 searching, resumes, interviews, grad school applications, or other decisions.

Visit Queen's Grad Maps for the online version with links!
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.

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

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.

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 Kingston as one of the GREATEST UNIVERSITY TOWNS in the world – and it is often awarded 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. 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.