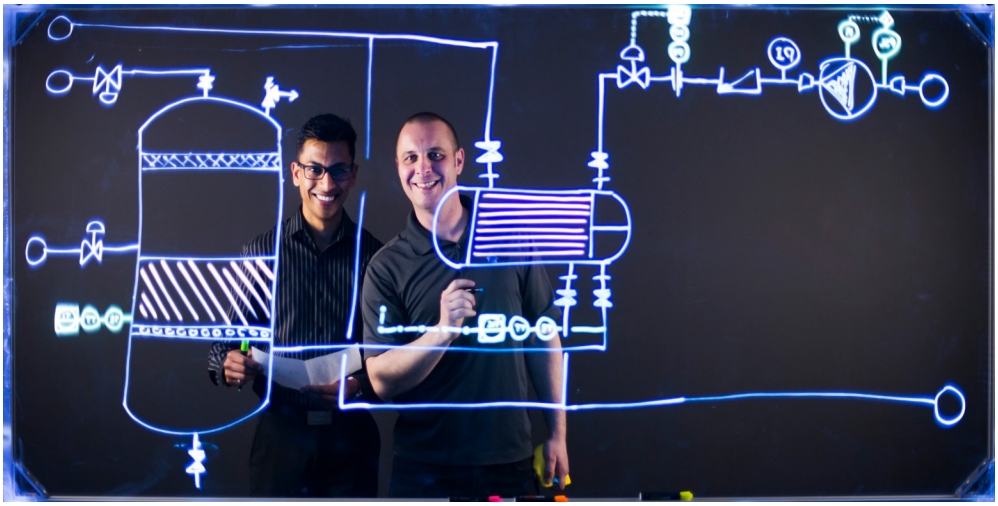
# Chemical Engineering

## Get to know CHEMICAL ENGINEERING

Society relies daily on products such as fuel, pharmaceuticals, advanced composites, semiconductors, magnetic and optical storage devices, agricultural products, light-weight materials, coatings, synthetic fibers, and personal care products. Chemical Engineers develop new advanced materials and design the processes that convert raw materials into value-added products.

Chemical Engineering is a broadly based engineering discipline, which combines the study of mathematics, chemistry, physics and biology, with engineering science, design, and economics. You will learn how to design safe, efficient, environmentally-friendly and economical processes. You will also acquire direct experience with pilot-scale chemical process equipment and simulators. Queen's Chemical Engineering offers options in Chemical Process Engineering and in Biochemical Engineering. Areas of specialization through choice of electives: biochemical, biomedical, environmental, process systems engineering, energy, and materials.



*"Semiconductor production, microchips, metals, mineral processing, paper products, petroleum and petrochemicals, plastics, forest products, pharmaceuticals and foods are just some of the sectors in which chemical engineers work."*

## 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.

## 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.

## Degree OPTIONS

**Bachelor of Applied Science in Engineering**

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

*Option in Bioengineering / Process Engineering*

## Course HIGHLIGHTS

Chemical 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:

- Design of Manufacturing processes
- Technology, Engineering and Management
- Process Dynamics and Control
- Mitigation of Industrial Pollution
- Engineering Innovation & Entrepreneurship
- Biomedical Engineering
- Pharmaceutical Technology
- Bioremediation
- Polymer Formulations and Processing Technology

## Acquire Skills. Gain Experience. Go Global.

**That is a degree from Queen's.**

chemeng.queensu.ca

2024-2025

# Chemical Engineering MAJOR MAP

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

Queen's UNIVERSITY

| | 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.<br><br>Discipline selection will take place in February! You will also choose your Sub-Plan: Chemical Process Engineering (CHE1) or Bioengineering (CHE2). | Courses include: Analysis of Process Data, Chemical Processes & Systems, Main Group Chemistry, Principles of Chemical Reactivity, Ordinary Differential Equations, Thermodynamics of Energy Conversion Systems, Process Dynamics & Numerical Methods, Fluid Mechanics and Applied Organic Chemistry.<br><br>You will also take the second EDPS course – APSC200, as well as a laboratory project course and one additional course based on your option: Transport Phenomena Fundamentals (CHE1) or Cell Based Engineering Principles (CHE2). | Courses include: Engineering Innovation & Entrepreneurship, Fluid Phase & Reaction Equilibrium, Chemical Reaction Engineering, Heat & Mass Transfer, Biochemical Engineering, Process Dynamics & Control, Design of Unit Operations, Engineering Communications, Ethics, and Professionalism, and Mitigation of Industrial Pollution.<br><br>You will also take another laboratory projects course, as well as additional courses based on your option: Environmental Biotechnology and Biomedical Engineering (CHE2) or Industrial Catalysis (CHE1). | Courses include: Strategies for Process Investigations, Design of Manufacturing Processes, and Transport Phenomena.<br><br>You will also choose 5-6 courses based on your option, which may include research thesis project, multi-disciplinary design projects, or Technology Engineering and Management (TEAM) and you are set to graduate! |
| **GET RELEVANT EXPERIENCE** | Join teams or clubs on campus such as the Queen's Solar Design Team and the Fuel Cell Team.<br><br>See the AMS Clubs Directory or the Queen's Get Involved page for more ideas. | Look into summer jobs by talking to the dept. or Career Services about work through SWEP or NSERC.<br><br>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 an external summer research opportunity. Consider applying to NSERC Collaborative Research and Training Experience (CREATE) Programs such as SERA.<br><br>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.<br><br>Assess what experience you're lacking and fill in gaps with volunteering, clubs, or internships – check out Career Services workshops for help. |
| **GET ENGAGED WITH THE COMMUNITY** | Volunteer on- or off-campus with different community organizations, such as Let's Talk Science (LTS) and Women in Science and Engineering.<br><br>Consider joining an intramural sports or an athletics team. Check out the Athletics & Recreation site. | Get involved with the Engineering Society (ENGSOC).<br><br>Start or continue volunteering with organizations such as Engineers without Borders (EWB). Attend conferences like the Conference on Industry and Resources Queen's University Engineering (CIRQUE) and the Queen's Engineering Competition. | Do some targeted networking with alumni working in careers of interest by joining the LinkedIn group Queen's Connects Career Network.<br><br>Go to the Oil and Gas Speakers Series offered by the department. | Consider joining professional associations like the Canadian Society for Chemical Engineering or the Canadian Society for Chemical Technology.<br><br>Join groups on LinkedIn reflecting specific careers or topics of interest in Chemical Engineering. |
| **GET ENGAGED GLOBALLY** | Speak to a QUIC advisor or get involved in their programs, events and training opportunities.<br><br>Prepare for work or studies in a multi-cultural environment by taking the Intercultural Awareness Training Certificate hosted by QUIC and Four Directions Indigenous Student Centre, and research possible immigration regulations. | 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. | Build your intercultural competence by getting involved with other cultures or by practicing or improving your language skills. | International students interested in staying in Canada can speak with an International Student Advisor. |
| **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<br><br>Get some help from Career Services. | Explore different careers of interest in the Career Services Information Area. For more information check out Career Cruising. | 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 Services. | 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. |

CONSIDER A 12-16 MONTH QUIP INTERNSHIP

### 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.

### Knowledge & Workplace Skills

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

- Knowledge of **chemical engineering theory** and methods
- Proficiency in mathematics
- Ability to apply **physics, chemistry, and biology principles** to practical engineering projects
- Experience working on **hands-on engineering projects**
- Technical knowledge - use software to create **mathematical models** and analyze data
- **Research skills** - conduct research and collect data
- **Complex problem solving** - approach problems from various perspectives
- Ability to **work independently** and in teams
- **Written and oral communication -** write reports and give presentations to a knowledgeable audience
- Time and **resource management**
- Sustainability and the **impact of engineering** on society

### Career Possibilities

- Agricultural sciences
- Biochemistry
- Biomedical engineering
- Chemical process engineering
- Cytotechnology
- Environmental management
- Fluid dynamics - aerospace
- Finance & financial analysis
- Food industry, nutrition & dietetics
- Mineral processing
- Nanotechnology
- Patent law
- Pharmaceutical engineering
- Planning urban and regional
- Polymer/rubber/plastic technology
- Radiology
- Toxicology

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 only suggestions.

# Chemical 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.

## 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 a "Professional Internship" degree
- Learn about current advances, practices and technologies in business and industry.
- Test drive a career, earn a competitive salary, and get real world experience.

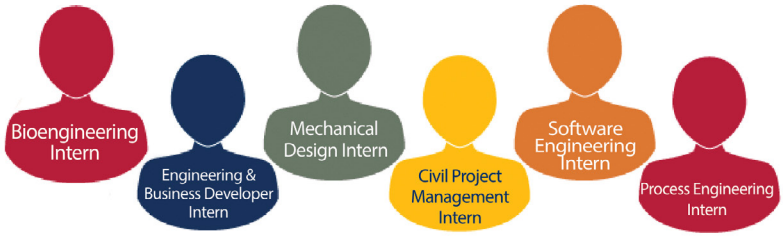
**ELIGIBILITY**

- 2nd or 3rd Year Students
- Minimum GPA of 1.9

**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 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.


SMITH ENGINEERING
Queen's University

**Faculty of Engineering and Applied Science**
Dupuis Hall, Room 201
19 Division Street
(613) 533-2765
chemeng.queensu.ca