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.”

Degree OPTIONS

Bachelor of Applied Science
Bachelor of Applied Science with Professional Internship
Option in Bioengineering / Process Engineering

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

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

That is a degree from Queen’s.
chemeng.queensu.ca
**MAJOR MAP**

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

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**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! You will also choose your Sub-Plan: Chemical Process Engineering (CHE1) or Bioengineering (CHE2).

**GET RELEVANT EXPERIENCE**
- Join teams or clubs on campus such as the Queen's Solar Design Team, Fuel Cell Team or the Chemical Engineering Club.
- 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 Let's Talk Science (LTS) and Women in Science and Engineering.
- Consider joining an intramural sports or an athletics team. Check out the Athletics & Recreation site.

**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 wondering about career options from Career Services.
- Explore different careers of interest by reading books in the Career Services Information Area, such as NonTraditional Careers for Chemists. For more information check out Career Cruising or by finding and connecting with alumni on LinkedIn.
- 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.

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**2ND YEAR**

**GET THE COURSES YOU NEED**
- 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).

**GET RELEVANT EXPERIENCE**
- Look into summer jobs: by talking to the dept. or Career Services about work through SWEF or NSERC.
- Take more responsibility within different clubs or extracurriculars such as the Living Energy Lab.
- 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).
- 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.

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

**GET READY FOR LIFE AFTER GRADUATION**
- 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.

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**3RD YEAR**

**GET THE COURSES YOU NEED**
- 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).

**GET RELEVANT EXPERIENCE**
- 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.
- Consider applying to a 12-16 month QUIP internship between your third and fourth year.

**GET CONNECTED WITH THE COMMUNITY**
- Consider joining professional associations like the Canadian Society for Chemical Engineering or the Canadian Society for Chemical Technology.
- Join groups on LinkedIn reflecting specific careers or topics of interest in Chemical Engineering.

**GET THINKING GLOBALLY**
- International students interested in studying 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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**4TH OR FINAL YEAR**

**GET THE COURSES YOU NEED**
- Courses include: Strategies for Process Investigations, Design of Manufacturing Processes, and Transport Phenomena.
- 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**
- 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 Canadian Society for Chemical Engineering or the Canadian Society for Chemical Technology.
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**Employability 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

Where could I go after graduation?
- 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.
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.