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 Science in Engineering**
- **Bachelor of Science in Engineering with Professional Internship**
- **Option in Biochemical Engineering / Process Engineering**

**Queen’s ADMISSIONS**

Students apply to Queen’s Engineering (QE) through the OUAC (Ontario University Application Centre) website. Secondary School prerequisites include six 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 J-Section, 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:

- Environmental Biotechnology
- Biomedical Engineering
- Pharmaceutical Technology
- Bioremediation
- Polymer Formulations and Process Technology
- Innovation & Entrepreneurship

**Acquire Skills. Gain Experience. Go Global.**

That is a degree from Queen’s.

chemeng.queensu.ca
### 1ST YEAR


- **Stay during the summer as an assistant to a faculty member or apply for an external summer research opportunity.**
- **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 to leverage your existing cross-cultural experience.**

### 2ND YEAR

**Courses include:** Chemical Engineering A/B, Chemical Engineering A/B, Chemical Engineering A/B, Chemical Engineering A/B, Chemical Engineering A/B.

- **Consider applying to NSERC Collaborative Research and Training Experience (CREATE) Programs such as SERA.**
- **Prepare for work or studies in a multi-cultural environment by taking QUIC's Intercultural Competency Certificate, and research possible immigration regulations.**
- **International students interested in staying in Canada can speak with an International Student Advisor.**

### 3RD YEAR


- **Consider applying to a 12-16 month QUIP internship between your third and fourth year.**
- **Visit careers.queensu.ca/majormaps for the online version with links!**

### 4TH OR FINAL YEAR

**Courses include:** Strategies for Process Investigations, Design of Manufacturing Processes, and Transport Phenomena in Chemical Engineering.

- **You will also choose 5-6 courses based on your option, and you are set to graduate!**
- **Prepare to take any required tests (like the LSAT or GMAT) with job searching, resumes, interviews, grad school applications, or other decisions.**

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### GET RELEVANT EXPERIENCE

- **Get involved with the Engineering Society (ENGSSC).**
- **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 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

- **Is 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. If exchange isn't for you, come talk to QUIC about some other options.**
- **Look into summer jobs by talking to the dept. or Career Services about work through SWEP or NSERC.**
- **Consider joining an intramural sports or an athletics team.**

### 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.**
- **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.**

### Where could I go after graduation?

**Agricultural sciences**
- Biotechnology
- Agronomy

**Agrochemicals**
- Nutraceuticals
- Animal health

**Biochemistry**
- Enzymology
- Toxicology

**Biomedical engineering**
- Dentistry
- Ophthalmology

**Business administration and management**
- Financial management
- Entrepreneurship

**Chemical process engineering**
- Environmental engineering
- Energy engineering

**Consulting**
- Management consulting
- Energy consulting

**Cybertechnology**
- Software development
- Cybersecurity

**Environmental management**
- Sustainability engineering
- Water resources management

**Fluid dynamics - aerospace**
- Aircraft engineering
- Aerodynamics

**Food industry**
- Nutrition
- Food science

**Government**
- Public policy
- Policy analysis

**Industrial chemicals**
- Petrochemicals
- Plastics

**International development**
- Development economics
- International cooperation

**Manufacturing**
- Manufacturing management
- Product design

**Medical technology**
- Biotechnology
- Medical device design

**Medical science**
- Biostatistics
- Health informatics

**Nanotechnology**
- Nanomaterials
- Nanomedicine

**Pharmaceutical engineering**
- Drug development
- Pharmaceutical technology

**Patent law**
- Intellectual property
- Infringement

**Oil and gas**
- Petroleum engineering
- Offshore drilling

**Planning - urban and regional**
- Urban planning
- Regional development

**Polymers**
- Polymer materials
- Polymer processing

**Private and public research**
- Academic research
- Government research

**Product design**
- Product development
- Industrial design

**Public policy**
- Fiscal policy
- Economic policy

**Radiology**
- Medical imaging
- Radiation therapy

**Safety**
- Occupational health
- Environmental safety

**Sustainable development**
- Renewable energy
- Sustainable technologies

**Tissue engineering**
- Tissue regeneration
- Stem cell research

**Toxicology**
- Toxicology testing
- Environmental toxicology

**Transport**
- Transportation systems
- Traffic engineering

**Water management**
- Environmental sanitation
- Water treatment

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CHEMICAL ENGINEERING MAJOR MAP

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.

A balanced approach leads to long-term success. While you will learn a lot from your studies, taking time to get relevant experience outside of the classroom, build your network, and gain international experience, will position you to be more competitive in your job search or grad school applications.

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, and Queen’s wants you to succeed! Check out the Student Affairs website for available resources.

Succeed in the workplace

What employers want
The Canadian Council of Chief Executives list the top 6 skills sought by employers as:

1. People skills
2. Communication skills
3. Problem-solving skills
4. Analytical abilities
5. Leadership skills
6. Industry-specific knowledge

Take the time to think about the unique skills you have developed at Queen’s, starting with the skills list here for ideas. Explaining your strengths with compelling examples will be important for applications to employers and further education. For help, check out the Career Services skills workshop.

What can I learn studying CHEMICAL ENGINEERING?

- 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

DEPARTMENT OF CHEMICAL ENGINEERING

Faculty of Engineering and Applied Science

Dupuis Hall, Room 201
19 Division Street
613.533.2765
chemeng.queensu.ca