WHAT IS ENGINEERING CHEMISTRY

Established in 1895, the program is distinguished by the breadth and depth of its offerings in fundamental and applied chemistry, many of these courses having been especially developed for the program. It is accredited by the Canadian Engineering Accreditation Board (CEAB) as a distinct engineering program, and by the Canadian Society for Chemistry (CSC) as a chemistry program. This dual accreditation allows graduates to pursue professional careers in both fields – a unique benefit of an Engineering Chemistry degree.

The curriculum creates Engineers that have a firm grasp of fundamental science as well as the engineering tools needed to put this knowledge into practice. An in-depth understanding of chemical principles makes Engineering Chemists particularly adept at early-stage design, when knowledge of chemical phenomena is needed to create and/or advance new technology. Extensive training in core engineering principles such as fluid mechanics, thermodynamics, and transport phenomena ensure that graduates can contribute equally well to late-stage design efforts involving detailed equipment specifications and financial analyses.

Engineering Chemistry design activities focus on three areas – Electrochemical Energy Systems, Chemical Diagnostics, and Process Synthesis. Students apply knowledge of thermodynamics and electrochemistry to design energy generation, conversion and storage devices. Courses in analytical chemistry and electronics allow students to design instruments that detect compounds in chemical / biological process streams and the environment. Instruction in organic chemistry and reaction engineering are used to scale up chemical syntheses from laboratory amounts to production volumes, and to create environmentally responsible alternatives to existing processes.

WHO EMPLOYS ENGINEERING CHEMISTS?

Companies with interests in the applied chemical and material science realm hire Engineering Chemistry graduates in a wide range of roles, including research and development, consulting, production and marketing. Some specific fields of operation include:

- conventional and alternative energy systems;
- electrochemistry, batteries, electrolysers, fuel cells;
- synthesis of fine chemicals, pharmaceuticals and agrochemicals;
- medical diagnostics and environmental monitoring technology;
- environmental protection and industrial health;
- green chemistry and responsible process (re)design;
- polymer synthesis, formulation and processing;
- food science and technology;
- waste management systems;
- water quality monitoring and protection;
- mineral processing;
- engineering and financial consulting.

NEED MORE INFORMATION?

A summary of the current curriculum is provided on the back of this page. More information about the program and its graduates can be found on the Department of Chemical Engineering website, and by contacting Liann Joanette, Undergraduate Program Assistant (liann.joanette@queensu.ca).
## Engineering Chemistry Curriculum

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Term</th>
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<tbody>
<tr>
<td>CHEE 209  Analysis of Process Data</td>
<td>F</td>
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<tr>
<td>CHEE 221  Chemical Processes and Systems</td>
<td>F</td>
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<tr>
<td>CHEE 270  ChemEtronics</td>
<td>F</td>
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<tr>
<td>ENCH 211  Main Group Chemistry</td>
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<tr>
<td>ENCH 212  Principles of Chemical Reactivity</td>
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<td>MTHE 225  Ordinary Differential Equations</td>
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<tr>
<td>APSC 200  Engineering Design &amp; Practice II</td>
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<td>APSC 293  Engineering Communications</td>
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<td>CHEE 210  Thermodynamics and Energy Conversion</td>
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<td>CHEE 222  Process Dynamics and Numerical Methods</td>
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<td>CHEE 223  Fluid Mechanics</td>
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<tr>
<td>ENCH 222  Methods of Structure Determination</td>
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<td>ENCH 245  Applied Organic Chemistry I</td>
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<th>Third Year</th>
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<tr>
<td>CHEE 311  Fluid Phase and Reaction Equilibria</td>
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<td>CHEE 321  Chemical Reaction Engineering</td>
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<td>CHEE 330  Heat and Mass Transfer</td>
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<td>CHEE 380  Biochemical Engineering</td>
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<td>ENCH 213  Introduction to Chemical Analysis</td>
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<td>ENCH 312  Transition Metal Chemistry</td>
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<td>CHEE 324  Organic Process Development</td>
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<td>CHEE 363  Electrochemical Engineering</td>
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<td>CHEE 331  Design of Unit Operations</td>
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<td>CHEE 361  Communications, Ethics &amp; Professionalism</td>
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<td>ENCH 399  Experimental Chemistry II</td>
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<td>Electives (minimum 3 Credits)</td>
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<td>APSC 221  Economics &amp; Business Practices in Engineering</td>
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<tr>
<td>CHEE 460  Applied Surface and Colloid Science</td>
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<td>ENCH 313  Quantum Mechanics &amp; Mol. Simulation</td>
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<td>CHEE 471  Chemical Process Design</td>
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<td>ENCH 417  Research Project</td>
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<td>CHEE 415  Engineering Chemistry Laboratory</td>
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<td>CHEE 463  Electrochemical Energy Systems</td>
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