

# Engineering 101

## Overview

In this course, students will be introduced to all the main engineering disciplines. Students will apply their previous knowledge of math and science to open ended design problems, requiring abstract and technical thinking to showcase the engineering design cycle. Students will learn basic technical welding, soldering, and machine skills, along with laboratory skills through chemical and biology experiments. Electrical engineering will be explored through computer programming, hardware design, and the physical construction of electronic circuits. Engineering 101 will showcase the diverse field that is engineering.

## Engineering Design Challenge – FitBit Design using Micro:bit

The engineering design process will be introduced to students through a full day, hands-on activity that involves both material construction and computer programming basics. The students will work in groups to design a FitBit using Micro:Bit technology while considering the economic, social, and environmental impacts of their design.



## Mechanical Engineering - Welding and Machine Shop

Students will be introduced to the basic concepts of solid and fluid mechanics, thermodynamics and heat transfer through a welding and machine workshop through the department of Mechanical Engineering at McLaughlin Hall. For more information on mechanical engineering at Queen's, go to <https://vimeo.com/28310453>.

## Chemical Engineering – Polymer Synthesis

Chemical engineers design processes which convert raw materials into value-added materials and develop chemical, biochemical, and biomedical products for manufacturing. Students will explore this field through a polymer synthesis experiment in the Dupuis Pilot Plant. For more information on Chemical Engineering at Queen's, go to <https://vimeo.com/150947685>.

## Civil Engineering – Composite Material Design

Civil engineering is an innovative field of study that focuses on infrastructure and the environment. Combining environmental science with physics and math, civil engineers are able to design, control and test infrastructures, water systems, and land masses. Students will learn to implement engineering judgement to build and test structures using a variety of materials and compositions. For more information on Civil Engineering at Queen's, go to [https://www.youtube.com/watch?v=RxYbiTRTH\\_w](https://www.youtube.com/watch?v=RxYbiTRTH_w).

## Mining Engineering – Case Study

Mining has traditionally been thought of as one of the broadest fields of engineering. As their job entails all aspects of a mining project, mining students receive basic training in all major engineering disciplines. This enables a mining engineer to plan, execute and manage projects from the initial discovery phase to the selling of the final product. Students will apply their science and math skills to solving a case study in the field of mining. For more information on the resources in the mining department, go to <https://vimeo.com/227458853>.

## Electrical and Computer Engineering – Arduino

Electrical and Computer Engineering focuses on the integration of the technical computer and electrical engineering with business and entrepreneurship. Electrical and computing engineers work in telecommunications, computers, signal processing, robotics, biomedicine, industrial processes control, power generation and distribution, and industrial machinery. Students will learn basic coding and hardware design using Arduino's to design and build a marketable product. For more information on ECE at Queen's, go to <https://vimeo.com/103906013>.



## Soldering Brain Games

Soldering is an extremely useful skill that the students will learn by creating their very own Brain Game!

