



## A day in chemical engineering

This latest initiative will allow your students to explore the breadth of chemical engineering. They will use equipment from our undergraduate pilot plant facility to study heat transfer, mass transfer, fluid flow, measurement and material balances. A presentation on chemical engineering will be followed by two group experiments, giving students hands on experience. Your students won't want to miss this exciting introduction to our Faculty of Engineering, and the field of chemical and biological engineering.

### Schedule

**9:00 – 9:30 ARRIVAL AND WELCOME**

**9:30 – 10:00 INTRODUCTORY PRESENTATION**

- The chemical engineering profession
- The day's schedule
- Safety in the laboratory
- Division into teams and assignment of experiments

**10:00 – 11:00 EXPERIMENT #1**

- Explanations, demonstration and safety (15 minutes)
- Experiment (30 minutes)
- Transition (15 minutes)

**11:00 – 12:00 EXPERIMENT 2**

- Explanations, demonstration and safety (15 minutes)
- Experiment (30 minutes)
- Transition (15 minutes)

**12:00 – 13:00 SNACK AND DISCUSSION WITH DEMONSTRATORS**

**13:00 – 14:00 PRESENTATION OF EXPERIMENT SUMMARIES BY THE DEMONSTRATORS**

**14:00 – 14:30 CLOSING COMMENTS AND DEPARTURE**

The proposed schedule may be adapted, if required.



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### Description of proposed experiments

Students will be divided into groups and will be assigned two experiments to conduct from the selection offered that day. A brief description of the type of experiments offered is provided below as an example, since the experiments could be altered or replaced.

#### **WIND ENERGY**

Students will be introduced to the concepts of wind power, such as storing electricity, kinetic energy and composite materials. Participants may be able to make their own wind turbine and then compare the quantity of electricity produced by an individual wind turbine with that of a circuit of wind turbines.

#### **FLUIDIZATION AND FLUIDIZED BEDS**

Students will be introduced to the concepts of bubbling regimes and the various phases of fluidization, as well as the concepts related to data measurement and acquisition. Participants may be able to change the conditions of the experiment and appreciate the effect of different parameters on fluidization of the glass bead bed using a gas (air) and a liquid (water) within a transparent column.

#### **ENDOTHERMIC AND EXOTHERMIC CHEMICAL REACTIONS**

Students will be introduced to the concepts of endothermic and exothermic chemical reactions and to the concepts of heat transfer and specific heat. Participants may be able to observe the effects of dissolving different concentrations of chemical products on the temperature of a mixture to show the importance and scope of controlling chemical reactions in industry.

#### **REFRIGERATION**

Students will be introduced to the basic principles of refrigeration and thermodynamics, such as evaporation, the Carnot cycle and hot and sub zero storage tanks using a refrigeration teaching module. The importance of refrigeration in industry and everyday life will be discussed.

#### **HEAT TRANSFER**

Students will be introduced to the basic principles of heat transfer, such as conduction and convection, as well as the concepts related to data measurement and acquisition. Using an assembly of various metal rods, participants will be able to observe the effect of the nature of a metal on its heating or cooling by altering the conditions of the experiment.