## ACESLogo.gif2012/2013 RSGC ACES Program

### RSGC’s ACES program is a set of six complementary courses (*2 streams/3 courses per stream*) designed to prepare motivated students for a variety of post-secondary engineering programs (*computer, electrical, mechanical, and software*). The program can aptly be described as problem immersion with an emphasis on hands-on activities. Students engage continuously in problem-solving contexts with the aim of developing deeper thinkers. Feelings of personal satisfaction stemming from successful (*full or partial*) completion of the activities (*and the associated skill development*) provide much of the encouragement and motivation for students to continue as far into the program as possible.

**TEI4M** (12) ⎯ *Microcontroller Engineering Technology: Arduino Robotics.* The 2012/2013 academic year marks the first time the ACES program has offered a course in robotics. Based on the familiarity students gained with the Arduino platform in their TEI3M course, students will undertake robotics projects involving power, relays, motors and sensing under the influence of R/C and wireless control.

**ICS4U** (12) ⎯ *Computer Science (AP)*

Graduates of ICS3U deepen their software experience through their study of recursion, data structures and algorithms. In the process, student will incorporate use modular design principles and patterns to create complex and fully documented programs. A special emphasis is placed on the mathematics and algorithms relating to advanced fractal geometry. In May, ICS4U students are required to write the AP CS Exam. Science exam.

**TEL3M** (10) ⎯ *Computer Engineering Technology: Electronics.* This hands-on half-course extends the Grade 9 introduction to Electricity by introducing students to concepts involving analog and digital circuitry. This course provides the foundation for Grade 11 *Microcontroller Engineering Technology* course.

**ICS3U** (11) ⎯ *Introduction to Computer Science.* This course continues to introduce students to computer science programming concepts using Java as the development language. Topics include fundamental data types, decisions, iteration, arrays, class and method design, and elementary topics in computer graphics. These concepts are studied in a depth appropriate as preparation for the Grade 12 Advanced Placement course. An introduction to concepts and techniques related to fractal geometry provide an underlying project thread.

**TEI3M** (11) ⎯ *Microcontroller Engineering Technology: Arduino Interfacing.* Students will explore the architecture and implementation of microcontroller applications using the Arduino platform. This 8-bit microcontroller-based board enables students to explore analog and digital interfacing . Concepts include the binary number system, ADC and DAC, PWM and interrupts. Projects include experimentation with light, sound, temperature and power.

**University Placement in Computer, Electrical, Mechanical or Software Engineering Mathematics, or Science**

**ICS2O** (10) ⎯ *Introduction to Computer Studies.* The second half-course provides an introduction to Java programming using the *Robots* environment developed by Professor Byron Becker of the University of Waterloo. This course provides the foundation for the Grade 11 *Introduction to Computer Science* course.