EECS 1021 3.00 Object Oriented Programming from Sensors to Actuators

The objective of this course is to introduce computational thinking—a process-based approach—to problem solving. It uses a problem-based pedagogy to expose the underlying concepts and an experiential laboratory to implement them. The programming language is chosen so that it is widely used in a variety of applications, is object-oriented, and is of industrial strength (Java is an example of such a language). The problems are chosen in order to expose abstract programming concepts by immersing them in relevant and engaging applications. The experiential laboratory is based on sensors and actuators that connect to a computer. The problems are chosen in consultation with the various engineering disciplines in the Faculty with a view of exposing how computing is used in these disciplines. The two hours of weekly lectures are complemented by three-hour long weekly labs.

The lab hardware is chosen so that it can interface with a variety of languages (including MATLAB and Java); has several analog-to-digital and digital-to-analog converters; can control external power supply, and has a form factor suitable for undergraduate labs.

Learning Objectives for the Course:

By the end of the course, the students will be able to:

1. Demonstrate the ability to test and debug a given program and reason about its correctness.

2. Given a problem specification and a suitable API, build an application that meets the given requirement.

3. Use ready-made collections to solve problems involving aggregations of typed data.

4. Build an event-driven application that controls sensors and actuators in order to connect events to physical actions.

5. Program common applications from a variety of engineering disciplines using an object oriented language and solve them on the computer.

Prerequisites: EECS1011 3.00

Course Credit Exclusions: EECS1020 3.00