Robots 102 - Advanced Robotics: Build a Vending Machine and Compete in Groups!

Monday - Friday, August 1-5, 2016

Class meets at the University of California, San Diego from 8:30am - 3:00pm.

Course Overview

Take your engineering skills to the next level with this exciting, hands-on robotics camp! Learn to build vending machines, target tracking robots, and compete in a complex robotics competition requiring the use of 2 robotics kits per team! That means 6 motors instead of 3 and double the sensing capability! These challenges are designed to develop team building skills, as well as reinforce the design process, time management and leadership! Students will get practical experience with design tolerances, limited materials, and learn to follow a timeline. It is encouraged that students have taken Level 1 Robotics, however, we will provide a recap of programming loops, switches, and sensors including the touch, sound, ultrasonic (distance), and light sensors. Not only is this a great opportunity to grow your engineering skills, but students will also be recognized for their creativity and leadership in our awards ceremony at the end! Join us now to experience a new level of excitement found in engineering complex tasks!

Course Goals and Learning Objectives

The goal of this course is to provide a strong and creative foundation in computer science. This is a hands-on class with problem solving at its core. Topics include learning about program design, using functions and loops to complete challenges, and most importantly testing the problem solving skills critical in becoming a successful computer programmer. The course will take the students through the design, development and implementation of their robots. This course promises an unforgettable experience!

The class is geared to advanced middle school students. It is assumed the student has a basic understanding of Windows and using a computer.

How the Class Will Be Taught

This course is taught using classroom and lab instruction employing lecture and demonstration, in-class lab, student participation, and class activities leading to a final project. Classes will include introductory concept presentations, followed by in-class exercises.

Reading

The course will be primarily based on a variety of free handouts and online readings, but the following are highly recommended:
Perdue, David, Valk, Laurens, The Unofficial Lego Mindstorm NXT 2.0 Inventor's Guide
Topics to be Covered During This Workshop

**Module 1:**
- Introduction to Lego Mindstorm NXT
  - Nxt Introduction
  - Nxt Editor

**Module 2:**
- Build Basic Robot
  - Drive forward
  - Drive reverse
  - Accelerate, turn and maneuver

**Module 3:**
- Beginning Programming
  - Drive in Square
  - Detect Distance
  - Detect Sound, touch, bumper, ultrasonic
  - Follow Line

**Module 4:**
- Programming
  - Move
  - Loops
  - Wait/Events
  - Switches
  - Blocks

**Module 5:**
- Challenge 1
  - Incorporate skills to develop a robot capable of completing the challenge.

**Module 6:**
- Challenge 2
  - Incorporate skills to develop a robot capable of completing the challenge.

**Module 7:**
- Final Project
  - Incorporate skills to develop special robot project

**Instructor:** Dusty Fisk, SouthWest Robotics in Science Education

**Prerequisites:**
- Must be a current middle student in grade 7 - 8.
- A more advanced understanding of robotics with student having gained robotics skills through classroom activities, clubs and perhaps even competitions with other teammates

**Course fee:** $260.00.

**Registration is open until course is filled. Register early as space fills quickly. Space is limited.**

If you have any questions regarding this workshop or the application process, please contact Ange Mason via phone at 858 534-5064 or via email at amason@ucsd.edu.