Robotics Programming Syllabus

Schroon Lake Central School
Spring Semester **2018**, ½ Credit High School Level Course
Teacher: David Jones

Course Description

Robotics Programming is a computer science course focused on learning principles of computer software writing through problem solving using robots. Students work to program robots already built using Lego EV3 robotics kits and CoDrone robotic drones. The robots solve problems posed in various challenges. Students learn programming using the C/C++ programming language.

Course Objectives

Students will:

1. write software using C/C++;
2. collaborate effectively in groups and teams;
3. compose detailed lab reports documenting lessons learned in robotics programming

Grading

All tasks count the same.

Lessons

Working in a team is common in the world of work, especially in technology fields. Students will be working in pairs through the course. In every situation, students are to follow the instructions to **divide up the task into two sub-tasks.** This is to ensure that one person does not do all the work.

Students use pre-constructed robots to succeed at **challenges** of various difficulty levels. There are periodic whole class tutorials in programming throughout the course.

Teams are required to submit a carefully-composed, well-organized **lab report** of their work online at the class website. The purpose of the reports is to preserve for future use bits of code or important principles and lessons learned from the hands-on work of each class period as well as to document learning experiences.

There will a programming quiz **every other week** (opposite the weeks when readings are due) to assess students' programming knowledge. These are either in multiple-choice format or practical tests of reading/writing software code in C/C++.

Throughout the semester, students work in pairs in rotation through cycles at robotics programming stations. Each station builds a variation on a set of associated skills and each cycle becomes increasingly difficult. **Students who finish before the time allotted are expected to complete additional programming tasks as available in the "continuing assignments" section of the website.**

Cycles 1-4 are basic training lessons. In these cycles, you will learn motor control and sensor control. You will also learn how to have your robot save information ("datalogging"). You should use the code fragments provided in these lessons so that you can learn the basics.

After cycle 4, there are challenges of roughly similar difficulty and are generally variations on the same theme. Each cycle, however, becomes increasingly complex and difficult. Consult the course materials for code fragments that will help you, although in the last cycles of the course there are no such hints available. Work with the flying drones begins in the advanced stages of the course.

You will need to make minor changes to the robots to attach the necessary sensors, but you are not allowed to make any major modifications to the robots. Robots need to be returned to their basic configuration at the end of a turn for the next team.

Your grade comes from the teacher observing your robot complete each challenge. You are expected to equally contribute to the assignment and, in most cases, will earn the same grade.

Participation is assessed using the following rubric documented in the lab report for each cycle. Score is based on 3 assessments: student's own, partner's, and teacher's.

	4	3	2	1
On Task	Always	Mostly	Sometimes	Seldom
Manners: polite, respectful, kind, patient.	Always	Mostly	Sometimes	Seldom
Contribution	"Did my fair share"	"Did mostly my fair share"	"Did about half of what I should have"	"My partner really did most of this"