Fairfax Collegiate

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Intro to VEX IQ Robotics 5-6 Syllabus

Course Goals

1 VEX Robotics Platform
Students work extensively with the equipment and programming environment designed by the VEX Robotics organization.

2 Understanding Robotics
Students use the VEX platform to explore topics of interest to modern robotics.

3 Robotics Engineering
Students synthesize what they have learned about the planning, building, and testing processes to solve practical problems.

Course Topics

1 Simple Machines
Students learn how to use pendulums, pulleys, levers, and gears in robot design.

2 Mechanics of Robots
Students learn how turning scrub and manipulating objects affect robot design.

3 Movement in Graphical VEX
Students program autonomous movement patterns using the graphical interface of VEX.

4 Sensors in Graphical VEX
Students implement all the sensors available in the VEX kits to enhance their programs.

5 Revising Designs
Students practice testing and revising their designs for a bigger challenge.

6 Working Around Limits
Students practice completing challenges when restricted in materials, time, and resources.

Course Schedule

Day 1

Introduction
Students are introduced to the instructor and each other, and they learn about the rules for class.

Assessment of Robotics Knowledge

Students are assessed on prior robotics knowledge in order to give the instructor a better understanding of where the class is as a whole, and how to best teach according to the students' strong suits.

Pendulum Introduction
Students are introduced to the pendulum as a mechanism in robotics and machines.

Pulley Introduction
Students learn about the pulley and how useful it is in designing robots.

Lever Introduction
Students look into how simple lever mechanics are used in robotics and why it is crucial to design.

Gears Introduction
Students understand how gears interact together and the math behind planning gear layouts.

Day 2

Gears Introduction
Students understand how gears interact together and the math behind planning gear layouts.

Drivetrain and Manipulation
Students work on drivetrains and how they affect performance, and how objects can be manipulated using the kits.

Standard Drive Base
Students work with a standard build of a robot to figure out basic robot movement and remote control interaction.

Day 3

Standard Drive Base
Students work with a standard build of a robot to figure out basic robot movement and remote control interaction.

Object Manipulator with Drive Base
Students take the standard drive base robot and apply object manipulation to further their understanding of how robots interact with real world objects.

Lifting Mechanism
Students use the standard drive base and pair it with a lifting attachment to explore how object manipulation can be taken further in real world applications.

Day 4

Lifting Mechanism
Students use the standard drive base and pair it with a lifting attachment to explore how object manipulation can be taken further in real world applications.

Autopilot
Students explore the autopilot capabilities of robots using sensors and the robot's software to see how remote controls are not the only way to use robots.

Day 5

Distance Sensor
Students tackle an in-depth "collision avoiding" function for the robots using motors and the distance sensors.

Color Sensor
Students complete a "green light, red light" function using the color sensor.

Day 6

Gyro Sensor
Students create a "return home" function with the gyro sensor and some programming.

Clawbot
Students build and program the Clawbot IQ and are challenged with prototyping.

Day 7

Clawbot
Students build and program the Clawbot IQ and are challenged with prototyping.

Clawbot and Sensors
Students use sensors with the Clawbot to do smaller challenges with the field.

Day 8

Clawbot and Autonomous Tasks
Students select appropriate sensors to the Clawbot to complete one or more tasks autonomously.

Day 9

Robot Soccer
Students apply all their learned knowledge in a friendly competition among the groups in two soccer challenges.

Day 10

Reviewing VEX
Students collectively discuss concepts, news, and future plans with regards to robotics.

Exploration
Students have a chance to plan and build for the current year's VEX challenge.

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