Programming for FTC Robotics

COURSE OUTLINE

Course Description

This class introduces students to the fundamentals of coding robots, including why code is needed and what it controls. Students will learn about the three programming methods used in FTC -- Blocks, OnBot Java, and Java -- while also covering core concepts like variables, operators, control statements, and functions. Most of the class is hands-on, with students writing and testing code in Blocks to control a real FTC robot and then proposing improvements.

01 Introduction to FTC Programming

- Why robots need code
- Overview of robot hardware (motors, servos, sensors, control hub)
- Programming methods: Blocks, OnBot Java, Java
- Hands-on: Connect to an FTC robot and explore the Blocks interface

02 Programming Basics in Blocks

- Using the Blocks interface
- Variables, data types, and operators
- Conditional statements (if, if/else)
- While loops and for loops
- Functions (methods) and why they are important
- Hands-on: creating a simple Blocks program

03 Understanding FDM Technology

- How FDM printers work
- Major components of an FDM printer
- FDM companies and machines

04 Integrating Motors, Servos and Sensors

- Controlling motors and servos
- Using sensors (encoders, vision, distance, etc)
- Hands-on: programming a simple drivetrain

05 Writing OpModes

- What is an OpMode
- Types of OpModes in FTC: Autonomous and TeleOp
- Sample Autonomous OpMode
- Sample TeleOp OpMode
- Hands-on: programming a simple autonomous OpMode

06 Putting it all together: Coding Challenge

- Students will be given a coding challenge
- Code will be loaded to a robot and tested

07 Questions & Comments