Introduction to FTC Robotics

COURSE OUTLINE

Course Description

This beginner-friendly class introduces students to the world of FIRST Tech Challenge (FTC) Robotics, where teams design, build, and program robots to compete in annually revealed games. Students will gain hands-on experience with an FTC robot while learning the fundamentals of design, programming, problem-solving, and teamwork.

01 Welcome to FTC Robotics
- Overview of the FIRST organization and the FTC program
- Gracious Professionalism
- Team roles (designers/builders, programmers, drivers, scouts, and representatives)

02 Design Process
- Brainstorming and prototyping strategies
- Engineering notebooks and documentation
- Introduction to the design cycle: design > build > test > improve

03 Mechanical Systems & Robot Assembly
- Common FTC building materials
- Basic mechanical systems: drivetrain, arm, intake, and lift mechanisms
- Hands-on: assembling a simple robot subsystem

04 Programming
- Overview of FTC programming options: Blocks, OnBot Java, Java
- Types of OpModes: Autonomous and TeleOp
- Hands-on: program a simple drivetrain using Blocks

05 Sensors & Control
- Types of sensors (encoders, distance sensors, color sensors, IMU, etc)

- Manually controlling your robot
- Hands-on: update OpMode to use sensor data

06 Strategy & Teamwork
- Competition preparation
- General match strategy
- Scouting

07 Mini FTC Challenge
- Simple challenge is introduced
- Students form small teams to brainstorm and design a solution

08 Questions & Comments