FTC Summer Camp Syllabus

Day 1

FTC Introduction

Mechanical - Drivetrain

- Mecanum, tank, omni
- Power transmission – gear ratio, direct drive, timing belt, chain drive
- Servo vs. motor selection
- Structural design, stability, weight distribution

CAD

- Onshape fundamentals
- Basic sketch + extrusion
- Assembly with FTC parts libraries

Programming

- Driver Hub/Control Hub configuration
- Hardware map

Day 2

Mechanical – Scoring Mechanism

- Linear motion
- Intake + transfer system
- End effector (claw, hook, intake, …)
- Fastening methods

CAD

- Simple bracket and mounts
- Claw design

Programming - TeleOp fundamentals

- Gamepad control
- Mecanum drive code
- Motor and servo control

Day 3

Mechenicals

- Odometry
- Design tradeoffs

CAD

- Mounting holes

- Gear design

Programming

- System structure
    - Subsystem-based coding
    - Code organization and modularity
- Finite state machine

Day 4

Programming

- Parallel actions
- Sensors (encoder, color, touch, …)
- Intro to autonomous
    - Simple encoder-based movement
    - Pathing concept
- Git basics

Day 5

System Integration

- Wiring
- Driving drills
- Tuning and debugging

Mini Competition