**Java FRC Crash Course Outline**

**Note: The end goal of this class is to get students programming the kit drivetrain on the 2023 robot as well as some of its pneumatics. If we don’t have enough time, I’m considering having the students program a function to control the lights on the robot.**

**(Explanation = Purple)**

**(Demo = Yellow)**

**(Lab = Teal)**

**Part 1 – Gauging Basics:**

**Note:** The speed at which we move through this part’s content largely depends on how well students understand the fundamentals of code. If we finish with extra time, we might be able to cover the beginning of part two’s content.

Part 1: Syntax

1. What is syntax
2. Compare syntax (Python, C, and Java)
3. “Hello World” Java

Part 2: Variables and Arrays

1. Fundamental Variable
2. Fundamental Array
3. Variables in Java

Part 3: Conditional And Loop Statements

1. If, Else and Else If Statement
2. If Statements in Java
3. Switch Statement
4. While, For and For Each Loop
5. Loops in Java

Part 4: Functions

1. Functions and their purpose
2. Java Functions

Extra: Build a Guessing Game (If there’s time)

**Part 2 – OOP and Working with Libraries:**

Part 1: OOP Paradigm

1. Classes and Objects (Blueprint Analogy)
2. Methods and Attributes
3. Constructors/Create an Object

Part 2: Libraries and WPILib

1. What Is a Library?
2. How To Manage Libraries

Part 3: Programming The Drivetrain

1. CAN Network and Creating Motors
2. Getting Joystick Input
3. Setting Motor Power with Joysticks

Part 4: Programming Pneumatics (If there’s time)

1. Constructing Pneumatic Hub Object
2. Using Logic to Actuate Pneumatic Cylinders