# Advanced Arduino Programming
# Suitable for: G10 - G12

**Prerequisite:** Arduino Electronics Programming: Level I
**Duration:** 26 Weeks
**Classes per Week:** 1 class (45 minutes each)

**Course Overview:**
This advanced course builds on foundational Arduino skills, introducing students to more complex sensors, components, and programming techniques. Students will explore projects using temperature sensors, ultrasonic range meters, heartbeat sensors, and more. By the end of the course, students will be able to design and implement intricate Arduino projects, utilizing advanced components and coding for real-world applications.

**Covered Topics**

**Unit 1: Review of Arduino Basics and Introduction to Sensors**

- Quick review of basic Arduino concepts
- Introduction to new sensors: temperature and humidity, tilt, and touch sensors
- Using RGB LEDs with push buttons for interactive color control

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**Unit 2: Environmental and Motion Sensors**

- Working with alcohol, flame, and photoresistor sensors for environmental sensing
- Introduction to Linear Hall and light-blocking sensors for magnetic and light detection
- Programming the Arduino to react based on environmental data

**Unit 3: Advanced Components and LED Displays**

- Using the buzzer for sound alerts and notifications
- Programming with infrared receivers for remote control applications
- Utilizing ultrasonic range meters for distance measurement projects

**Unit 4: Projects with Interactive Displays and Inputs**

- Building projects with LCD displays and shock sensors
- Developing applications using joysticks and LEDs for user interaction
- Creating games like Rock Paper Scissors and Electronic Dice

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**Unit 5: Capstone Projects and Final Assessment**

- Building complex projects like Blind Glasses, Safety Alarm, and Arduino Piano
- Final project: Door Monitor with reed switch
- Course completion and demonstration of advanced Arduino programming skills

**Materials Needed:**

- Arduino kit with 37 in 1 sensors box, LED displays, resistors, wires, and breadboard
- Computer or tablet
- Chrome Browser

**Assessment**

At the end of each lesson, learners will be assessed on their ability to incorporate advanced sensors, components, and programming techniques in their Arduino projects. Assessments will focus on problem-solving, coding accuracy, and project functionality.

**Certification**

A certificate of completion will be awarded to students who successfully complete the course, recognizing their proficiency in advanced Arduino programming.