

Embedded Programming Beginner Plan (Arduino + C/C++)

Goal

- Learn programming fundamentals
- Understand embedded systems and microcontrollers
- Build hands-on projects using Arduino
- Get introduced to real-world tech workflows
- Learn a programming language

Learning Milestones

Week 1: Programming Basics & Arduino Setup

- **Concepts:**
 - What is embedded programming?
 - Intro to Arduino ecosystem
 - Basic syntax in C/C++
- **Tasks:**
 - Install Arduino IDE
 - Set up your Arduino board
 - Blink an LED!
- **Resources:**
 - [Arduino Getting Started](#)
 - [W3Schools C Tutorial](#)

Week 2: Inputs, Outputs, Control and PCB Design

- **Concepts:**
 - Digital vs Analog signals
 - Reading sensor input
 - Controlling LEDs, motors, and buzzers

- **Tasks:**
 - Use `digitalRead()`, `analogRead()`, `digitalWrite()`
 - Build a basic temperature or light sensor project
- **Project:** Light-controlled LED
- **Resources:**
 - [Arduino Digital I/O](#)

Week 3: Programming Logic and Functions

- **Concepts:**
 - Variables, if/else, loops
 - Writing custom functions
 - Debugging
- **Tasks:**
 - Use buttons to control LEDs
 - Use serial monitor for debugging
- **Resources:**
 - [C Programming Basics](#)
 - [Arduino Functions](#)

Week 4: Sensors, Libraries, and Real Projects

- **Concepts:**
 - Using external libraries
 - Reading from temperature/ultrasonic sensors
- **Tasks:**
 - Install and use a library (e.g., DHT11, HC-SR04)
 - Understand how to read sensor data and act on it
- **Resources:**
 - [DHT11 with Arduino](#)

Week 5+: Expanding Your Skill

- IoT (ESP32 + Wi-Fi)
- Arduino + Bluetooth
- Real-time clock, displays, etc.

Tools Checklist

| Tool | Purpose |
|-------------|------------------------|
| Arduino UNO | Microcontroller board |
| Arduino IDE | Code editor & uploader |
| YouTube | Learning Resource |
| Git Hub | Research resource |

Learning Resources

- [Arduino Official Tutorials](#)
- [Paul McWhorter Arduino YouTube Series](#)
- [PlatformIO for Advanced Arduino Dev.](#)