

Arduino Electronics Programming: Level I

Suitable for: G10 - G12

Prerequisite: None

Duration: 15 Weeks

Classes per Week: 1 class (45 minutes each)

Course Overview:

This course introduces students to the basics of electronics and programming using Arduino. Students will learn how to work with electronic components and build simple circuits, gaining hands-on experience with LEDs, series and parallel circuits, and coding for Arduino. By the end of the course, students will be able to create and code basic circuits to perform various tasks and light effects.

Covered Topics

Unit 1: Introduction to Arduino and Basic Electronics

- Understanding what Arduino is and its applications
- Introduction to electric circuits and basic electronic components
- Setting up and lighting a single LED

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Unit 2: Coding for Arduino and Circuit Design

- Writing code to control an LED with Arduino
- Exploring series circuits and understanding their behavior
- Coding series circuits for controlled outputs

Unit 3: Advanced Circuits and Parallel Configuration

- Building parallel circuits and comparing with series circuits
- Writing code to control LEDs in parallel circuits
- Learning the differences in current and voltage in various setups

Unit 4: LED Patterns and Effects

- Creating blinking LED patterns and multiple LED setups
- Building a light show with sequential lighting effects
- Coding for complex light sequences with multiple LEDs

Unit 5: RGB LEDs and Color Effects

- Working with RGB LEDs for color mixing
- Coding to produce random colors and light effects with an RGB LED
- Final project: Design a unique light show using all learned skills

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Materials Needed:

- Arduino kit (including LEDs, resistors, and an RGB LED)
- Computer for coding and programming the Arduino
- Internet connection
- Chrome browser

Assessment

At the end of each lesson, learners will be assessed on their ability to build circuits and write code for Arduino. Assessments will focus on understanding circuit design, coding accuracy, and creativity in creating LED patterns and light effects.

Certification

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