ELECTRONIC BASICS

By Great Scott

Summaries:

Class-01: The Multimeter

Provides an introduction to using a digital multimeter (DMM), an essential tool for measuring electrical properties in circuits. It covers the basics of measuring voltage, current, and resistance, explaining how to select the appropriate settings and connect the multimeter to components. The video also touches on advanced features like auto-ranging and continuity testing, which simplify the measurement process.

Class-02

This video explains how to dim LEDs using Pulse Width Modulation (PWM). The presenter demonstrates how to dim LEDs using a bench power supply, a potentiometer, an Arduino, and a 555 timer chip. They also discuss the benefits and drawbacks of each method.

Class-03

This video demonstrates how to program an ATtiny 85 microcontroller using an Arduino Uno as a programmer. The creator shows how to set up the Arduino software and download the necessary board data for the ATtiny. They then build a custom shield for the ATtiny, allowing for easier programming and connection to other components. The video concludes with a brief overview of using the ATtiny with a WS 2801 LED strip, promising a future video with more details.

Repo Link: https://github.com/damellis/attiny

Class-04

This video demonstrates how to connect a Bluetooth module to an Arduino Nano to control LEDs using an Android app. The creator explains how to wire the module, overcome voltage differences, and program the Arduino. They also provide a free Android app recommendation and share their code for controlling the LEDs.

Repo Link: https://github.com/Preetam21022/Color-Changing-Bluetooth-Controlled-LED

Class-05

Learn how to control multiple LEDs using multiplexing with minimal IO pins. By connecting LEDs in a matrix format and using a P-channel MOSFET as a switch, you can light up individual LEDs without overloading your microcontroller. The tutorial includes wiring instructions and code to create visual effects like moving sine waves.

Repo Link: https://github.com/Preetam21022/Multiplex

Class-06

This video demonstrates how to build a standalone Arduino circuit using an ATmega328p microcontroller. The video covers the necessary components, wiring, and programming methods, including using an FTDI chip for USB to serial conversion. The video also discusses the advantages and disadvantages of using a standalone circuit compared to a traditional Arduino board.

Class-07

This video explores the use of 7-segment displays, both with and without an Arduino microcontroller. It covers different types of displays, how to use a BCD to 7-segment display driver, and how to multiplex multiple displays using an IC specifically designed for this purpose. The video also includes a demonstration of how to use a library to control the displays with an Arduino.

Repo Link: https://github.com/Preetam21022/7-Segment-Display

Class-08

This video explains how to use LEDs and current limiting resistors. It covers basic concepts like forward voltage and current, and how to calculate resistor values. The video also explores more advanced topics like variations in LED forward voltage and how to use constant current sources to drive LEDs.

Class-09

This video explores the importance of diodes in electronics, focusing on their use in DC circuits and AC-to-DC conversion. The video explains how diodes prevent damage from reversed polarity and how they can be used to create a simple DC power supply. It also introduces the concept of bridge rectifiers, which allow for more efficient DC conversion.

Class-10

The video explains how Digital to Analog Converters (DACs) work mainly 8bit R-2R DAC, focusing on converting digital signals from devices like Arduino into analog waveforms (e.g. sine, ramp, triangle). It demonstrates building a simple resistor-ladder DAC, generating waveforms, and using an op-amp to stabilize output. It also compares DACs with Arduino's analogWrite() (PWM) and introduces more precise DAC chips like the MCP4725. Also explains how voltage followers and I2C devices can do the job.

Repo Link: https://github.com/Preetam21022/DAC

Class-11

This video demonstrates how to use a TC 35 GSM module to send SMS messages with an Arduino Uno. The video covers the basics of connecting the module, powering it, and sending text messages. It also includes a simple schematic and code example.