

COURSE CONTENTS

1. Introduction

- Alternative Current (AC) & Direct Current (DC)
- Closed Circuit & Open Circuit
- Passive Components
- Active Components
- Through Hole & Surface Mount Devices (SMD)
- Fuses
- Switches
- Breadboards
- Batteries & Circuit wires
- Practical :
 - ✓ Observe waveform pattern of Alternative Current (AC) & Direct Current (DC) using Oscilloscope
 - ✓ Identify Passive & Active Components
 - ✓ Identify Through Hole & Surface Mount Devices (SMD)
 - ✓ Identify Fuses & Switches
 - ✓ Design first circuit using 9V Battery, 1K Ω / 1/4W Resistor, Switch, LED and breadboard

2. Resistors

- What is Resistor, Resistor circuit Symbol & Ohm's Law
- What do Resistors Do in a circuit
- Types of Resistors – Fixed Value Resistors, Variable Resistors, Resistor Network etc.
- Resistor value marking
- Resistive materials – Carbon Film Resistors, Metal Film Resistors, Wire Wound Resistors, Metal Oxide Resistors etc.
- Resistors in parallel/series
- Varistor
- Thermistor
- LDR
- Practical :
 - ✓ Identify Types of Resistors
 - ✓ Understand to read Resistor Color Code
 - ✓ Measure resistor value using Multimeter
 - ✓ Identify different types of Resistive materials
 - ✓ How do variable resistor work
 - ✓ Identify the differences between parallel/series resistors

3. Diodes

- What is diodes & Symbols
- Working principle of diodes – Forward Bias & Reverse Bias
- Types of Diodes – Zener Diodes, PN Junction Diodes, Light Emitting Diodes (LED) etc.
- Identify characteristics of diodes using datasheet
- Practical use of diodes
- Practical :
 - ✓ Identify the diodes
 - ✓ Check the diode using Multimeter
 - ✓ Design circuit using diodes and observe operation of diodes using oscilloscope

4. Capacitors

- What is Capacitor & Symbols
- Types of Capacitors
- Capacitor characteristics
- Capacitor Color Code / Number system
- Capacitors in parallel/series
- Practical :
 - ✓ Identify the different types of capacitors
 - ✓ Read the value of capacitance using color code / number system
 - ✓ Measure the capacitance using Capacity Meter

5. Transistors

- Types of Transistors – BJTs & FETs
- N Type & P Type
- Symbol of transistors
- How does transistor work
- Applications of transistors
- Practical:
 - ✓ Identify transistors
 - ✓ Identify terminal of transistor using multimeter
 - ✓ Identify terminal of transistor using datasheet
 - ✓ Identify characteristics of transistor using datasheet

6. Transformers

- What is transformer & Symbol
- Types of Transformers
- Transformers turns ratios
- Transformer construction techniques

7. Soldering & Desoldering

- Soldering
- Desoldering
- SMD (Soldering & Desoldering)

8. Voltage Regulators

- What is Voltage Regulators
- Types of Voltage Regulators
- Application of Voltage Regulators
- Identify characteristics of Voltage Regulator using datasheet
- Practical :
 - ✓ Identify the function of Voltage Regulators

9. Digital Electronics

- Basic logic Gates
- Identify pin configuration using datasheet
- Practical :
 - ✓ Identify the function of Logic Gates

10. Measuring Instruments

- Basic of Analog Multimeter
- Basic of Digital Multimeter
- Basic of Oscilloscope
- Practical :
 - ✓ Use of Analog Multimeter
 - ✓ Use of Digital Multimeter
 - ✓ Use of Oscilloscope

11. Commonly used Sensors/Transducers and their Applications

- Sensor & Transducer
- How to select Sensors/transducers for your project
- Commonly use Sensors/Transducers
- Practical :
 - ✓ Identify present available Sensors/transducers in the market (Ex. Soil Humidity Sensor, Infra-Red Sensor, Smoke Sensor, Ultrasonic sensor, Temperature Sensor etc.)

12. Design of Printed Circuit Board (PCB)

- Basic design techniques using Proteus Software
- Making PCB using Ferric Chloride

13. Project on Basic Electronics

Simple project using Basic Components (12V power Supply/ Flashing LEDs etc.)