1. Basic Principles – 10 days

1.1 Ohms Law and its Applications
1.2 Capacitors and Inductors - Behavior
1.3 Analyze simple RC, RL and RLC circuits
1.4 Non idealities in Passive and Active components
1.5 Understanding Power dissipation and Ratings

Practical Assignment: You will be asked to complete an online Quiz with multiple choices to test your understanding of the basic principles in electronics design. You will then construct a circuit and measure the power consumed by that circuit.

2. Circuits Analysis – 10 days

2.1 Reading and Understanding PCB Schematics
2.2 Analyze simple transistor circuits
2.3 Analyze simple digital logic circuits
2.4 Positive and Negative Feedback concepts
2.5 Understanding power supply circuits in PCB designs

Practical Assignment: You will be given a PCB Schematic and asked to analyze the overall function of that design. Identify various sections of the schematic and explain the transistor circuits functionality in that schematic.

3. Circuit Synthesis – 10 days

3.1 Filter & Delay Design using RC network
3.2 Designing feedback resistor dividers for LDO/DC-DC
3.3 Building Inverters, AND and OR using BJTs.

Practical Assignment: You will be given a skeleton schematic that contains DC-DC converter, LDO and Microcontroller and Analog Switch IC. You have to complete the design by constructing the Feedback dividers for the DC-DC and LDO and design a delay circuit for Microcontroller RESET pin. Also, you have to construct a given logic control signal for the MUX switches using BJTs.

4. Circuit Test & Debug – 15 days

4.1 Using multimeter for voltage/current/resistor measurements
4.2 Using oscilloscope to measure analog and digital signals in real time
4.3 Circuit debug techniques and Methodology of Root-cause analysis of a design issue.

Practical Assignment: Debugging is an important and hard to acquire design skill that is irreplaceable skill set every engineer must master to ensure a rewarding and satisfying career in electronics. You will be given a PCB with some issue and you have to debug the issue (could be hardware/firmware) and document your step by step approach to root-causing the issue.

Course Completion Certificate:

You will be given a course completion certificate with evaluation report based on your performance in the Practical Assignments. Your score in the assessment indicates to potential employers of your hands on capability and job readiness.