1. PCB Fundamentals – 1 day

1.1 PCB Material Types & Layers
1.2 Impedance Control in PCBs
1.3 Reading Gerber Files

Practical Assignment: Read a layout file to find out number of PCB layers used, any impedance control done and view gerber files to find out minimum trace thickness in the design.

2. Components Fundamentals – 2 days

2.1 Active vs Passive Components
2.2 Surface mount vs Through hole
2.3 Package Types and Identifying a package
2.4 Reading datasheets of different foot-prints and drawings

Practical Assignment: Identify the package type of 10 different ICs given to you. Distinguish between active and passive components among 10 components given to you. Find the pitch of IC pins whose datasheet is given to you.

3. Soldering Fundamentals – 28 days

3.1 Lead Types and Lead-Free types
3.2 Solder Paste Types & Solder Flux types
3.3 Factors that makes a solder joint reliable
3.4 Effect of ground plane on solder joint quality
3.5 Solder tips and soldering station types

3.6 Working with Soldering station – care abouts
3.7 Temperature settings based on solder type
3.8 SMD Passives Soldering Techniques
3.9 SMD IC Soldering Techniques for different packages
3.10 Soldering QFN using Hot Air Blower
3.11 De-soldering Techniques
3.12 ESD Concerns and Safety precautions

Practical Assignment : You will be given a PCB with required components and the task is to assemble that PCB within 30 minutes using all the different techniques learnt. The task is considered successfully completed if the PCB Assembly powers up and functions correctly.

4. SMT Automation and Production: 14 days

4.1 Introduction to Automatic Assembly of SMD PCBs
4.2 Stencil Creation
4.3 Aligning PCB and Stencil in a Solder Paste Printer
4.4 Programming a 4-head Pick and Place machine
4.5 Thermal profile settings in a 12-zone Oven
4.6 Common problems with Soldering & Solutions

Practical Assignment: You will be given a 2 layer blank PCB and the Stencil for it. Your task would be to apply solder paste to it and program the Pick and Place machine and load required component reels on to the feeders and get the components placed. Then run the board through oven to get final soldered PCB. The task is considered successfully completed if the PCB works correctly right out of the oven.

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.