PCB DESIGN ADVANCED COURSE

Prerequisite 👍

- Completion of PCB Design Basic or Familiar With PCB Design on any ECAD tool
- Familiar with computer usage, having a dedicated PC for practice is recommended

Module 1: RLC

1. Resistance of Interconnects
2. Capacitance of Interconnects
3. Inductance of Interconnects

Module 2: Impedance & Transmission Line Concepts

1. What is Impedance ?
2. Low and High frequency models for RLC
3. Return patch or Ground ?
4. Uniform Transmission lines
5. Instantaneous impedance of Transmission line
6. Characteristic impedance of transmission line

Module 3: Controlled Impedance Trace Geometry

1. What is controlled impedance ?
2. Factors that Change in Impedance
3. Single ended & Differential signalling scheme
4. Single ended structures
5. Differential Structures

Module 4: Stack up Design

1. Understanding material properties
2. Weave Structures
3. Layer count decision factors
4. Material Selection for high performance
5. Layer Order Design

Module 5: Via Structures in High dense & High speed

1. Through hole via and its properties.
2. Blind via
3. Buried via
4. Stacked and Staggered

5. Stub length
6. Back drilling

Module 6: Placement and Floor Plan optimization

1. Distributing functional section
2. Placement for Routing
3. Placement for Thermal
4. Placement for EMC
5. Placement for Assembly

Module 7: Power Converters Placement and routing

1. Distributing functional section
2. Placement for Routing
3. Placement for Thermal
4. Placement for EMC

Module 8: Propagation Delay and Skew and Delay Tuning

1. Speed of signal in transmission line
2. Propagation Delay calculation
3. Change in propagation delay
4. What is Skew?
5. Serial interface vs Parallel interface
6. Timing in interface
7. Skew and Delay matching limits

Module 9: Design for Power Integrity

1. Why PI is required
2. What is PDN
3. Importance of Decoupling caps placement
4. Voltage drops in Planes
5. Defining Plane minimum width
6. Interaction with Simulation teams

Module 10: Design for Signal Integrity

1. Impedance control in Physical geometry
2. Termination placement & AC coupling placement
3. Signal Stub control

4. Return via and signal travel in return path
5. Design rules for Cross talk avoiding
6. Interaction with Simulation teams

Module 11: ECAD & MCAD Collaboration

1. File format to exchange
2. Key things to control / verify

Module 12: Design for EMC

1. Protection circuit placement and routing
2. Filter placement
3. Switching Loops Optimization
4. Skin depth of signal
5. Guarding and Faraday case
6. Radiating antenna

Module 13: Practical Designs with High Speed Interfaces

1. USB2.0 , USB3.0, Ethernet, Gigabit Ethernet, HDMI, eDP
2. LVDS (CSI , DSI), PCIe, SATA
3. SerDes Interfaces (GMSL, FPD Link etc)
4. RMI , RGMI , Quad and Octa Flash, UFS and NVRAM
5. DDR2, DDR3, DDR4, DDR5
6. WiFi, BLE, GPS and GPRS

Module 14: PCB Design for Manufacturing (DFX)

1. Design considerations for manufacturing
2. Design for Assembly
3. Design for Testing

Module 15: Fab & Assembly drawings Preparation

1. Importance of Assembly and fab notes
2. Key things to control in fab drawings
3. Preparing assembly drawings

What you Learn from this course 👏

Understand the requirements of DFX
You will learn key building blocks for high performance designs

Understand and learn about latest technology used in PCB level
You should be able to design by respecting compliance requirements.

Thank You