

**SYLLABUS FOR THE WRITTEN EXAM TOWARDS PCB DESIGNER
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Introduction to PCB Design: History and evolution of PCB technology, Basic components of a PCB.

Types of PCBs: single-layer, double-layer, and multi-layer.

PCB Materials: Substrate materials: FR4, polyimide, Copper thickness and its importance, Types of copper cladding.

PCB Manufacturing Process: Photolithography, Etching, Drilling and via formation, Plating and solder masking.

PCB Layout Design: Schematic design and netlist creation, Component placement strategies, Trace routing techniques, Design rules and constraints.

High-Speed PCB Layout Design: Factors affecting signal integrity, Electromagnetic interference (EMI) mitigation, Thermal management techniques.

Differential Pair Routing: Importance of differential pair routing, Critical aspects for ensuring signal integrity, Techniques for maintaining equal trace lengths and spacing.

Ground Plane Utilization: Role of the ground plane in PCB design, Effects on signal integrity and EMI, Grounding techniques and best practices.

Types of PCB Vias: Through-hole vias, Blind vias, Buried vias, Applications and challenges of each via type.

Thermal Management in PCB Design: Use of thermal vias, Heat sink applications, Importance and methods of thermal management.

Impedance Matching: Process and significance in PCB design, Techniques for achieving controlled impedance, Importance for high-speed signal transmission.

Testing and Verification of PCB Design: Design rule checks (DRC), Electrical rule checks (ERC), Signal integrity analysis, Methods and importance of pre-manufacturing testing.

Flexible PCB Design: Considerations for designing flexible circuits, Differences from rigid PCB designs, Materials, manufacturing processes, and applications.

Copper Thickness in PCB Design: Significance of copper thickness, Effects on electrical and thermal performance, Typical industry standards.

Design for Manufacturability (DFM): Role and importance of DFM, Key aspects to ensure manufacturability and cost-effectiveness, Component placement, trace width, vias, panelization, and test points.

Numerical Problems on all above topics.