Zetlan Technologies

PCB (Printed Circuit Board) Design

ZETLAN TECHNOLOGIES

e-Learning Course

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COURSE MODULES

Module 1: Introduction to PCB Design

- Basics of Electronics and Circuit Design
- Introduction to PCB and Its Applications
- Types of PCBs (Single-layer, Double-layer, Multilayer)
- PCB Materials and Substrates. Design Workflow and Tools

Module 2: PCB Design Software Tools

- Overview of Popular PCB Design Software
- Installing and Setting Up PCB Design Software
- Introduction to Schematic Capture and PCB Layout

Module 3: Schematic Design & Components Selectn

- Creating a Circuit Schematic
- Symbol Libraries and Component Selection
- Power and Ground Planes
- Design Rules and Constraints
- Netlists and Connectivity Checks

Module 4: PCB Layout Design

- Layer Stackup and Board Dimensions
- Placement of Components (Best Practices)
- Routing Techniques (Manual vs. Auto-routing)
- Signal Integrity and High-Speed Design Considerations
- PCB Design for Manufacturability (DFM)

Module 5: Advanced PCB Design Concepts

- High-Frequency and RF PCB Design
- Power Distribution and Thermal Management
- EMI/EMC Considerations in PCB Design
- Via Types (Through-hole, Blind, Buried, Microvias)
- Multi-layer PCB Design and Stackup Planning

Module 6: Simulation & Verification

- Signal Integrity Analysis
- Thermal Simulation
- DRC (Design Rule Check) and ERC (Electrical Rule Check)
- Gerber File Generation and BOM (Bill of Materials)

Module 7: PCB Fabrication & Assembly

- PCB Manufacturing Process
- Soldering Techniques (SMD and Through-hole)
- PCB Assembly and Testing
- Troubleshooting Common PCB Issues
- Industry Standards (IPC, RoHS, UL)

Module 8: Hands-on Projects & Case Studies

- Designing a Simple LED Circuit PCB
- Power Supply PCB Design
- Microcontroller-Based PCB Design
- Industry-Grade PCB Project