

PCB_Design_Manual

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ENE 311 : FUNDAMENTALS OF ELECTRONIC PRODUCT DESIGN

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Main Drive :  PCB Design Reference

Slide presentation file :  ENE311_PCB_Design_Slide_Compressed.pdf

Simulation Tools

- Electromagnetic Field / Signal Propagation
(For High-Speed or RF PCB Design)
 - [Ansys Electronics](#)
 - [CST Studio Suite](#)
 - [OpenEMS](#) / ([OpenEMS & KiCAD](#))
- Circuit Simulation
 - [LTspice](#) (RF / Analog_Circuit Simulation)
 - [QucsStudio](#) (Microwave_Circuit Simulation)
 - [Psim](#) (Power_Electronics / Control_System Simulation)
 - [CircuitVerse](#) (Digital System Simulation)
 - [MATLAB / Simulink](#)
 - [PSPICE](#)
 - [Proteus Design Suite](#)
 - [Ni Multisim](#)

Kicad w/ Python Example code :

Github : [XACKIES/ENE311_PCB_Design_Class_--Kicad_with_Python_Example--](#)

EDA Tools

- [Kicad](#) (Tutorial for ENE311 Class)
- [Fusion 360 \(Autodesk Eagle \)](#) (Classic)
- [EasyEDA](#) (Works w/ LCSC Electronics & JLCPCB to build custom products)
- [Altium Designer](#) (World Class)
- [PCB Wizard](#) (Classic)
- [Diptrace](#) (Old School)
- [Flux](#) (EDA w/ AI)

Electronic Components Distributor

- [Digikey](#)
- [Electronics Source](#) (in Thailand)
- [LCSC Electronics](#)
- [MOUSER Electronics](#)

PCB Manufacturing Supplier

- [PCBWay](#)
- [JLCPCB](#)

List of electronic component packaging types

- [List of electronic component packaging types - Wikipedia](#)

Design Constraints

- High-Speed / Digital Circuit Design
 - Signal Integrity
 - Timing Constraints
 - Power Distribution Network (PDN)
 - Layer Stack-up Design
 - Crosstalk / EMI
 - Differential Pairs
 - SRF & Q in High-Speed
 - L/C Saturation & Derating(Margin : 50–80%)
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- RF / Analog_Circuit _Design
 - Impedance Control
 - Parasitics Minimization
 - Component Placement
 - Grounding and Shielding
 - Crosstalk Reduction
 - Self-Resonant Frequency (SRF)
 - Q-Factor Constraints
 - L/C Saturation & Derating(Margin : 50–80%)
- Power_Electronics / Control_System_Design
 - Thermal Management
 - Current Carrying Capacity
 - Voltage Range
 - Switching Noise / EMI
 - Isolation and Safety
 - Control vs Power Separation
 - L/C Saturation & Derating(Margin : 50–80%)