

EEE 272 High-Speed Digital Design

Elective

2-22-2007

Digital Design

Course Coordinator:

Catalog Description: Theoretical topics and practical applications relating to high speed digital systems. Review of basic transmission line theory, crosstalk, impact of PCB traces, vias, and connectors on signal integrity, return current paths, simultaneous switching noise, high frequency power delivery, high speed timing budgets, high speed bus design methodologies, radiated emissions, and system noise.

Prerequisites: EEE 161

Text: Hall; High-Speed Digital System Design, Wiley-Interscience

Required

Additional Resources: BOGATIN; SIGNAL INTEGRITY - SIMPLIFIED

Recommended

Course Objectives: Study theoretical topics and practical applications related to high speed digital systems.

Prerequisites by Topic:

1. Basic digital CMOS device and circuit theory.
2. Basic electromagnetic theory.
3. Basic analog circuit theory

Topics Covered:

1. Ideal transmission line systems with mismatch load.
2. cross-talk between transmission lines
3. Non-ideal transmission lines
4. Effects due to connector, power buses, grounds, packaging, ...
5. Buffer modeling
6. Electromagnetic interferences

Evaluation:

Quizzes/homework (4% each, 5 out of 6)	20%
Midterm + Final	30% + 30%
Presentation	20%

Course Outline/Schedule

Wk #			Course Outline	Chapter #
1	1/30	2/1	Overview	Note, 1
2	2/6	2/8	Transmission Lines + Q1	Note, 2
3	2/13	2/15	Transmission Lines (bounce diagram)	2
4	2/20	2/22	Crosstalk + Q2	3
5	2/27	3/1	Crosstalk	3
6	3/6	3/8	NonIdeal Interconnects + Q3 (example 4.1)	Example 4.1 4
7	3/13	3/15	Connector, Pads, and Vias	5
8	3/20	3/22	Review + Midterm	
	3/27	3/29	Spring Break	
9	4/3	4/5	Misc. Topics + Q4 (take home-due 4/12)	
10	4/10	4/12	Other Nonideal Issues	6
11	4/17	4/19	Buffer Modeling + Q5	7
12	4/24	4/26	Radiation (antenna tutorial)	10
13	5/1	5/3	Radiation + Q6	10
14	5/8	5/10	Presentation	
15	5/15	5/17	Review	
Tue 5/22			Final	7:30-9:30