EEL 6935 High-Speed Digital Design
Section: 2014
Spring 2006

Instructor
Dr. Rizwan Bashirullah
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Office Hours
MWF 3:00-3:50

Time and Location
BEN 328
MWF 1:55-2:45 (7)

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Required Textbooks

Reference Textbooks

Course Goals
- To develop proficiency in analyses, design and implementation of CMOS circuits and acquire an understanding of advanced techniques for high speed signaling circuits.
- Take into consideration signal integrity issues and process variations; identify design tradeoffs such as area, noise, power and speed.
- Gain IC design and layout practice for implementing high-speed I/O circuits; be familiarized with high-speed transceiver architectures

Computer/software req.
Workstations with CADENCE Design system.

Prerequisites
EEL5322 VLSI Circuits and Technology
EEL5320 Bipolar Analog IC Design
**Grading policy**

This is a tentative grading policy.

- Homework: 10% (3-4)
- Midterm: 15%
- Projects: 65% (3-4)
- Presentations: 10%
  
  (NO FINAL)

**Academic Honesty**

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action.

This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.

**Student with disability**

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide documentation to the instructor when requesting accommodation.

**Other**

No make-up exam/homework unless there is a very good reason. This will be handled on case by case basis. Class attendance is required.

**Course Topics**

**Fundamentals**
- Frequency and Time
- Time and Distance
- Lumped vs. Distributed
- Reactance (ordinary and mutual)
- Capacitive/magnetic coupling

**Transmission Lines**
- Basic and real wires
- Lossy and Lossless
- Skin effect
- Reflections and lattice diagrams
- Terminations
- Differential/odd, Common/even mode impedances

**Measurement Techniques**
- Rise time and bandwidth of oscilloscopes
- Time Domain Reflectometry
- TDR lumped element analysis
Circuits
- Clocking and Flip-flops
- Process independent design
- Power distribution
- Decoupling capacitance
- ESD

Signaling
- Signaling Standards: LVDS, HSTL, SSTL, CML
- Equalization
- Bandwidth enhancement techniques
- I/O circuits

Timing and Synchronization
- Phase Noise
- Jitter basics
- Clocking for Chip Interfaces
- DLL process independent design

Project
Driver, pre-driver design
Equalization filters
DLL design
Retimer
Serial/Parallel