EEL 6935 **Section: 2014**	**High-Speed Digital Design** **Spring 2006**
Instructor	Dr. Rizwan Bashirullah 527 NEB rizwan@ufl.edu
Office Hours	MWF 3:00-3:50
Time and Location	BEN 328 MWF 1:55-2:45 (7)
Secretary	Marcy Bryant, 567 NEB Tel: (352) 846-3039 Fax: (352) 392-8381 E-mail: mlb@ece.ufl.edu
Required Textbooks	William J. Dally, John W. Poulton, "Digital Systems Engineering," Cambridge University Press 1999, ISBN: 0-521-59292-5
Reference Textbooks	- Tom Granberg "Handbook of Digital Techniques for High-Speed Design," Prentice Hall 2004, ISBN: 0-13-142291-X - Howard Johnson, Martin Graham, "High-Speed Digital Design: A handbook of black magic," Prentice Hall 1993, ISBN: 0-13-395724-1 - Henry W. Ott "Noise Reduction Techniques in Electronic Systems," Second Edition, John Wiley & Sons 1988, ISBN 0-471-85068-3 - Behzad Razavi, "Monolithic Phase-locked Loops and Clock Recovery Circuits, Theory and Design," Wiley-IEEE Press 1996, ISBN: 0-7803-1149-3
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