EE4340/EE5340 – Analog Integrated Circuit Analysis and Design

Course Objective: To provide principles of analog integrated circuit analysis and design knowledge, which are required in analog IC design industry and research. Contents of the class include large and small signal behavior of MOS transistors, single-stage amplifiers, differential amplifiers, current mirrors, amplifier basics, input offset voltage and feedback.

Prerequisite: EE3311 Electronic Circuits

Instructor: Prof. Jin Liu, ECSN 4.506, (972) 883-4393, jinliu@utdallas.edu, www.utdallas.edu/~jinliu

Lecture: Tuesdays and Thursdays, 2:30pm – 3:45pm, ECSS 2.305

Office Hours: After class and by appointment

Teaching Assistant and Office Hours: To be determined

Required Textbook:
Paul R. Gray, Paul J. Hurst, Stephen H. Lewis, and Robert G. Meyer, *Analysis and Design of Analog Integrated Circuits*, John Wily & Sons, Inc., 5th edition, 2009. (ISBN: 0470245999)

Suggested Reference Books:
Behzad Razavi, *Design of Analog CMOS Integrated Circuits*, McGraw-Hill, 2001. (ISBN: 0072380322)

Adel S. Sedra and Kenneth C. Smith, *Microelectronic Circuits*, Oxford University Press, 5th edition, 2003. (ISBN: 0195142519)

Phillip E. Allen and Douglas R. Holberg, *CMOS Analog Circuit Design*, Oxford University Press, 2nd edition, 2002. (ISBN: 0195116445)

Library Reserve: The required textbook and the suggested reference books are on reserve in the library with the check-out time of two hours.

Course Grading Policy:
Students enrolled in the graduate level EE5340 course has additional requirement on the circuit design knowledge than students enrolled in the undergraduate level EE4340 course. A design project will be assigned for students enrolled in EE5340. Students enrolled in EE5340 will be graded separately from students enrolled in EE4340. The corresponding grading policies of these two courses are listed below.

For EE4340, the final grade will be determined using the following scheme:
Homework x 30% + Midterm Exam x 30% + Final Exam x 40%

For EE5340, the final grade will be determined using the following scheme:
Homework x 20% + Project x 10% + Midterm Exam x 30% + Final Exam x 40%

Homework: Homework will be assigned on a bi-weekly basis and be collected at the beginning of the class on the due date. *No late homework is allowed.* The homework solution will be posted on the professor's webpage, with password protection.

Exams: All exams are closed book with a one-page note allowed for the Midterm Exam and a two-page note for the Final Examination.

Attendance Announcement: You are responsible for all course materials, announcements, notes, etc. given during our regular class meeting time.

Academic Honesty: It is the responsibility of the instructor to encourage an environment where you can learn and your accomplishments will be rewarded fairly. Any behavior that compromises the University's rules of academic honesty will be reported to the Dean of Students.

Coverage of Topics:

Topics	**Readings**	
	Gray	**Razavi**
Course Introduction & Introduction to Analog IC		
MOSFET Model – Large Signal BJT Model – Large Signal	Chap. 1	Chap. 2
MOSFET Model – Small Signal BJT Model – Small Signal	Chap. 1	Chap. 2
Single-Stage Amplifiers – CS, CS with SD, CD, CG & Cascode	Chap. 3	Chap. 3
Differential Amplifiers	Chap. 3	Chap. 4
Current Mirrors & Active Loads	Chap. 4	Chap. 5
Amplifier Basics		Chap. 9
Input Offset Voltages	Chap. 4	
Feedback	Chap. 8	Chap. 8