ECE 510 TOP: Design and Verification of Mixed-Signal Circuits

Syllabus (Winter 2018)

Course Introduction:

This is a special topic course offered for graduate students and practical electrical engineers. The theory, design skills, and verification of CMOS A/D & D/A converters used in modern communication systems and consumer electronic products are covered in this class.

Prerequisite: ECE 521- Analog IC Design 1, ECE 525 – Digital IC Design 1, or some equivalent courses from other colleges or universities.

Required Textbooks:


Optional Textbooks and Journals:

(2) Bramhananda Marathe and Sandhya Nerale, Analog-Mixed Signal Verification, 2015

Calculation Tool: Scientific calculator.

Instructor: Dr. David H. Chiang  E-mail: chiangd@pdx.edu  Telephone: 503-725-9039 (Office)
Office Location: FAB 85-3  Office Hours: 4:00 pm – 5:00 pm, Tuesday and Thursday
Class Time: Tuesday & Thursday: 6:40 pm – 8:30 pm  Classroom: FAB 150
Website: www.ece.pdx.edu/~chiang (Only the syllabus, spice models, and some presentation files will be posted in the website.)

Class Contents:

(1) Introduction to mixed-signal design and verification, opamp design (1.0 week)
(2) Design of CMOS comparator, and Sample and Hold Circuits (1.0 week)
(3) Design of CMOS reference circuits (1.0 week)
(4) Data converter fundamentals (0.5 week)
(5) Design of CMOS D/A Converters (2.0 weeks)
(6) Design of CMOS Nyquist-Rate A/D Converters (2.0 weeks)
(7) Behavioral Modeling of Data Converter Circuits (1.0 week)
(8) Mixed-Signal Verification and Final Project (1.0 weeks)

Grading Policy:

Homework: 30 %, Exam: 35 %, Final Project: 35 %
A (100 – 85), A- (84.9 – 80), B+ (79.9 – 75), B (74.9 – 70), B- (69.9 – 65), C+ (64.9 – 60), C (59.9 – 50), F (below 49)

CAD Tools:

(1) Schematic editor and Spectre from Cadence

Computer Action Team (CAT): E-mail support@cat.pdx.edu, Tel. 503-725-5420

Exam: 6:40 pm – 8:30 pm, Thursday, 3/1/2018

Class Policy:

The cellular phone must be turned it off during the class. Students using computers in the class are required to sit on the last row of the classroom. No make-up exams will be given and no late homework and project will be accepted unless a sincere excuse has been told in advance or an accident has happened during the homework/project due days or exam days. The student who asks for submitting a late homework or having a make-up exam needs to submit a valid document to the instructor to prove the excuse or accident. New homework problems will be assigned for the late homework submission if the solutions of the homework are released before the late homework due date. Different exam problems will be given for the make-up exam. Final project will not be returned to students. Only a scientific calculator can be used for calculations during the exams. Photos, video recording, audio recording are not allowed during the class.

Academic Honesty Policy:

If a student is caught for cheating on an exam, the student will receive zero point for that exam. Some course points will be taken out for the students who copy homework or project works from classmates or loan homework or project works to classmates before the due date of the works.

Disability:

If you are a student with a documented disability and are registered with the Disability Resource Center (DRC), please contact the instructor at the beginning of the course to set up appropriate academic accommodation or testing services.