

## EE 7326 Course Syllabus

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### Course Information

Course Prefix, Number, Section: EE 7326  
Course Title: Advanced Analog IC Design  
Credit hours: 3 semester hours  
Term: Fall 2023  
Class Time: 5:30 - 6:45pm, T & Th (8/22-12/7)  
Class Venue: ECSW 2.325  
Course Website: [www.utdallas.edu/~chiu.yun/courses/7326](http://www.utdallas.edu/~chiu.yun/courses/7326)

**Note: we will use the course web, updated weekly, to distribute all information about the class including homework assignments, readings, lecture notes, etc.** (More course info and detail including SPICE manual and tutorials are available on the course website, which will be updated weekly.)

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### Professor Contact Information

Instructor: Professor Yun Chiu  
E-Mail: [chiu.yun@utdallas.edu](mailto:chiu.yun@utdallas.edu)  
Office: ECSN 3.602  
Office hours: Wed, 12pm-2pm, in ECSN 3.602

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### Course Pre-requisites, Co-requisites, and/or Other Restrictions

EECT 6326 (Analog IC Design) or equivalent

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### Course Description

This course covers important topics in analog IC design at graduate level not sufficiently taught in a first introductory course, including a rigorous treatment of noise, feedback, and distortion in analog circuits. Common-mode feedback in CT and DT differential amplifiers, CMOS active-cascode gain stage, two-port and return-ratio feedback analyses, noise analysis in sampled circuits, etc. will be covered in detail. Selected topics from other advanced topics such as switched-capacitor circuit, continuous-time filter, oscillator, or phase-locked loop (PLL) will be covered when time allows. Extensive computer simulations are required in homework assignments.

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### Student Learning Objectives/Outcomes

1. Ability to analyze and design of CMFB circuits in fully differential amplifiers
  2. Ability to analyze noise behavior in analog circuits
  3. Ability to analyze nonideal, practical feedback circuits using RR and LG methods
  4. Ability to analyze large-signal distortions in analog circuits
  5. Ability to understand and basic design of continuous-time filter, oscillator, and/or PLL
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## Assignments & Academic Calendar

Date		Topic (tentative)	Week
08/22	08/24	Small-signal model of fully differential amp, CMFB concept	1
08/29	08/31	CT and DT CMFB circuits (HW #1 posted, due @ 12pm on F, 9/15)	2
09/05	09/07	CT and DT CMFB circuits (cont'd)	3
09/12	09/14	High-swing cascode bias, active cascode gain stage (HW #2 posted, due @ 12pm on F, 9/29.)	4
09/19	09/21	Noise in linear circuits, thermal and Flicker noises	5
09/26	09/28	Input-referred noise, noise calc in differential amp (HW #3 posted, due @ 12pm on F, 10/13.)	6
10/03	10/05	Noise calc in cascode gain stage and two-stage amp	7
10/10	10/12	<b>Recitation, Midterm exam (in class)</b>	8
10/17	10/19	Sampled circuits noise calc and simulation	9
10/24	10/26	Unilateral vs. bilateral feedbacks, two-port models of feedback circuit (HW #4 posted, due @ 12pm on F, 11/10.)	10
10/31	11/02	Loop-gain vs. return-ratio analyses, SPICE simulation of FB circuits	11
11/07	11/09	Asymptotic gain formula, Blackman's impedance formula (HW #5 posted, due @ 12pm on F, 12/1.)	12
11/14	11/16	Power series model of memoryless nonlinear amplifiers	13
11/22	11/24	Thanksgiving break	14
11/28	11/30	Harmonic distortion, intermodulation, THD, intercept points etc.	15
12/05	12/07	Distortion in NFB circuits, series inversion, cascaded gain stages	16
<b>Univ. sch.</b>		<b>Final exam (TBD)</b>	17

## Required Textbooks and Materials

No textbook is required. Lecture notes, slides, and papers will be posted.

## Suggested Course Materials

- Gray et al., Analysis and Design of Analog Integrated Circuits, Wiley, 5th Ed., 2009
- Razavi, Design of Analog CMOS Integrated Circuits, McGraw-Hill, 2001
- Pederson and Mayaram, Analog Integrated Circuits for Communication: Principles, Simulation and Design, Kluwer, 1991
- Allen and Holberg, CMOS Analog Circuit Design, Oxford, 3rd Ed., 2011
- Johns and Martin, Analog Integrated Circuit Design, Wiley, 1996

## Grading Policy

Homework (4-5 assignments):	25%	(~biweekly)
Midterm Exam	30%	(TBD)
Final Exam:	45%	(TBD)

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## Course & Instructor Policies

Assignments are to be completed individually. Reports and SPICE decks in each assignment will be checked. **No plagiarism will be tolerated in grading. No credit if reports are turned in past due time.**

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## Off-campus Instruction and Course Activities

None

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## Comet Creed

*This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:*

“As a Comet, I pledge honesty, integrity, and service in all that I do.”

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## UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

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*The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.*