

**ECEN 458 (ESS)**  
**ACTIVE FILTER ANALYSIS AND DESIGN**

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**Fall 2008**  
**Time:** TR 12:45-2:00  
**Location:** 128A Zachry

**Office Hours:** Tues, Thu, 2:00 to 3:00 PM

### Textbook

Notes ( see my webpage under : <http://amesp02.tamu.edu/~sanchez> ) and Active and Passive Analog Filter Design: An Introduction, L.P. Huelsman, McGraw Hill, 1993, ISBN 0-07-030860

### References

- [1] *Analog Integrated Circuit Design*, David A. Johns, and Ken Martin, John Wiley & Sons, Inc., New York, 1997. Chapters 10 & 15
- [2] *Design with Operational Amplifiers and Analog Integrated Circuits*, S. Franco, McGraw Hill, New York, 1988
- [3] *Analog Filter Design*, M. E. van Valkenburg, Holt, Rinehart and Winston, Inc. (Saunders College Publishing), 1982
- [4] *Design of Analog Filters Passive, Active RC, and Switched Capacitor*, R. Schaumann, M. S. Ghauri, and K. R. Laker, Prentice Hall, New Jersey, 1990

**OBJECTIVES:** To analyze and design active-filters. Emphasize the design of practical filters for a host of applications. To blend theory and practice. This is a hands-on course. The final project ends in a prototype.

### Grading Policy

Partial Exam 1	20%
Partial Exam 2	15%
Partial Exam 3	15%
Laboratory	20%
Final Project	15%
Homework	10%
Quizzes	<u>5%</u>
	100%

### Special Notes

1) The Final Project evaluation will be as follows:

Working prototype	8%	(Non-working 4%)
Presentation	5%	
Team Evaluation	<u>2%</u>	
	15%	

The “presentation” section will be peer reviewed and evaluated by other teams working on the same project. I reserve the right to judge your evaluation on other teams (“team evaluation”). Although the presentation is scheduled for weeks 14 and 15, all projects (hardware prototypes and typewritten reports) are due on Friday, December 4.

- 2) No final exam will be given. Partial exams can be take-home or closed book (with only one page information possibly). Exams can be scheduled to be out of class.
- 3) There will be no make-up exams for individual cases, unless it is properly justified, e.g. medical or family emergency.
- 4) Quizzes will be given randomly.
- 5) Homework is due at the beginning of the class on the due date. Late homework is not accepted.
- 6) Knowledge of using SPICE (CADENCE) and FIESTA II is strongly suggested.

### TENTATIVE COURSE SCHEDULE

Week	Week of	Topic	Chapter	Lab	Remarks
1	Aug. 26-28	Introduction			Historical Review
2	Sept 2-4	Basic Block and Systems	1 [3]		Key Blocks
3	Sept 9-11	Systems Fundamentals	3,4 [2]		Good Fundamentals
4	Sept 16-18	Approximation	6		Find its Origin and where to access software related
5	Sept 23-25	Biquad Circuits	6		Study input signal injections
6	Sept 30-Oct 2	RC-Active Filters	2,5,6		Exam 1
7	Oct. 7-9	RC-Active Filters	2,3,5,6		Summarize Design Approaches and Topologies
8	Oct. 14-16	RC-Oscillators	2,5,6, Notes		Project Assignment
9	Oct. 21-23	OTA-C Filters	Notes		Study Commercial OTA's
10	Oct. 28-30	OTA-C Filters			Exam 2
11	Nov. 4-6	Switched-Capacitor Concepts	Notes		Find Commercial SC Filters
12	Nov. 11-13	Switched Capacitor Filters	7, 17 [1]		
13	Nov. 18-20	Switched Capacitor Filters	7, 17 [1]		
14	Nov. 25-27*	Presentation			Final Report, Exam 3
15	Dec. 2**	Presentation			Last day Dec. 2

\*Thanksgiving Holiday is Nov. 27 and 28.

\*\* Last Day of Classes is Dec. 2.

### Laboratory

1. Op Amp
2. OTA Characterization
3. Design of a Crossover Filter

4. Elliptic BP Filter
5. Design of a BP-based Oscillator
6. Graphic Equalizer Filter
7. Design, Implementation and Simulation of Switched Capacitor
8. Switched Capacitor Filter

**Americans with Disabilities Act (ADA) Policy Statement**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637.

**Academic Integrity Statement**

“An Aggie does not lie, cheat, or steal or tolerate those who do.”

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