SYLLABUS

EE 548 Electronic Design I

Spring 2000

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Catalog Data: Introduction to electronic design for analog signal processing. Linear op amp circuits for amplification and filtering. Use of LaPlace techniques for filter specification; simple passive and op amp filter realizations. Discrete active devices (FET and BJT): operating characteristics, biasing considerations, canonical amplifier configurations including differential amplifiers. Prereq: EE 541. Lab. 4 cr.

Meeting Times:

Lecture	Everybody	Kingsbury 103	Monday, Wednesday, Friday	10-11	
Discussion	Sec 1	Kingsbury 103	Monday <===== ***CANCELED***	11-12	
	Sec 2	Kingsbury 103	Wednesday	11-12	
Laboratory	Sec 1	Kingsbury 105	Monday	1-3	
	Sec 2	Kingsbury 105	Tuesday		2-4
	Sec 3	Kingsbury 105	Thursday	10-12	

An attempt will be make to balance discussion sections and laboratory sections, so students may be assigned to different sections from what their registration slips show.

ABET Content: Engineering Science 50%; Engineering Design 50%

Instructional Staff

Prof. Allen Drake (lectures)	Kingsbury 248B	862-1325	allen.drake@unh.edu
Prof. Richard Messner (labs)	Kingsbury 248E	862-1304	rich.messner@unh.edu
Chee Lin Yum ("Chee")	Kingsbury 213	862-1307	clyum@hopper.unh.edu

Course Web Site: http://svpal1.unh.edu/ee548/

Office hours will be announced after the semester is underway. In the meantime, feel free to drop in on any one of us when our doors are open. Or make an appointment by phone or email.

Textbooks: Sedra & Smith, *Microelectronic Circuits*, 4th edition, Oxford University Press, 1998
James W. Nilsson & Susan A. Riedel, *Electric Circuits*, 5th (not 6th) edition, Addison-Wesley, 1996 (Most students will have this from EE 541.)

Software: The Student Edition of **Electronic Workbench** is required for the labs and Design Exercise. (Most students will be familiar with this from EE 541. Version 5.12 is on the machines in the EE Cluster.) For all parts of this course students are also encouraged to avail themselves of their expertise (gained in EE 401 and 541) in **MATLAB** and **EXCEL**, which are also on the machines in the EE Cluster.

References: J. Millman, *Microelectronics: Digital and Analog Circuits and Systems*, McGraw-Hill, 1979

V. Del Toro, *Engineering Circuits*, Prentice-Hall, 1987
D.E. Johnson, J.L. Hilburn, and J.R. Johnson, *Basic Electric Circuit Analysis*, 3/e, Prentice-Hall, 1986
D.E. Johnson, J.R. Johnson, and J.L. Hilburn, *Electronic Circuit Analysis*, Prentice-Hall
R.J. Smith, *Circuits, Devices, and Systems*, 4/e, Wiley, 1984
R. Boylestad and L Nashelsky, *Electronic Devices and Circuit Theory*, 3/e, Prentice-Hall, 1982
S. Franco, *Electric Circuits Fundamentals*, Saunders, 1995
J.W. Nilsson and S.A. Riedel, *Electric Circuits*, 6/e, Addison-Wesley, 1999
R.C. Jaeger, *Microelectronic Circuit Design*, McGraw-Hill, 1997
M.N. Horenstein, *Microelectronic Circuits and Devices*, 2/e, Prentice Hall, 1996

Requisites: EE 541 is the prerequisite for this course. This course is a prerequisite for EE 651.

Credits: Four

Objectives: EE 548 provides a follow-on course at the sophomore level to the first course in circuits (EE 541) that electrical engineering majors take. Students learn more advanced topics in circuit theory and then proceed to the fundamentals of electronics. The circuit theory topics include a review of ideal linear opamp circuits, sinusoidal steady-state analysis, complex impedance, phasors, complex, real, and reactive power, rms values, maximum power transfer, and the concept of transfer functions. Students are then introduced to three-phase power, wye and delta circuits, mutual inductance, ideal transformers, Laplace transforms, the impulse function, frequency dependent transfer functions, and Bode plots. Electronic topics covered include diodes, rectifying, limiting, and clamping circuits, the p-n junction, BJTs, FETs, dc analysis and biasing for transistors, small signal models, basic transistor circuits as amplifiers and switches.

Discussion (Recitation) Times: These are not an optional part of EE 548. In some of these, new material will be presented, in some problems will be worked out, in some lab preparation will be undertaken, in some exams may be given. Students are as responsible to attend these as they are to attend the regular lectures.

Grading Policy:

Homework		10
Exam I		10
Exam II		10
Exam III	10	
Design Exercise		10
Final		25
Laboratory		25
TOTAL		100%

Exams: All exams except the final will be 50-minute tests held during the class or discussion times. Unless otherwise specified, the exams are all closed-book, closed notes. Students are expected to bring their own calculators (no sharing) and their own watches if they need to know the time. The instructor is averse to disrupting students' concentration by writing on the board any more than is absolutely necessary during an exam.

Homework: Homework will be assigned each Friday and is due in the EE 548 homework box outside Room 251 the following Friday at 4:00pm. Approaches to homework problems can be discussed among students, but each student should do his own work independently. Certainly what is turned in by any student should not be similar in appearance to what is turned in by any other student. Late homework will not be accepted, although the lecturer for this course will consider justifiable excuses. An accepted excuse will result in that assignment's not being averaged in with the rest. Without an accepted excuse, a late or missing assignment will be given zero credit. All homework must be submitted by the end of the university's reading period at the end of the semester. Solutions will be available on two-hour reserve in Kingsbury Library and will also be posted outside Kingsbury 248B.

Unannounced Quizzes: At the discretion of the instructor, pop quizzes may be given any time during the semester. What applies to missed homework applies to these. These quizzes will be averaged in with the homework.

Design Exercise: Toward the end of this course, students will be assigned a design exercise, which unlike the labs, does not have to be implemented in hardware. Each student is to do this by means of Electronic Workbench independently of any other student, and it is to be submitted the last day of classes.

Cozenage: Any student suspected of representing another person's work (homework, lab report, exam) as his own, communicating during an exam, or otherwise cheating, will be confronted by the instructor and given a chance to explain. If in the instructor's mind the explanation is inadequate, or if the student does not reply, such conduct will be deemed to constitute grounds for having the student fail the entire course. In other words, don't cheat.

Lab Organization: There are six experiments that each student must perform, and these are spread over twelve weeks, so that each student needs to appear only once every other week in lab. For that reason, each section is divided into two subsections, A and B. Thus instead of three sections, we effectively have six. In the lab, six students (one to a station) can be accommodated comfortably, so the lab part of this course can service a total of 36 students. Since it is unlikely that there will be this many students in EE 548, several of the lab sections may be closed. To pass this course, a student has to perform every one of the six experiments. Further lab information and the schedule is given on the lab handout.

Approximate Lecture Schedule

Week of	Textbook section
1/17	Nilsson, 5,9
1/24	Nilsson, 9,10
1/31	Nilsson, 11
2/7	Nilsson, 12
2/14	Nilsson, 13
2/21	Nilsson, 14
2/28	Nilsson, 15
3/06	Nilsson, 16
3/13	**Spring Break**
3/20	Sedra & Smith, 1,2
3/27	Sedra & Smith, 3
4/03	Sedra & Smith, 3
4/10	Sedra & Smith, 4
4/17	Sedra & Smith, 4

4/24	Sedra & Smith, 5
5/01	Sedra & Smith, 5,6
5/08	**Last Day of Classes**