Course Description:
This course provides an in-depth treatment of various techniques for designing digital filters, such as the design of IIR filters from analog filters, and the design of optimal linear phase FIR filters. The course also covers certain nonlinear effects of finite-wordlength implementations of digital filters such as limit cycle and overflow oscillations. A statistical analysis of roundoff noise in digital filters is presented which allows a comparison of various filter structures based on their performance. Finally, several structures for the implementation of digital filters will be presented (e.g., wave digital filters and state-space structures) and their various merits will be discussed.

Prerequisite:
E.E. 113, Digital Signal Processing, or equivalent

Textbook:
The course textbook is *Digital Signal Processing*, Proakis and Manolakis, 3rd ed., Prentice-Hall, 1996. Reference will be made to numerous research papers for some topics => Course Reader.

EE212A Web Page (www.seas.ucla.edu/ee212a) MOVING TO: www.eeweb.ee.ucla.edu
A MATLAB toolbox is on the class web page. You can apply for a computer account, if needed, online (www.seas.ucla.edu/acctapp). MATLAB will be used in the course. Student editions of MATLAB can be purchased at the UCLA campus bookstore.

Homework:
Homework will be assigned each Wednesday with the expectation that it will be completed by the following Wednesday. Homework will not routinely be graded, but frequently, randomly chosen students will be asked to turn in their homework so as to provide feedback on your progress. Homework solutions will be made available.

Exams:
Midterm Exam: Wednesday, November 10: 12:00pm - 1:50 pm
Final Exam: Friday, December 17: 8:00am - 11:00am

Grades:
Your grade in the course will be based mainly on your performance on the midterm and final examinations. (I might ask for some specific homework problem or problems to be handed in for credit—perhaps some small design project that can be done using MATLAB, for example—and if I do, that work will have a small influence on your course grade.) Numerical scores will be given on examinations. Letter grades will be given only for the complete course, and will be based on the total numerical grade. The relative weights are: Midterm = 35%, Final Exam = 65%.