ECEN 4503
Random Signals and Noise
Spring 2002
Syllabus

Time: Tuesday/Thursday 5:00-6:15 PM

Place: Physical Science 153

Prerequisite: Completeion of the junior block courses, in particular this course builds on the material covered in ECEN 3513- Signal Analysis and ECEN 3723- Systems I

Text: *Probability, Random Variables and Random Signal Processing* 4th edition, Peyton Z. Peebles, Jr., McGraw-Hill, 2001

References: *Probability, Random Variables, and Stochastic Processes*
A. Papoulis, McGraw-Hill, 1965
Probability amd Random Processes, An Introduction for Applied Scientists and Engineers
W.B. Davenport, Mc-Graw-Hill, 1970
An Introduction to Probability and Stochastic Processes
J.L. Melsa and A.P. Sage, Prentice-Hall, 1973
Probability and Stochastic Processes for Engineers
C.W. Helstrom, Macmillian, 1984

Instructor: Professor Gary G. Yen, Engineering South 404
http://www.okstate.edu/elec-engr/faculty/yen
405-744-7743, 405-744-9198 (fax), gyen@ceat.okstate.edu
Office Hours: Tuesday/Thursday 9:00AM-12:00PM;
or by appointment only

Objectives: To introduce some basic principles of probability, random variables and random signals to deal with system involving random process and noise through mathematical analysis and computer simulations.
The topics include
- Probability theory
  - set definition; set operations; joint and conditional probability;independent events; Bernoulli trials

- Random variable
  - basic concept; discrete/continuous/mixed random variables; distribution function; density function; Gaussian random variable; Binomial/Poisson/uniform /exponential/Rayleigh random variables; conditional distribution/conditional density function

- Operations on one random variable
  - expectation; moment; transformation of a random variable; computer generation of random variable

- Multiple Random Variables
  - vector random variables; joint distribution/marginal distribution; joint density/marginal density; conditional distribution/conditional density function; statistical independence; distribution and density of a sum of random variables

- Central Limit Theorem

- Operations on multiple random variables
  - expected value of a function of random variables; joint Gaussian random variables; linear transformation of Gaussian random variables; computer generation of multiple random variables

- Random process
  - basic concept; classification of random processes; first-/second-order stationary process; wide-sense stationarity; n-order and strict-sense stationarity; time average and ergodicity; auto-correlation/cross-correlation function; covariance; Gaussian random process; Poisson random process

- Spectral analysis of random processes
  - power density spectrum; bandwidth; cross-power density spectrum; noise deinfition; white and colored noises

- Linear Systems with random inputs
  - linear system; transfer function; random signal response; spectral characteristics; noise bandwidth; modeling of noise sources; noisy network

Grading:	10 Weekly Homework Assignments	**20%**
	Tentative schedule-	
	1/24, 1/31, 2/7, 2/14, (before the first midtem)	
	2/28, 3/7, 3/14, 3/21, (before the second midterm)	
	4/16, 4/23	
	Computer Simulation Project	**10%**
	Midterm Exam 1 (February 26, 5:00-6:30 PM)	**20%**
	Midterm Exam 2 (April 4, 5:00-6:30 PM)	**20%**
	Final Exam (May 7, 6:30-8:20 PM)	**30%**

A-85% above; **B**-76%-85%; **C**-66%-75%; **D**-56%-65%; **F**-55% below

Note: All exams are open notes, but close book.

Drop and Add: The instructor will follow University, College and Departmental guidelines for drops and adds. Consult the calss schedule book or Ms. Rea Maltsberger in Engineering South 202 for more information.

Attendance: Students will be expected to attend class. Habitual failure to do so will result in a reduced grade. Class attendance is taken occasionally for reference.

An incomplete grade will only be given when a student misses a portion of the semester because of illness or accident. All (I) grades must be completed within thirty days.

Academic Dishonesty: Cheating on homework, quizzes or examinations, plariarism and other forms of academic dishonesty are serious offenses and will subject the student to serious penalties.

On the first instance of academic dishonesty, the student will receive a grade of zero for the assignment, quiz or examination, and a letter will be placed in the student's academic file. The second instance will result in a grade of "F" for the course.

Disability Impairment: If any member of the class feels that he/she has a disability and needs special accommodations of any nature whatsoever, the instructor will work with you and the University Office of Disabled Student Services to provide reasonable accommodations to ensure that yo have a fair opportunity to perform in this class. Please advise the instructor of such disability and the desired accommodations at some point before, during, or immediately after the first scheduled class period.

Class Website: You are advised to check class website at http://www.okstate.edu/elec-engr/faculty/yen/spring02.html regularly for important information, such as handouts, homework assignments, schedule changes, old exams and etc.