Course Syllabus and Information v.1.0
3 January 2015

The deadline to add or drop this class (with 100% refund) is 30 January 2015
The withdrawal deadline (no refund) is 10 April 2015

Course Summary: This course covers mathematical and probabilistic descriptions of unpredictable or random phenomena, with applications to many engineering problems. Probabilistic tools are among the most useful for modeling real systems and analyzing system performance. The course provides a solid background in probability theory and related topics for graduate students in electrical and computer engineering (ECE), financial engineering, and other engineering majors. The course includes material from first principles in a more rigorous manner than is typically found in undergraduate probability classes in engineering.

Prerequisites: Calculus, linear algebra and matrices

Class Time and Location: Monday and Wednesday, 10:00 am-11:50 am, OHE 122
Discussion: Friday, 8:00 am-8:50 am, OHE 122

Instructor: A.A. Sawchuk; EEB 404B; phone: 213-740-4622; fax: 213-740-6618; email: sawchuk@sipi.usc.edu; http://ee.usc.edu/faculty_staff/faculty_directory/sawchuk.htm
Office Hours: Tuesday, 10:00 am-12:00 noon

Teaching Assistant: TBA
Office Hours: TBA

Graders: TBA

Texts and Readings
Handouts and supplementary class notes will be distributed.

The required course textbook is:

An optional textbook is:

The following two outline-type books may also be useful. They have many examples and supplementary solved problems:
http://www.amazon.com/gp/product/0071755616/ref=wms_ohs_product?ie=UTF8&psc=1

Grading
Your course grade is determined by a process of reasoning. Everyone will receive the highest grade justified by available evidence from the following data:

- **2 Midterms** = 23.5% each (in class, Monday, 23 February and Monday, 6 April)
- **Final** = 40% (will be given Monday, 11 May, 8:00 am-10:00 am as listed in the USC exam schedule; there are NO exceptions to this date - if you can't take the final at this time, do not enroll in this course)
- **Homework** = 13% (two lowest average homework grades will be discarded)

DEN students in the local area must come to campus for the exams.

Attendance in class is required. Many examples and applications not in the text will be covered in the lectures.

Homework will be assigned every week on Wednesday, and due the following Wednesday. Homework will be graded – solutions are provided on Monday following the due date. You can turn in homework late until solutions are posted for full credit. No credit after solutions appear. It is extremely important to keep up with the lectures and to do the homework problems. Many details and applications of the principles are learned by doing problems.

Academic Integrity - Cheating
Cheating or plagiarism will not be tolerated on homework or exams. You may discuss homework problems among yourselves but each person must do their own work. Copying or turning in identical homework sets is cheating. The penalty ranges from F on the homework or exam, to an F in the course, to recommended expulsion. See:

http://viterbi.usc.edu/academics/integrity/
http://www.usc.edu/student-affairs/SJACS/pages/students/academic_integrity.html
http://www.usc.edu/libraries/about/reference/tutorials/academic_integrity/index.php

If you have any questions regarding academic integrity - see the instructor.

USC Statement on Academic Integrity
USC seeks to maintain an optimal learning environment. General principles of academic honesty include: the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, (www.usc.edu/scampus or http://scampus.usc.edu) contains the University Student Conduct Code (see University Governance, Section 11.00)
**Course Content**

Algebra of events – set theory
Sample, event spaces
Probability as a measure in sample space
Combinatorics
Conditional probability and sample spaces
Independence of events
Probability mass and densities
Discrete and continuous random variables
Expectations and moments of random variables
Frequently occurring densities
Discrete and continuous transforms
Poisson, Bernoulli, Markov processes
Gaussian, Poisson distributions
Gaussian random vectors
Functions of random variables
Estimation, statistics
Covariance and correlation
Limit theorems
Stochastic processes
Discrete and continuous time Markov chains
Brief introduction to queueing theory
Engineering applications

**Follow-on Classes**

EE 450 Introduction to Computer Networks (3)
EE 511 Simulation Methods for Stochastic Systems (1)
EE 512 Stochastic Processes (3)
EE 517 Statistics for Engineers (3)
EE 562a Random Processes in Engineering (3)