

Course Syllabus and Information v.1.0

7 January 2016

The deadline to add or drop this class (with 100% refund) is 29 January 2016
The withdrawal deadline (no refund) is 8 April 2016

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 1: Yu-Chen (Ethan) Sung; EEB 307; phone: 213-740-4454; email: yuchens@usc.edu; office hours: to be determined

Teaching Assistant 2: To be announced

Graders: To be announced

Texts and Readings

Handouts and supplementary class notes will be distributed.

The required course textbook is:

Alberto Leon-Garcia, *Probability, Statistics, and Random Processes for Electrical Engineering, 3rd Edition*, Pearson Prentice Hall, 2008.

An optional textbook is:

Sheldon M. Ross, *Introduction to Probability Models, 10th Edition*, Academic Press, 2010.

The following two outline-type books may also be useful. They have many examples and supplementary solved problems:

1. Seymour Lipschutz and Marc Lipson, *Schaum's Outline of Probability, Second Edition* (Schaum's Outline Series) Paperback

http://www.amazon.com/gp/product/0071755616/ref=wms_ohs_product?ie=UTF8&psc=1

2. Hwei Hsu, *Schaum's Outline of Probability, Random Variables, and Random Processes, 3rd Edition* (Schaum's Outline Series) Paperback

http://www.amazon.com/Schaums-Outline-Probability-Variables-Processes/dp/0071822984/ref=dp_ob_title_bk

Grading and Exams (this may change)

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, 29 February and Monday, 4 April)
Final	= 40% (will be given Monday, 9 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.

Homework

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.

Attendance and Class Courtesy

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

Using iPads, laptops, or similar devices to take notes is OK. However, using these devices or cell phones to talk, send email, websurf, etc. during the lectures is rude and distracting to other students. Leave the room if you must do this.

Course Web Site and Email

Make sure your email listed in USC records is up-to-date; I will contact you often by email. The course web site is accessible through <http://courses.uscden.net>

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 and submit individual solutions written in their own hand. 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<http://www.u>

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
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)