

EE 503: Probability for Electrical and Computer Engineers

Fall 2015

Description: Randomness or “noise” is common in engineering systems. This course addresses how to understand randomness and how to mitigate its effect in engineering design. Examples from a range of applications will be presented, ideally including communications, networking, circuit design, device modeling, manufacturing, and computing.

Covered Topics: Rigorous coverage of probability, discrete and continuous random variables, functions of multiple random variables, covariance, correlation, random sequences, estimation, introduction to statistics, and Markov chains.

Required Textbook: *Introduction to Probability*, 2nd edition, by Dimitri P. Bertsekas and John N. Tsitsiklis. Athena Scientific, 2008.

Other References:

- *Probability, Statistics, and Random Processes For Electrical Engineering*, Third Edition, by Alberto Leon-Garcia. Prentice Hall, 2008.
- *Introduction to Probability Models*, 10th Edition, by Sheldon M. Ross, Academic Press, 2010.

Instructor: Professor Salman Avestimehr. EEB 526. Contact: avestimehr@ee.usc.edu

Teaching Assistant (TA): Kuan-Wen Huang. EEB522. Contact: kuanwenh@usc.edu

Grader: Naren Nallapareddy. Contact: nallapar@usc.edu

Lecture and Discussion Section:

- Lectures: Thursdays, 5:00–8:30 p.m., GFS101.
- Discussion Section: Tuesday, 1:00–1:50 p.m., THH B10.

Office Hours:

- Instructor: Thursdays 2:45 – 4:45 pm, EEB526.
- TA: Tuesdays 2:00-4:00 pm, EEB522.

Website: USC Blackboard.

Grading:

- Homework: 20%.
- Midterm Exam 1: 25% **Thursday October 8, in class.**
- Midterm Exam 2 (25%) **Thursday November 12, in class.**
- Final Exam: 30% **Thursday December 10, 4:30–6:30 p.m., as listed in the USC exam schedule.**

Homework:

- There will be approximately 10 homework assignments.
- Homework assignments will be distributed on blackboard on Thursday and will be due on the Thursday of the subsequent week at **5:00 p.m. sharp in the class.**
- Solutions will be posted on blackboard right after 5:00 p.m.
- No credit will be given for homework submissions after 5:00 p.m.

- You are invited to consult with others and to use the web when solving the homework problems. You must submit individual solutions, however, and they must be in your own words and (except for Matlab code) written in your own hand.
- The two worst homework scores will be dropped.

Midterm Exam Makeup Policy:

- For both of the midterm exams, an alternate seating is available for students with a conflict due to a religious observance. The scheduling of these alternate seatings will be at the discretion of the instructor. Students who anticipate a conflict with one of the midterm exam *must meet with the instructor at least two weeks before the exam explaining the nature of the conflict*. Students raising conflicts with less than two weeks notice will only be permitted to take the exam at a different time if space is available, and a 10% penalty will be deducted from their scores. For students who are unable to take a midterm exam due to unforeseen circumstances, their normalized final exam score will be used in place of their missed midterm exam.

USC's Final Exam Makeup Policy:

- When a final examination falls at a time that conflicts with a student's observance of a holy day, instructor will accommodate a request for an alternate examination date at a time that does not violate the student's religious creed. A student must discuss a final examination conflict with the instructor no later than two weeks prior to the scheduled examination date to arrange an acceptable alternate examination date.

Statement on Academic Conduct and Support Systems:

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11, Behavior Violating University Standards <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity <http://equity.usc.edu/> or to the Department of Public Safety <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared

emergency makes travel to campus infeasible, USC Emergency Information <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.