Introduction to Probability and Statistics
EE 364: Spring 2017

This course introduces you to concepts of randomness and uncertainty. Probability and statistics form the foundation for a large number of fields in electrical engineering and computer science. Probability theory uses models to inform us about the outcome of real-world experiments and complex questions where relations and effects may not be known in advance. Statistics formalizes data analysis and connects closely with probability models and data collection methods. The course begins with basic concepts involving set probability, conditional probability, and random variables. The remainder of the course presents applications of these concepts to problems in estimation and decision theory.

Instructor: Brandon Franzke
Email: franzke@usc.edu
Office: EEB 420
Hours: Tuesday 11:00 – 12:30 and
    Thursday 10:00 – 11:00.
    * Tuesday and Thursday after 15:30 by appointment

Lecture
Tuesday and Thursday
12:30 – 14:00 (section: 30889) and 14:00 – 15:30 (section: 30541)

Piazza
This course uses Piazza for class discussion. The system is suited to getting you help fast and efficiently from classmates, the TA, and myself. I encourage you to post your questions on Piazza rather than emailing questions to the teaching staff.

Class page: https://piazza.com/usc/spring2017/ee364/home

TAs and Graders
There are 3 TAs to help you with EE364. Two TAs lead discussions and the third leads the weekly quiz at the beginning of each Tuesday lecture. You may approach any TA with questions pertaining to EE364.

TA: Roberto Martin Del Campo Vera
Office: EEB 303
Office hours: Tuesday 11:00 – 12:00 and
    Thursday 11:00 – 12:00
Email: mart737@usc.edu

TA: Filipe Vital
Office: EEB 322
Office hours: Tuesday 15:30 – 17:00
Email: fvital@usc.edu

TA: Diyi Hu
Office: EEB 234
Office hours: Friday 10:00 – 12:00
Email: diyihu@usc.edu

Grader:	TBD		Grader:	TBD
Office hours:	by appointment		Office hours:	by appointment
E-mail:			E-mail:	

Course materials

Online content (Blackboard):	http://blackboard.usc.edu
References (Required):	"Probability, Statistics, and Random Processes for Electrical Engineering", 3rd edition, Alberto Leon-Garcia, 2008, (ISBN: 0131471228).

Course Outline (tentative)

Week 1	09 Jan	Basic set theory, samples spaces, events
Week 2	16 Jan	Axioms of probability, combinatorics, binomial theorem
Week 3	23 Jan	Conditional probability, independence, Bayes' formula
Week 4	30 Jan	Discrete random variables, probability mass function
Week 5	06 Feb	Continuous random variables, probability and cumulative density functions
	09 Feb	**Midterm #1**
Week 6	13 Feb	Multiple random variables, conditionals, joints, and marginal
Week 7	20 Feb	Mean (expected value), variance, linear combinations of random variables
Week 8	27 Feb	Expectation, moments, covariance, correlation
Week 9	06 Mar	Functions of random variables, many-to-one transformations
	09 Mar	**Midterm #2**
		No class: Spring Break, University holiday
Week 10	20 Mar	Functions of random variables (continued)
Week 11	27 Mar	The normal (Gaussian) distribution, Gaussian approximation to binomial
Week 12	03 Apr	Probabilistic inequalities: Markov, Chebyshev, Jensen
Week 13	10 Apr	Random sampling, sample mean, sample variance, laws of large numbers
Week 14	17 Apr	Central limit theorem, confidence intervals
Week 15	24 Apr	Hypothesis testing, simple linear regression, least squares estimates

Final Exam
12:30 lecture
Wednesday, May 10, 14:00 – 16:00

14:00 lecture
Thursday, May 04, 14:00 – 16:00

Grading Procedure

Homework

Assigned weekly. This is an introductory course and the homework is meant to supplement topics that we might not cover fully in class. Staying current with the class requires practice to master the concepts. Experience has shown that students who put in the effort on these homeworks, struggle with problems, and ask questions when they did not understand a problem did the best in this course.

The total homework score sums your best homework scores (as a percentage) after removing the lowest two scores. Homeworks are due at the **beginning of lecture** on the posted due date. Late homework will be accepted with a **10% deduction per day for up to 2 days only if the solutions are not distributed**. Late homework can be submitted by placing it in the EE364 HW locker in the basement of EEB near room B24. Homework will not be accepted after solutions are distributed. Solutions are usually posted 2 days after the due date. If you cannot make it to a lecture you may turn your homework in early or ask a friend to turn it in for you.

Students may discuss homework problems among themselves but each student must do his or her own work. Cheating warrants an F in the course. Turning in identical homework sets counts as cheating.

Exams

Approximately 13 weekly quizzes. Closed book. 15 minutes per quiz at the start of each Tuesday lecture session. Each quiz will be a single problem based on the previous week's homework and lecture material. No make-up exams. Each exam is worth 10 points. Missed exams earn an automatic 0. The total weekly exam score sums your 10 best weekly exam scores. Class attendance is mandatory. Unexcused absences get an automatic exam score of zero for that session's exam grade.

Exams

All exams are cumulative. They are closed book with no additional note sheets allowed. You are expected to bring a non-graphing scientific calculator. You must show how you arrived at your answers to receive full credit. Any cheating may result in an "F" in the course and will be referred to Student Affairs for other penalties. Make up exams will only be given for valid medical or family emergency excuses (proof required).

Course Grade

HW	10% (lowest 2 thrown out)	A	if 90 – 100 points
Weekly Exams	25% (best 10 scores)	B	if 80 – 89 points
MT1	20%	C	if 70 – 79 points
MT2	20%	D	if 60 – 69 points
Final	25%	F	if 0 – 59 points

Attendance and Participation

Attendance is mandatory to all lectures and discussions. There are weekly exams and no make-ups. You are responsible for missed announcements or changes to the course schedule or assignments. Unexcused absences result in an automatic quiz score of zero.

Cheating

Not tolerated on homework or exams. Penalty ranges from F on exam to F in course to recommended expulsion.

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-andappropriate-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/contactus. 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/studentaffairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage http://sarc.usc.edu describes reporting options and other resources.

Academic Integrity
Academic integrity is critical the assessment and evaluation we perform which leads to your grade. In general, all work should be your own and any sources used should be cited. Gray-areas occur when working in groups. Telling someone how to do the problem or showing your solution is a VIOLATION. Reviewing examples from class or other sources to help a fellow classmate understand a principle is fine and encouraged. All students are expected to understand and abide by these principles. SCampus, the Student Guidebook, contains the University Student Conduct Code in Section 10, while the recommended sanctions are located in Appendix A. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty.

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.

Academic Accommodations
Any student requiring academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in GFS 120 and is open 08:30 – 17:00, Monday through Friday. The phone number for DSP is (213) 740-0776.