

UCSC Computer Engineering
CE 107: Probability and Statistics for Engineers
Summer 2016

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Text book: *Fundamentals of Probability with Stochastic Processes*, 3rd Edition, by Saeed Ghahramani, LCCN 2015036260, ISBN: 9781498755016, Taylor and Francis, 2016

Grade policy: 65% examinations, 35% quizzes; failing grade: below 50% in either component

Planned: 3 examinations (**no final**), frequent quizzes on class material, homework assignments (ungraded)

Projected course outline

- I. Introductory Notions
 - probabilistic phenomena, relationship to experiments, intuitive notions
 - event, random variable
 - statistics, inference from limited data and outcomes of repeated experiments
 - random experiment, sample space, sample points
 - probability measures, probability axioms
- II. Conditional Probability
 - motivation, law of total probability, independence of events
 - Bayes' theorem
 - application to reliability
- III. Random Variables & Transforms
 - distribution function, pmf, pdf (discrete/continuous random variables)
 - characterization, moments
 - jointly distributed random variables, covariance, independence
 - generation of pseudo-random variates for simulation experiments
 - sums of independent random variables, convolution
 - conditional moments
 - transform methods, moment generating function, generating function
 - sums of independent random variables
 - general inequalities and applications, bounds, application to design assessment
 - relative frequency and probability, law of large numbers, precision of measurements
- IV. Selected Probability Distributions & Applications, Statistics
 - discrete, continuous
 - negative exponential random variable
 - gaussian random variable, Central Limit Theorem, precision of repeated measurements
 - applications in statistics, performance evaluation and reliability
- V. Elements of Stochastic Processes
 - basic notions, examples
 - counting, Bernoulli, Poisson process
 - birth and death process, equilibrium, steady state
 - Markov chains, state classification, ergodicity, applications

The projected course outline is only an initial plan. The actual number, order and extent of subjects covered may vary depending on a number of factors including, but not limited to, class progress.

Cheating and dishonesty are not considered acceptable.