STAT 131: Introduction to Probability Theory

Tentative syllabus and reading list: Second summer session, 2020

The course text is

DeGroot MH, Schervish MJ (2011). *Probability and Statistics*, fourth edition. London: Pearson; abbreviated **DS** below.

Lecture Number	Date	Topic	Pages in **DS**
1	27 Jul	Introduction; set theory	1–27
2	29 Jul	Probability axioms; combinatorial analysis	28–54
3	31 Jul	Conditional probability; discrete random variables	55–99
4	3 Aug	Continuous random variables; joint, marginal and conditional distributions	100–166
5	5 Aug	Functions of one or more random variables	167–187, 202–206
6	7 Aug	Expectation; mean, variance, median; covariance, correlation	207–255
7	10 Aug	Conditional expectation; utility	256–274
8	12 Aug	Discrete distributions: Bernoulli, Binomial, Hypergeometric, Poisson, Negative Binomial, Multinomial	275–301, 333–336
9	14 Aug	Continuous distributions: Normal, Gamma, Beta, Bivariate Normal, Multivariate Normal, t, Dirichlet; exponential family	302–332
10	17 Aug	Convergence in probability; Law of Large Numbers	347–359
11	19 Aug	Central Limit Theorem; continuity correction	360–375
12	21 Aug	Stochastic processes; Markov chains	188–195
13	24 Aug	Stationary distribution of a Markov chain	196–201
14	26 Aug	Frequentist inferential statistics	417–463
15	28 Aug	Bayesian inferential and predictive statistics	376–416

All assignments will be open-book, open-notes and take-home (i.e., there will be no in-class tests); you'll turn in all of your assignments by upload of PDF files at `canvas.ucsc.edu` .

Quizzes will be assigned every Tuesday and Thursday throughout the five weeks of the class (so there will be 9 or 10 of them in total). Tuesday quizzes will typically be due 3 days later, on Fridays of the week in which they're assigned; Thursday quizzes will typically be due the Monday of the week after they're assigned. There will be 3 take-home tests, spaced out across the five weeks.