BIOSTATISTICS 660/672 (FALL 2015)
Probability and Statistical Inference I

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Lectures: Tuesday and Thursday, 12:30 PM to 1:45 PM, Rosenau 228
Mon 11:00 AM to 11:50 AM (BIOS 672 ONLY), McGavran-Greenberg Hall 2302
Please be aware of the UNC policy that food and drink of any kind are prohibited in all General Purpose Classrooms.

Assessment:
1) MIDTERM EXAM 1 help on TBA (worth 20% of final grade);
2) MIDTERM EXAM 2 held on TBA (worth 20% of final grade);
3) FINAL EXAM (worth 35% of final grade);
   UNC assigned time for final exam is TBA
   You are allowed to bring a 1-page cheat-sheet to Midterm 1, a 2-page cheat-sheet to Midterm 1, and a 3-page cheat-sheet to Midterm 3. You can also bring the table with probability distributions.
4) HOMEWORK (worth 25% of final grade); the homework assignments are due by 12:30 PM. You are permitted to work together on homework assignments, but all work submitted must be your own. Copying or simply dividing up assignments among collaborating students is not allowed. Questions concerning the homework assignments can be addressed to the course instructor or the course assistant. Questions concerning grading of homeworks should be addressed to the course assistant.

Course assistants: TBA The course assistants will be grading the homework assignments
Primary text: A first course in probability by Sheldon Ross, 8th edition.
Lecture notes: https://sakai.unc.edu/
Other useful texts: Statistical Inference by Casella and Berger (Ch 1-5)
Course prerequisite: A working knowledge of multivariate calculus (e.g., MATH 33 at UNC)
Course evaluations: All students are expected to complete course evaluations during the two week time window at the end of the course as listed on the UNC Academic Calendar.
Lecture Content for BIOS 660 ⊕ BIOS 672
L 2. Combinations and permutations. Set theory.
L 4. The multiplication rule. Bayes' Theorem. Case-control design example.
L 5. Independence.
L 7. Bernoulli, Binomial, Poisson.
L 9. Derivation of the Poisson distribution.

L 13. Hazard rate, Gamma, Weibull, Cauchy, Beta.

L 20. Midterm 2

L 24. Conditional expectation and prediction.
L 25. Moment generating functions.
L 27. Sampling from populations. Infinite and finite populations.
L 29. Review.
Final exam.

Additional topics for BIOS 672 ONLY
1. Definition of Big O and little o, uniform boundedness, convergence of sequences
2. Series - power series, infinite series, types of convergence, sums of infinite and finite series, Taylor's series, expressions of certain functions as infinite series
3. Functions - limits, l'Hopital's rule, continuity, step functions, differentiable functions
4. Integration - Riemann, Stieltjes, Lebesgue integration, integrable functions
5. Operations - interchanging order of differentiation and integration, interchanging order of summation and integration, integration by parts, Fubini's theorem, dominated convergence theorem, monotone convergence theorem, bounded convergence theorem
6. Complex variables, Laplace transforms, Fourier transforms, inversion formulas