

BIOS 660/BIOS 672 (3-credits) - Probability and Statistical Inference I Fall 2018

Lecture Time/Location:

Tuesday and Thursday, 12:30 PM to 1:45 PM, McGavran-Greenberg (McG) room 2301

Instructor:

Jianwen Cai, Ph.D

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Office Hours: Thursday 4:30-5:30pm

Course Assistants:

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Office Hours (in McG-2303):

Monday 12:30-1:30pm

Tuesday 3:00-4:00pm

Wednesday 9:30-10:30am

Friday 3:00-4:00pm

Prerequisites

A working knowledge of multivariate calculus (e.g., MATH 33 at UNC)

Textbooks:

Casella and Berger, *Statistical Inference*, chapters 1-5

A. Gut, *An Intermediate Course in Probability* (optional)

Lecture Notes:

Copies of the slides used in lectures will be made available on the Sakai web site prior to class.

<https://sakai.unc.edu/portal/site/bios660-bios672-3-credits>

Other useful texts:

Any reasonable complete calculus book

A first course in probability, S. Ross

Mathematical Analysis, T. Apostol

Grading:

20% homework, 40% two midterms (20% each), 40% final exam

Homework:

Homework assignments are due at the beginning of class. You are allowed and even encouraged to discuss with peers, but write your own work. 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. Students may request regrades for homeworks, see *Regrade Policy* below.

Late Homework Policy:

Homework will be due at the beginning of class. Points will be deducted if homework is turned in late according to the following schedule:

If homework is turned in late but on the same day of the due date, 10% of total possible points will be deducted.

If homework is turned in the next day after the due date, 20% of total possible points will be deducted.

If homework is turned in two calendar days after the due date, 30% of total possible points will be deducted.

In general, homework will not be accepted three calendar days or later after the due date.

Midterms and Final:

Midterms: Given in class on (Tentatively) Tue Sep 25 and Tue Oct 30. Closed book, **one one-sided** summary sheet **written by hand** in **blue** ink allowed for the first Midterm, **two one-sided** summary sheet **written by hand** allowed for the second Midterm. Students may request regrades for midterms, see *Regrade Policy* below.

Final exam: Given on registrar's exam date (Fri Dec 7, 12pm-3:30pm). Closed book, **three one-sided** summary sheets **written by hand** allowed.

Tentative List of Topics:

1. Elementary set theory
2. Counting and combinatorial analysis
3. Axiomatic probability
4. Conditional probability and independence
5. Random variables
6. Transformations, moments, generating functions
7. Specific discrete and continuous distributions
8. Exponential families
9. Multiple random variables, conditional distributions, and independent random variables
10. Multivariate transformations and sums of random variables
11. Conditional expectation, covariance and correlation
12. Multivariate distributions, independence, MGFs
13. Inequalities
14. Random samples and order statistics
15. Convergence, Laws of Large Numbers, Limit Theorems

Regrade Policy:

Students that perceive that a problem on any assignment has been incorrectly graded must submit for a full regrade of the entire assignment per the regrade procedure (note: Mistakes in adding up points do not require full regrade).

Regrade Procedure:

- Entire assignment must be submitted for regrade by the second class after the assignment has been returned (e.g. if assignment is returned on Tuesday, regrade request must be made by the following Tuesday).
- Students must write a full paragraph clearly detailing why they believe their solution is correct/deserves additional credit.
- Regrades will be conducted with regard to the entire assignment, i.e. all problems will be reconsidered.
- Regrades may result in higher, unchanged, **OR lower** scores (grading errors can occur in both directions).
- Regraded scores are final.

The Honor System

The University of North Carolina at Chapel Hill has had a student-administered honor system and judicial system for over 100 years. The system is the responsibility of students and is regulated and governed by them, but faculty share the responsibility. If you have questions about your responsibility under the honor code, please bring them to your instructor or consult with the office of the Dean of Students or the Instrument of Student Judicial Governance. This document, adopted by the Chancellor, the Faculty Council, and the Student Congress, contains all policies and procedures pertaining to the student honor system. Your full participation and observance of the honor code is expected.

Four general responsibilities under the Code. The Instrument of Student Judicial Governance, which contains the provisions of the Honor Code, states that students have four general responsibilities under the Code:

1. Obey and support the enforcement of the Honor Code;
2. Refrain from lying, cheating, or stealing;
3. Conduct themselves so as not to impair significantly the welfare or the educational opportunities of others in the University community; and
4. Refrain from conduct that impairs or may impair the capacity of University and associated personnel to perform their duties, manage resources, protect the safety and welfare of members of the University community, and maintain the integrity of the University.

Plagiarism. Plagiarism in the form of deliberate or reckless representation of another's words, thoughts, or ideas as one's own without attribution in connection with submission of academic work, whether graded or otherwise.

Authorized vs. Unauthorized Collaboration. All academic work in this course, including homework, quizzes, and exams, is to be your own work. It is your responsibility if you have any doubt to confirm whether or not collaboration is permitted.

Unauthorized devices and materials. Electronic devices including calculators are NOT allowed during exams. Internet use is NOT allowed in the classroom.

Consequences. Under the Instrument of Student Judicial Governance, the usual sanction for a first time academic offense is suspension for one academic semester and a failing grade.

Additional Information. Additional information is available from the Office of the Dean of Students, or the Honor System <http://honor.unc.edu>.