

Syllabus: Probability and Statistics

Fall 2026

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Course Description

This course provides an introduction to probability theory and statistical inference for second-year undergraduate students. The course develops the basic probability and statistical tools that are useful for further study in statistics, econometrics, data science, and related quantitative fields.

The first part of the course introduces the foundations of probability theory, random variables, expectations, common probability distributions, multiple random variables, and properties of random samples. The second part introduces the fundamental ideas of statistical inference, including point estimation, hypothesis testing, confidence intervals, asymptotic approximations, and regression models.

At the end of the course, students should have a fundamental understanding of probability and statistical inference, be able to work with commonly used probability distributions, and understand the basic principles underlying estimation, hypothesis testing, confidence intervals, and regression analysis.

Prerequisites: Calculus and basic Linear Algebra.

Textbook:

Statistical Inference, 2nd Edition by George Casella and Roger L. Berger.

Other References:

Additional lecture notes and supplementary materials will be provided when necessary.

Grade: The course grade will be based on the following distribution:

6% Attendance (Check during the break or random check during the lecture.)
24% Homework (No late homework will be accepted.)
30% Midterm Exam (No make-up exams.)
40% Final Exam (No make-up exams.)

Tentative Course Schedule

Week	Lecture Topics	Chapters
1	Probability Theory I:	Chapter 1
2	Probability Theory II:	Chapter 1
3	Transformations and Expectations:	Chapter 2
4	Common Families of Distributions I:	Chapter 3
5	Common Families of Distributions II:	Chapter 3
6	Multiple Random Variables:	Chapter 4
7	Properties of a Random Sample:	Chapter 5
8	Point Estimation I:	Chapter 7
9	Point Estimation II:	Chapter 7
10	Hypothesis Testing I:	Chapter 8
11	Hypothesis Testing II:	Chapter 8
12	Interval Estimation:	Chapter 9
13	Asymptotic Evaluations:	Chapter 10
14	Regression Models:	Section 11.3 & Chapter 12
Exam Week	Final	

Reading Material The following materials are assigned as supplementary reading and will not be covered in lecture:

- Chapter 6: Principles of Data Reduction.
- Section 11.2: One-Way Analysis of Variance.