DS 501: Statistical Inference for Data Science
Fall 2025

Class Information

Time: TR 10:30am –11:45am
Classroom: Room 1501, E2-2

Instructor Information

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TA Information

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Course Description

This course provides an introduction to the foundational concepts of statistical inference that are essential for data science research. Students will explore probability theory, distributions of random variables (both univariate and multivariate), sampling distributions, and methods of statistical inference including estimation, hypothesis testing. The course also covers practical inference procedures involving one and two samples, analysis of variance (ANOVA), regression. Emphasis will be placed on both theoretical understanding and the development of skills necessary to analyze and interpret data in real-world contexts.

This is a fact-paced, demanding course. Please be ready to spend more time on this course than usual. Lecture slides will be uploaded to the KLMS page. The lecture slides will be continuously updated, so please download the latest version.

Topics

- Probability distributions.
- Probability distributions of multivariate random variables.
- Various probability distributions.
- Sampling distributions and approximations.
- Point estimation.
- Hypothesis testing.
- ANOVA and regression.

Prerequisites

Students should have a basic working knowledge of mathematical skills.

Textbook

There is no required textbook for this course, but a lot of materials are based off textbooks "Modern Mathematical Statistics with Applications, 3rd edition" by Devore, Berk, & Carlton, "Probability and Statistics, The Science of Uncertainty, 2nd edition" by Evans and Rosenthal, and "Mathematical Statistics, 2nd edition" by Woo Chul Kim.

Grading

The course grade is determined by the following components:

Attendance	5 %
Quizzes (2 planned)	25%
Midterm exam	35%
Final exam	35%

- Some problem sets will be provided for study purposes and will not be graded.
- All quizzes and exams will be administered during class time.
- Attendance will be checked on a sporadic basis.

Anything in this syllabus is subject to change at the discretion of the instructor.