

STAT 9710: Intro to Linear Stat Mod

2022 Fall

Course Overview. This is an advanced graduate course on mathematical statistics. Despite its name, this course is NOT about linear models. This is a mandatory course for first-year PhD students from the Statistics Department. It is also suitable for graduate students from AMCS, CIS, Math, and Biostatistics programs who are interested in the theory of statistics. Students are assumed to have taken undergraduate-level courses in calculus, linear algebra, probability, and statistics.

Lectures. Tuesday/Thursday 1:45pm–3:15pm (Location: 105 SHDH)

Instructor. Anderson Ye Zhang (ayz@wharton.upenn.edu)
Office Hours: TBD

Teaching Assistant. Anirban Chatterjee
Office Hours: TBD

Course Website. <https://canvas.upenn.edu/courses/1678373>. Please check the Canvas site for announcements, assignments, solutions, lecture notes, and other course materials.

Topics in This Course:

1. Basics
 - Stochastic convergence
 - Delta method
 - Concentration inequalities
2. Empirical Process
 - Uniform laws of large numbers: Rademacher complexity, VC dimension, symmetrization
 - Metric entropy: chaining, Dudley's integral entropy bound
3. Asymptotics / Large-sample Theory
 - U-Statistics: projection
 - M-estimators: consistency, asymptotic normality, quadratic mean differentiability
 - Contiguity
 - Tests: asymptotic relative efficiency, local asymptotic normality
4. Other topics (TBD)

Textbook.

Asymptotic Statistics, A.W. van der Vaart. Cambridge University Press, 1998.

High-dimensional statistics: A non-asymptotic viewpoint, Martin J. Wainwright. Cambridge University Press, 2019.

Course Grading Policy: There will be some problem sets.