Syllabus of STAT210B
(Theoretical Statistics)

Instructor: Song Mei (songmei@berkeley.edu)
Lectures: T/Th 11:00 - 12:30. Location: Evans 334.
GSI: Kaihao Jing (khjing@berkeley.edu)

Important websites
Course website (for general logistics): berkeley-stat210b.github.io/spring-2025/
bCourses (for course materials): https://bcourses.berkeley.edu/courses/1542128/.
Ed (for questions): https://edstem.org/us/courses/73735/discussion
Gradescope (for submitting homeworks): https://www.gradescope.com/courses/953916.
Entry code: WW73Y5.

Course introduction
This is an advanced graduate course on mathematical statistics, following up on the introductory course STAT 210A. Topics to be covered include tail bounds and basic aspects of concentration of measure, uniform laws of large numbers, metric entropy and chaining arguments, Gaussian comparison inequalities, covariance estimation, non-asymptotic random matrix theory, sparse high-dimensional models, structured forms of principal component analysis, non-parametric regression, and minimax lower bounds.

Textbooks
High-Dimensional Statistics: a Non-Asymptotic Viewpoint, by Martin Wainwright.

Other references
High-Dimensional Probability, by Roman Vershynin.
Probability in High Dimension, by Ramon van Handel.

Prerequisite
All students should have taken STAT 210A or an equivalent course in basic mathematical statistics, and must have a strong background in probability and real analysis. This course requires some degree of mathematical maturity.

Homework/Grading
- Class attendance is required.
- There will be 5-6 homework. Late submissions will get a deduction of 15 % per late day.

- In class mid-term. Date TBA.
- Final exam. Date Location TBA.
- Final grade will be Homework × 35 % + mid-term × 25 % + final × 40 %.

Code of conduct; attribution of work

The high academic standard at the University of California, Berkeley, is reflected in each degree awarded. Every student is expected to maintain this high standard by ensuring that all academic work reflects unique ideas or properly attributes the ideas to the original sources.

These are some basic expectations of students with regards to academic integrity: Any work submitted should be your own individual thoughts, and should not have been submitted for credit in another course unless you have prior written permission to re-use it in this course from this instructor.

All assignments must use "proper attribution," meaning that you have identified the original source and extent or words or ideas that you reproduce or use in your assignment. This includes drafts and homework assignments! If you are unclear about expectations, ask your instructor.

Do not collaborate or work with other students on assignments or projects unless the instructor gives you permission or instruction to do so.

Disability accommodations

If you need an accommodation for a disability, if you have information your wish to share with the instructor about a medical emergency, or if you need special arrangements if the building needs to be evacuated, please inform the instructor as soon as possible.

If you are not currently listed with DSP (the Disabled Students' Program) and believe you might benefit from their support, please apply online at https://dsp.berkeley.edu/.