Statistics 515 Advanced Statistical Inference I
Fall 2021

Instructor: Wei Wang
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Class hours: Monday and Wednesday, 10:15 am - 11:45 am (EST).

Office hours: by appointment.

Course description: This is a theoretical course on statistical inference. Examples and R programming will be used to explain the theory. Topics include random variables, distributions, moments, exponential families, multiple random variables, sufficiency, central limit theorem, point estimation, hypothesis testing, and confidence intervals. If time permits, the EM algorithm, simulations and bootstrap will also be covered.

Text: *Statistical Inference*, 2nd Edition, G. Casella and R. L. Berger.

References:
Probability and Measure, P. Billingsley.
A First Course in Probability, S. Ross.
Introduction to Mathematical Statistics, R. V. Hogg, J. W. McKean and A. T. Craig.
Mathematical Statistics and Data Analysis, J. A. Rice.
Mathematical Statistics, Basic Ideas and Selected Topics, Volume 1, 2nd edition, P. J. Bickel and K. A. Doksum

Course Prerequisites: STAT 430, MATH 114, and MATH 115.
Calculus (limit, supremum, infimum, continuity, differentiation, integration, Taylor expansion), linear algebra (vector, matrix), point set theory (union, intersection, complement), undergraduate level probability and statistics (histogram, boxplot, scatterplot, t-test, etc.).

Homework: There will be biweekly homework assignment. Without a convincing reason, late homework will not be given full credit (20 points off every 24 hours). If you are not sure about your situation, ask the instructor in advance. No last minute notice unless it's an urgency.

Exam: There will be a take home final.

Grading: The final grade will be based 60% on homework, and 40% on the exam. You can study together for your homework, but no plagiarism. Independent work is expected for the final exam. No discussion or communication with other people. Otherwise, it will be considered cheating.

Software: We will use the free statistical computing software R (http://www.r-project.org/) frequently in class. You will apply what you learned in class to solve the homework and final exam problems.