

FALL 2020 - STAT 513: Theory of Statistical Inference

10:05 am - 11:20 am, TR, Close-Hipp Building 335
Aug 20, 2020 - Dec 14, 2020

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Office hours: See [course website](#).

Bulletin description

(Prereq: STAT 512 with a grade of C or higher) Hypothesis testing, Neyman-Pearson lemma, likelihood ratio tests, power, theory of linear models including multiple linear regression and ANOVA, Bayesian inferences, advanced topics including survival analysis.

Purpose of the course

To provide a strong foundation in the mathematical development of statistical inference methodology.

Learning outcomes

By the end of the semester, students should be able to do the following:

- Formulate testable hypotheses, construct statistical tests, and compute power and Type I error rates of tests.
- Construct estimators using the maximum likelihood principle and construct likelihood ratio tests.
- Conduct inference for simple and multiple linear regression models, including ANOVA models.
- Implement some simple Bayesian methods of estimation and inference.
- Understand the rudiments of survival analysis.

Recommended textbook

Mathematical Statistics with Applications, 7th edition (2008), by Wackerly, D., Mendenhall, W., and Schaeffer, R.

Comprehensive course notes which I expect you to read and study can be found at the [course website](#).

Grading

The graded components of the course are the following:

Homework (10%) There will be 9 homework assignments. Homework will be submitted on Blackboard. In addition,

- At least one homework assignment must be typed using L^AT_EX.
- At least one homework assignment must be typed in R Markdown.

If this is done, then the two lowest homework scores will be disregarded in the calculation of the final grade. If this is not done, no homework scores will be disregarded.

Exam I (30%): Thursday, September 24th, take-home.

Exam II (30%): Thursday, November 5th, take-home.

Final exam (30%): Thursday, December 10th, take-home. More details to come. Official date/time is Dec. 10, Thursday, 9:00 a.m.

If the final exam score is higher than the lower of the two in-semester exam scores, the final exam score will replace that in-semester exam score in the calculation of the course grade.

All assignments and exams are to be *uploaded as single pdf documents*. One way you can do this is by using a smartphone app to take pictures of your hand-written work and to merge them into a pdf (there are various cost-free apps that do this). Or you can use a scanner if you have access to one.

The thresholds 90%, 87%, 80%, 77%, 70%, 67%, and 60% will be used to determine the assignment of the letter grades A, B+, B, C+, C, D+, and D, respectively. The grade of F will be assigned to those earning less than 60%.

To find important dates about withdrawal from the course etc., go to [this link](#).

Honor code

See the Carolinian Creed in the Carolina Community: Student Handbook Policy Guide. Violations of the USC Honor Code may result in a 0 for the work in question, and, in accordance with University policy, other punishments up to and including expulsion from the University.

Accommodations

If you require special accommodations, they must be arranged in advance through the Office of Student Disability Services Close-Hipp, Suite 102. (803-777-6142, SADRC@mailbox.sc.edu).

Covid-19 related

See up-to-date university policies [here](#).