STA 4322: Introduction to Statistics Theory

Fall 2024

Instructor

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Office Hours: 9:30-10:30 am MW
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Class information
Classroom: AND 134
Class Hours: 8:30 am - 9:20 am MWF

Teaching Assistant

Zhuochao Huang
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Office Hours: 2:00-5:00 pm Friday

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Sections: All

Course description

The sequence of courses STA 4321/4322 (rep. 5325/5328) provides a formal and systematic introduction to mathematical statistics for students who have passed three semesters of standard undergraduate level calculus. The primary purpose of STA 4322/5328 is preparation for graduate-level study in statistics and closely related subjects. Major topics of STA 4322/5328 include normal-theory sampling distributions; estimation methods; properties of point estimators; confidence intervals; hypothesis testing and related theory; and basic linear regression.

Prerequisites

STA 4321/5325. A well prepared student should have taken an introductory statistics course, such as STA 2023 or STA 3032.

Course Webpage

Course materials (e.g., homework assignments and due dates) will be posted the course's eLearning site (Canvas), where grades will also be posted. Please check this site regularly for updates and announcements. Course documents and important information, including homework exercises, homework solutions, sample exams, and special announcements, will be posted there.

Textbook

Wackerly, Mendenhall, and Scheaffer, Mathematical Statistics with Applications (7th ed), Duxbury Press (Thomson Brooks/Cole Publishing), 2008.

Exams will be based on material presented in lectures, which will approximately cover Chapters 7–11 of the textbook.

Grades

The grades will be determined according to the following scale:

Grade	Range
A	92-100
A-	89-91
B+	86-88
B	83-85
B-	80-82
C+	77-79
C	67-76
D	50-66
E	0-49

In total, there will be three exams, three quizzes, and four homework assignments. The class will be weighted as follows:

Item	Weight
Homework (highest 3)	30 %
Quizzes (highest 2)	10 %
Exam 1	20 %
Exam 2	20 %
Exam 3	20 %

Attendance and Make-Ups

Attendance is expected and will be essential for performing well in the class. There is however, no attendance grade.

See university attendance policies:

https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Late homework will be graded with a 15% deduction per day late. More than 3 days late will receive a 0.

UF Grading Policies

https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Recordings

This class is 100% in-person, there will be no recordings of the lectures.

Weekly Schedule

Here is a **tentative** weekly schedule for the class (subject to change):

Week 1

- Parameters
- No class Mon/Wed

Week 2

- Estimators
  - Point and Interval
- Maximum Likelihood
- Method of Moments

Week 3

- Bias and MSE
- Variance of an estimator
- Quiz 1 Wednesday, Sept 4
- No class Mon

Week 4

- Intuitive estimators (for the mean, variance, difference in two population means)
- Statistics from a normal random sample
  - Chi-Squared and t distributions
- Sampling Distributions

Week 5

- Quantiles
- Confidence Intervals
- Exam 1 Friday, Sept 20

Week 6

- Pivots
- Confidence Limits

Week 7

- Central limit theorem
- Likelihood functions
- MLE asymptotics

Week 8

- WLLN and Consistency
- Sufficiency
- Quiz 2 Wednesday, October 9

Week 9

- Rao-Blackwell and MVUE
- No class Fri

Week 10

- Statistical tests
- Type two error probability control
- Inverting tests

Week 11

- p-values
- Exam 2 Friday, Nov 1

Week 12

- UMP Tests and the NP Lemma
- LRT

Week 13

- Testing simulations
- Random Vectors
- No class Mon

Week 14

- Linear Models
- Distribution of regression coefficients
- Quiz 3 Wednesday, Nov 20

Week 15

- No class this week

Week 16

- Review
- Exam 3 Wednesday, Dec 4
- Friday off

If this document is updated, an announcement will be made in class, and the new version will be uploaded to the course website in canvas.