STA 4322/5328
Introduction to Statistical Theory/ Fundamentals of Statistical Theory
Fall 2025
Course Information and Policies

Objectives: 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. 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. The primary purpose of STA 4322/5328 is preparation for graduate-level study in statistics and closely related subjects.

Prerequisite: STA 4321/5325

Course Website: All course documents and important information, including suggested homework exercises and readings, will be posted in E-Learning.

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Lecture: Monday, Wednesday and Friday, Period 4 (10:40 am – 11:30 am), Anderson Hall, Room 101

Instructor Office Hours: Monday, Wednesday and Friday, 11:40 am – 12:40 pm

TA: Rhitankar Bandyopadhyay, Email - r.bandyopadhyay@ufl.edu, Office Hours - Tuesday, 2:30 pm - 3:30 pm, Thursday, 3:30 pm - 4:30 pm

Required textbook: Denni D. Wackerley, William Mendenhall III, &
Richard L. Scheaffer, Mathematical Statistics with Applications, 7th Edition, Brooks/Cole, Cengage Learning.

Homework: Appropriate textbook readings and suggested textbook exercises will be posted as the course progresses. You are not expected to submit your answers to the suggested exercises, but you should solve all of them to thoroughly learn the material and best prepare yourself for exams. Though you are allowed to work with other students to solve the suggested exercises and to learn course material in general, please keep in mind that you will be assessed individually. Answers to selected exercises can be found near the end of the textbook, and more complete solutions can be found in the *optional* Student Solutions Manual. Naturally, you will learn best if you attempt to solve the exercises before consulting the solutions.

Quizzes: There will be approximately nine in-class quizzes, typically scheduled for Tuesdays. Each will take place during the final 5 to 10 minutes of class time. No books, notes or other references may be used during a quiz. All quizzes have equal weight for grading, but three of your quiz scores will be dropped – whichever three give you the highest final score in the course, as determined by the instructor. No make-up quizzes will be offered.

Exams: Four within-term exams are tentatively scheduled:

September 17 – Exam 1	October 15 – Exam 2
November 12 – Exam 3	December 3 – Exam 4

Exams will take place in class for the entire class period. Policies and coverage details will be announced prior to the date of each exam. All within-term exams have equal weight for grading, but one of your first three within-term exam scores will be dropped – whichever one gives you the highest final score in the course, as determined by the instructor. The fourth within-term exam on December 3 is compulsory (the exam is not cumulative).

Course Grade: Grading will be based on a composite score: 20% quizzes, 80% within-term exams.

Final letter grades will be assigned on the University's newly-instituted grading scale that includes minus-grades. Please familiarize yourself with the new policy related to this scale and the resulting changes in the grade point equivalences of letter grades. Details may be found on the following web page.

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

A grade of incomplete (I) is assigned only in rare cases, such as if you are absent with extenuating circumstances from the final exam. Extenuating circumstances require specific, official documentation (eg. a signed excuse note from the Student Health Care Center). You are eligible for a grade of Incomplete only if you have completed a significant amount of the graded course work and you are currently passing based on that work, as determined by the instructor. If you find that you cannot continue the semester before this point is reached, you should instead seek an administrative withdrawal. As part of receiving a grade on Incomplete, University policy requires you to sign a contract with the instructor that specifies a plan and deadline for completing the course.

Lecture Attendance: Classroom lecture attendance is fully expected, even if not strictly enforced. You are responsible for learning all material presented during lecture, and any topic covered in lecture is a potential exam topic (unless otherwise stated).

Academic Integrity: Please familiarize yourself with the Student Honor Code and Academic Honesty Guidelines outlined in your University of Florida *Student Guide* and at http://www.dso.ufl.edu/studentguide/studentrights.php.

Reasonable Accommodations: To request classroom accommodation, please be certain that you have made all necessary arrangements with the Dean of Students Office, and obtain from them documentation to submit to the instructor at the time of your request. A request must be made to the instructor *at least one week in advance* of the date for which the accommodation is requested.

Daily lecture plan:

Friday, August 22 - Discussion of course policies and Motivation

Monday, August 25 - Statistical estimators, bias, mean squared error, confidence intervals (Suggested Reading Section 8.1)

Wednesday, August 27 - Examples to understand MSE (Suggested Reading Section 8.2)

Friday, August 29 - Unbiased estimators for some standard problems (Suggested Reading Section 8.3)

Wednesday, September 3 - Unbiased estimators for some standard problems, continued (Suggested Reading Section 8.3)

Friday, September 5 - Random sample from normal population, Chi-square distribution, t-distribution (Suggested Reading Section 7.2)

Monday, September 8 - Another criterion for evaluating quality of estimators (Suggested Reading Section 7.2)

Wednesday, September 10 - Confidence intervals (Suggested Reading Section 8.5)

Friday, September 12 - Confidence intervals in normal population, upper confidence limit, lower confidence limit (Suggested Reading Section 8.5)

Monday, September 15 - Confidence intervals - examples (Suggested Reading Section 8.5)

Friday, September 19 - Central limit theorem and large sample confidence intervals (Suggested Reading Section 8.6)

Monday, September 22 - Estimation in the two population setting with known and unknown variance (Suggested Reading Section 8.8)

Wednesday, September 24 - Relative efficiency (Suggested Reading Section 9.2)

Friday, September 26 - Consistency of a statistical estimator (Suggested Reading Section 9.3)

Monday, September 29 - Sufficiency (Suggested Reading Section 9.4)

Wednesday, October 1 - Likelihood and alternative definition of sufficiency (Suggested Reading Section 9.4)

Friday, October 3 - Rao-Blackwell theorem and MVUE estimators (Suggested Reading Section 9.5)

Monday, October 6 - Method of moments (Suggested Reading Section Section 9.6)

Wednesday, October 8 - Method of maximum likelihood (Suggested Reading Section 9.7)

Friday, October 10 - Method of maximum likelihood, continued (Suggested Reading Section 9.7)

Monday, October 13 - Statistical test, Test statistic, Rejection region (Suggested Reading Section 10.1)

Monday, October 20 - Level of a test, large sample approximations (Suggested Reading Section 10.2)

Wednesday, October 22 - Some large sample tests (Suggested Reading Section 10.3)

Friday, October 24 - Calculating Type II error probabilities (Suggested Reading Section 10.4)

Monday, October 27 - Relation between testing and confidence intervals (Suggested Reading Section 10.5)

Wednesday, October 29 - Small-sample tests for the mean and difference of means (Suggested Reading Section 10.8)

Friday, October 31 - p-values (Suggested Reading Section 10.6)

Monday, November 3 - Simple and composite hypothesis, Neyman-Pearson lemma (Suggested Reading Section 10.10)

Wednesday, November 5 - Uniformly most powerful tests (Suggested Reading Section 10.11)

Friday, November 7 - Likelihood ratio tests (Suggested Reading Section 10.12)

Monday, November 10 - Linear model and the method of least squares (Suggested Reading Section 6.4)

Friday, November 14 - Conditional expectations (Suggested Reading Section 11.3)

Monday, November 17 - Properties of least squares estimators (Suggested Reading Section 11.4)

Wednesday, November 19 - Properties of least squares estimators, continued (Suggested Reading Section 11.4)

Friday, November 21 - Confidence intervals for regression coefficients (Suggested Reading Section 11.6)

Monday, December 1 - Multivariate linear models (Suggested Reading Section 11.10)

This course information and policies sheet can be made available in alternative formats to accommodate print-related disabilities. Contact the instructor for more information.